An Examination of Student Perceptions

Of lynda.com Software

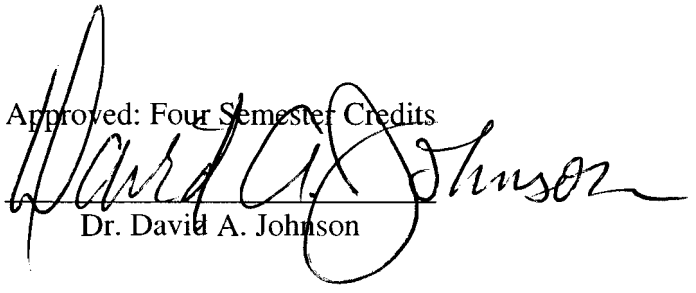
Tutorial Training

by

Bruce J. Dybvik

A Research Paper
Submitted in Partial Fulfillment of the
Requirements for the
Master of Science Degree
in

Training and Development



Approved: Four Semester Credits

Dr. David A. Johnson

The Graduate School

University of Wisconsin-Stout

August, 2008

The Graduate School
University of Wisconsin-Stout
Menomonie, WI

Author: **Dybvik, Bruce J.**

Title: ***An Examination of Student Perceptions of lynda.com Software Tutorial Training***

Graduate Degree/ Major: MS Training and Development

Research Adviser: **David A. Johnson, Ph.D.**

Month/Year: **August, 2008**

Number of Pages: **54**

Style Manual Used: **American Psychological Association, 5th edition**

ABSTRACT

In 2005 the Art and Design Department at the University of Wisconsin-Stout first adopted the use of lynda.com software tutorial training to supplement classroom instruction. In 2006 the license with the lynda.com company was extended and expanded. to include over 100 software titles for the whole of the UW-Stout campus This ambitious training program was adopted without the benefit of a formal training needs analysis, and without subsequent formal training evaluation. The purpose of this study was to apply a formal training evaluation method to begin the process of measuring the effectiveness of this type of computer-based training at UW-Stout. The evaluation method chosen for this study was Donald Kirkpatrick's four levels of training evaluation: reaction, learning, behavior, and results. Specifically, this study confined itself to level one, an evaluation of student reaction to lynda.com training as a supplement to the course curricula.

Based upon the results of the study, students affirmed that in terms of five training process inputs: people, equipment, materials, methods, environment (PEMME) the lynda.com training was a positive addition to their classroom instruction.

The Graduate School

University of Wisconsin Stout

Menomonie, WI

Acknowledgments

I gratefully acknowledge and thank the faculty and students in the Art and Design Department at UW-Stout for their cooperation in the training evaluation effort. Special thanks to Dr. David A. Johnson, my advisor and instructor, for his teaching, training, and his perseverance in the fulfillment of this research paper. Most importantly, I want to express my deepest appreciation to my wife Ann, without whose encouragement, inspiration, sacrifice, and support none of this undertaking would have been possible.

List of Figures

TABLE OF CONTENTS

Chapter I: Introduction

In 2005, a faculty member of the Art and Design Department at the University of Wisconsin-Stout (UW-Stout) supplemented a classroom course with DVD-based software tutorials. This was in response to the perception that many students lacked adequate software skills necessary to learn the course curriculum content. Rather than spend class time training on software tools, the teacher requested the students pay the user fee for software tutorial DVDs from a company, lynda.com. The students could now develop the necessary skills for the course on their own, and leave classroom time for other content. This experience led to a one year Student Technology grant for multiple software titles through the lynda.com Managed Multi-User System. Following this year-long contract, another contract was approved for an additional three years starting in August 2007, and expanded the 72 titles to include an additional 25 software tutorials.

Given this now campus-wide software training availability, university departments other than Art and Design have adopted some lynda.com training to supplement their classes. However, there appears that little has been done to formally evaluate the training since its inception. At this writing, no data exist which measures the various aspects of training, including the training's overall effectiveness. UW-Stout does have the ability to track the number of views on the university server and has reports of random verbal feedback, but no other data is available regarding the training suitability, effectiveness or other related qualities of lynda.com.

The remainder of this chapter will include a statement of the problem, the purpose of the study, assumptions, definitions, limitations, and methodology.

Statement of the Problem

UW-Stout made a commitment to apply lynda.com software to meet a perceived software training need. This training solution was adopted without the benefit of a formal front-end analysis, and little evaluation data has been acquired since the training program inception. Without formal evaluation, the training effectiveness of lynda.com cannot be accurately determined.

Purpose of the Study

The purpose of this study is to formally measure and evaluate student reaction to the use of lynda.com software tutorials as implemented by the Art and Design Department at UW-Stout. The measurement and evaluation will be conducted using Kirkpatrick's level one survey. Formal training evaluation procedures will be used to determine the students' reactions to this training

Assumptions of the Study

There are six primary assumptions of this study:

1. The UW-Stout Art and Design Department has a software training need.
2. The lynda.com company has created a software training product to meet the Art and Design Department training need.
3. UW-Stout employed lynda.com to supply the training.
4. To date, formal data measuring the effects of this training has not been collected.
5. Students who use lynda.com tutorials have not been evaluated regarding their reaction to this training.
6. An evaluation of this training could benefit future practices.

Definition of Terms

Kirkpatrick's four levels of evaluation. To better understand the importance of level one evaluation and its relation to the other three levels, it will be helpful to define the various levels. Donald Kirkpatrick developed in 1959 what is probably the best-known model for evaluating training experiences to this day. His model consists of four levels: reaction, learning, behavior, and results. Kirkpatrick maintains that these four levels represent a sequence of ways to evaluate training programs and that each level affects the next (2006). He further holds that the levels of evaluation should be performed in sequence and that none should be bypassed.

Level one - reaction. Reaction is the first level in Kirkpatrick's training evaluation model, and it is meant to measure how training participants react to the training (Kirkpatrick & Kirkpatrick, 2006). Specifically, level one is meant to measure the participants' level of satisfaction: how favorable they found the experience. Kirkpatrick believes it is important that trainees react favorably to the training experience otherwise they may not be motivated to learn. In addition, Kirkpatrick cites four reasons why measuring reaction is important:

1. Reaction sheets can be used to improve future training programs.
2. Measuring reaction assures trainees that the trainers are committed to improving the training.
3. Reaction sheets help inform management about the status of the training program.
4. The quantitative information gleaned from the reaction sheets can establish standards.

(Kirkpatrick & Kirkpatrick, 2006, p. 27)

Level two – learning. Level two evaluation is very important because it measures and evaluates the amount of knowledge, skill, and ability obtained by attending the training program (Kirkpatrick & Kirkpatrick, 2006). Under ideal conditions, the subjects are evaluated prior and immediately after the training program. A pretest and posttest should be administered to

measure whether learning occurred during the training. If practical, a control group should be used. Kirkpatrick maintains that measuring learning is important because if no learning takes place, then no behavior can change. Furthermore, he goes on to define learning as the "extent to which participants change attitudes, improve knowledge, and/or increase skill as a result of attending the program."

Level three – behavior. Kirkpatrick defines behavior as the extent to which change in on-the-job behavior has occurred because the participant attended the training program (2006). This level of evaluation measures the actual transfer of learning to the job site or work environment. Behavior evaluation involves testing, interviewing and/or observing the trainee at a time and place after the training has taken place to measure how much learning has affected the way the trainee actually performs the task. At this level of evaluation, Kirkpatrick suggests evaluating three to six months after the training has taken place.

Level four – results. This level of evaluation is regarded as the most significant and the most difficult (Kirkpatrick & Kirkpatrick, 2006). Kirkpatrick regards all four levels as important and necessary to properly evaluate training, but measuring the results of training is vital to gauging the effectiveness of the training. The objective of the training may have been to improve skills, attitudes, knowledge, or all three, but there should be some effort at some time after training to assess whether the objectives have been met. There is a very real emphasis in recent history to measure the cost benefit for the training, or the return on investment (ROI).

Level four evaluation should take place one year after the training. To determine level four-results, trainers ask questions such as

"How much did quality improve because of the training program on total quality improvement that we presented to the entire workforce? How much has it contributed to profits? What reduction did we achieve in employee turnover and scrap rate because we taught our

foremen and supervisors to train new employees? How much have sales increased as the result of teaching our salespeople such things as market research, overcoming objections, and closing a sale? Also, what is the return on investment (ROI) for all the money we spent on training?" (Kirkpatrick & Kirkpatrick, 2006, p. 63)

Ironically, level four seems to be least employed. In fact, a recent American Society of Training and Development (ASTD) study of course evaluations by level found that "only about three percent of courses reach Level Four, which measures influence in the field" (Rossett, 2007, p. 49). Since the evaluation methods can be problematic with level four, Kirkpatrick stresses that evidence of change due to training is adequate only because "proof is usually impossible to get" (2006, p. 69).

Lynda.com software tutorial training. "lynda.com is an award-winning provider of educational materials, including Hands-On Training™ instructional books, the Online Training Library™, CD- and DVD-based video training, training Podcasts, and events for creative designers, instructors, students, and hobbyists" (lynda.com, 2008, para. 1).

Managed Multi-User System. A lynda.com training systems license and configuration which allows multiple software tutorials to be loaded, managed, and accessed from a central local server via a local area network (lynda.com, 2008, para. 1). One same training tutorial can be streamed to 25 computers simultaneously.

Computer-Based Training (CBT).

> Computer-based training involves training courses that are offered on a computer, typically distributed on CD or DVD. Learners using CBT courses are able to study the material for the given course at their own pace. Often these CBT courses can be used as preparation or follow up to more traditional classroom teaching. (Belanger & Jordan, 2000, p. 41)

Limitations of the Study

The type of evaluation conducted in this study is a level one - reaction evaluation. This evaluation measures the trainee's reaction or satisfaction with the training. This initial level of evaluation is rudimentary, necessary, and provides information about how the students feel about the training. However, the data is still quantifiable and, as such, provides empirical data regarding student satisfaction. Kirkpatrick believes that a thoroughgoing evaluation of the effectiveness of a training program such as lynda.com should involve all four levels of evaluation. This study begins the process by employing only his first level, reaction, chiefly because it is the first in the sequence. Also, since the evaluation was conducted well after the training had commenced there was no opportunity to conduct pre-testing or control group comparison, which are all required for the other three levels of evaluation.

Limited methodology and sampling is the second limitation. Two classes were randomly chosen from a population of 11 classes identified as utilizing lynda.com training. By choosing two classes, a clustered sampling method was employed, but the clusters were not carefully defined. It was reported that the lynda.com training is implemented in different manners depending upon the class. That is, the training may be passive with the students simply reviewing the video presentation or the training may be interactive with students downloading files that can be manipulated in accordance with the tutorial. Finally, the software training may be required by the teacher, or simply recommended.

In the case of the two classes surveyed in this study, the teacher required the students to undergo the training, and the interaction was recommended. As a result, the evaluation of the two classes may be compared but not generalized to the rest of the population.

Methodology

A population of 11 classes using lynda.com training in the Art and Design Department were identified. From these classes, two classes were randomly selected to be evaluated. A level one survey instrument was developed to measure the students' reactions to the training inputs involved in the training: people, equipment, materials, methods, and environment (PEMME; see Appendix A). The instrument consisted of 15 Likert-scale questions (three questions for each of the inputs) and five open-ended completion questions pertaining to the five inputs. The Likert scale was a five point scale with the following choices: (1) strongly disagree, (2) disagree, (3) undecided, (4) agree, (5) strongly agree. The instrument was administered on the last day of class in keeping with level one evaluation protocol, and the results from each class were tabulated and compared with the other class. Thirty-six survey responses of 40 possible students were obtained, for a 90% response rate. Several students were absent from one class, and one student arrived late for the other. None declined to complete the survey.

The population was confined to the Art and Design Department in order to narrow the scope to a similar and dense group of lynda.com users. From that population, two classes were chosen to offer a level of comparison.

Chapter II: Literature Review

Introduction

Faculty members within the Art and Design Department at UW-Stout have long integrated computers and applications into their courses as tools to perform assignments. Students are expected to use the software application tools such as Adobe Photoshop to perform tasks such as designing, drawing, coloring and modifying artwork for the purpose of course project requirements. As dependence upon these applications has increased, the faculty has expected their students to possess greater software proficiency as a prerequisite to class enrollment.

In 2005, an Art and Design Department faculty member concluded that a performance gap in software skill existed among her students, and chose an external training solution to remedy the matter. Based upon the prior success she had training herself on the product, the teacher adopted the online lynda.com software tutorial company to meet her class training need. The plan requires students to train themselves outside of class in the necessary software skills, which in turn would allows her to spend more time in class teaching core art and design concepts.

The problem with this scenario is that UW-Stout made a potentially premature commitment to use lynda.com software tutorials as a solution to a perceived training need. The training solution was adopted without the benefit of a formal needs assessment or front-end analysis and little evaluation data has been acquired since the training program's inception.

This study conducted an evaluation of the software training using Donald Kirkpatrick's level one evaluation technique. The results were tabulated and incorporated into this study.

In order to better understand the importance of this level one evaluation effort and the results thereof, this literature review will examine the following topics: lynda.com and how it is

applied at UW-Stout; the nature of this type of training as Computer Based Training (CBT)/Computer Assisted Instruction; and Donald Kirkpatrick's Four Levels of Training Evaluation, specifically the Level One Evaluation (Reaction) as implemented in this study.

Lynda.com Software Training

As previously defined in Chapter I of this study, "lynda.com is an award-winning provider of educational materials, including Hands-On Training™ instructional books, the Online Training Library™, CD- and DVD-based video training, training Podcasts, and events for creative designers, instructors, students, and hobbyists" (lynda.com, 2008, para. 1). An individual who chooses to use lynda.com training has many options available. In order to view the tutorials, the individual can purchase the application training CD/DVDs; subscribe to lynda.com, then simply log in and learn online; or in the case of UW-Stout, purchase a managed multi-user license. A multi-user license is typical for institutions and larger organizations with firewall protected intranets. With this configuration, various software tutorial DVDs are purchased, loaded, managed, and accessed from a central server. A single training tutorial can be streamed to 25 computers simultaneously.

Currently, UW-Stout has a multi-user license for over 100 software titles. These include tutorials on how to use various operating systems for both the PC and Mac platforms, and a multitude of topics such as digital imaging, web development, and graphic design. All UW-Stout enrolled students and faculty or staff members can access these titles, both on or off campus, 24 hours a day, and seven days a week.

Tutorial Selection

At the UW-Stout campus, the student needs to log in to a computer, access the website http://lynda.uwstout.edu/ and choose from the list of tutorial links on the page.

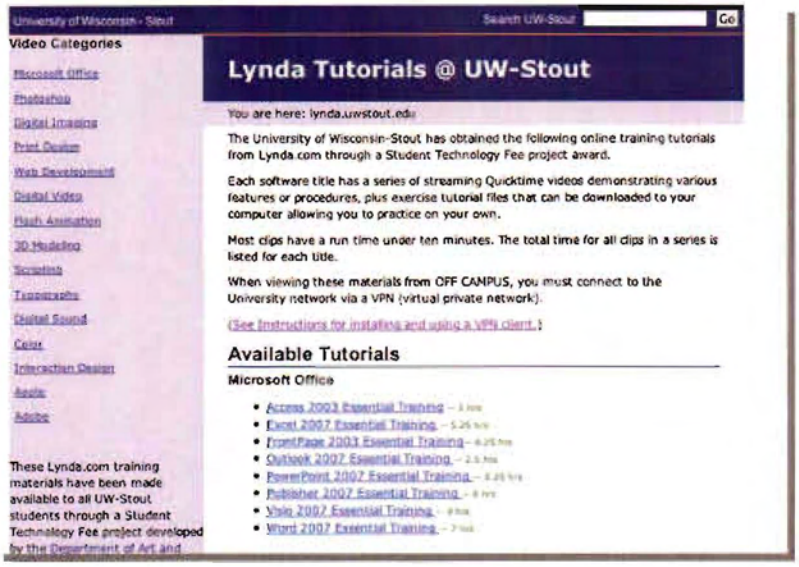


Figure 1. Screen shot of UW-Stout lynda.com tutorial site

Once the student selects from among the numerous titles, whether it be Microsoft Excel, Macromedia Flash, Adobe Premiere, or the popular Adobe Photoshop, the lynda.com tutorial menu for the specific title opens revealing the various files and steps for the tutorial. The student can opt to open any of the tutorials in non-linear fashion, or proceed in sequential order. Note in Figure 2 below that the banner alongside the logo reads "learning @ your own pace." In other words, students may use their computers to access the tutorials at any time, and retain the flexibility to follow the tutorials in any sequence and at the pace they choose.

The various training programs, or titles, consist of an instructor on camera who delivers the tutorial, screen images replicating what the student will view when performing the same steps with the application, and some files for possible download. If, for instance, a person opens the Adobe Photoshop training module, the first screen lists all of the tutorials, their length, size, and any files that might be downloaded for the student to interact with.

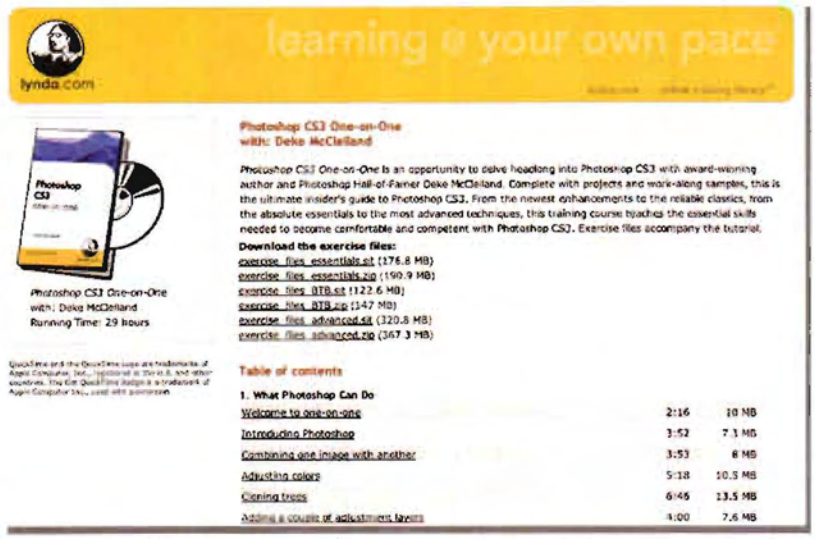


Figure 2. lynda.com tutorial menu for Adobe Photoshop CS3

It is important to note that a person can view the training tutorial passively as a streamed presentation accessed from the server or the student may download supplemental training files onto their own computer and interact by performing the various steps along with the instruction. The screens below illustrate what the student sees with instructor providing training narrative and a view of the Photoshop application as it is being demonstrated by the instructor. The tutorial images, such as those below, are opened and played as QuickTime movies and may be viewed full screen or squeezed smaller.

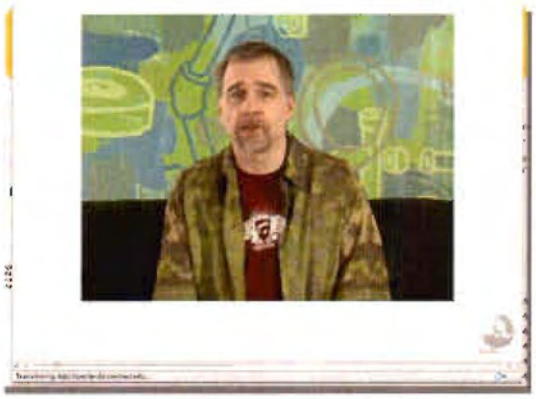


Figure 3. lynda.com Photoshop instructor

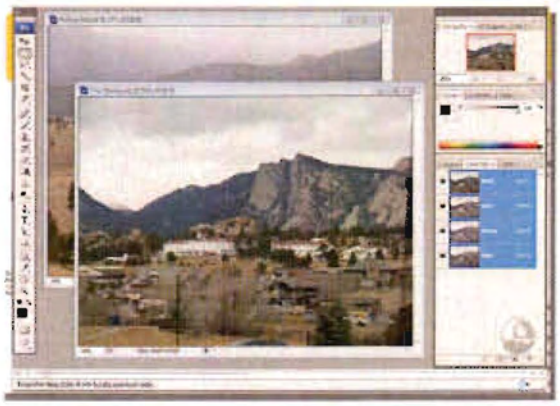


Figure 4. Lynda.com Photoshop demonstration

Note: Screen captures are used with permission from lynda.com – see email in Appendix B.

Computer Based Training/Computer Assisted Instruction

Training delivery methods may be broken down into three broad categories: on-the-job, classroom, and self-paced. On-the-job (OJT) training can be described as the most common form of training in the workplace (Johnson, 2007). It can be informal, such as job shadowing, or it can be formal, such as job instruction training. The chief advantages to this type of training over classroom training are efficient transfer of learning to the job and reduced costs because no special facilities are required. Limitations of this type of training are the physical constraints of the job, and disruption of the actual production.

Classroom training delivery has advantages over OJT in that it is conducted in a very controlled environment, allows for a variety of training techniques, and can accommodate numerous trainees (Johnson, 2007). The disadvantages are that the classroom is an artificial environment making learning transfer more difficult and the facilities can be very costly. The five types of classroom training techniques are lecture, discussion, audio-visual, experiential, and computer-based in labs.

Self-paced training methods include paper-based training such as workbooks or correspondence courses and computer-based training (CBT). In the case of lynda@UW-Stout, CBT is not relegated to a classroom or lab. It consists of computer-aided instruction and internet/intranet. The use of the computer in self-paced training has generated many names such as computer-based learning, computer-based instruction, computer-aided teaching, and computer-aided instruction. Computer training used in conjunction with classroom instruction is sometimes referred to as computer-aided instruction, or hybrid teaching. (Belanger & Jordan, 2000) As employed at UW-Stout, lynda.com is a bit of hybrid form of this type of training in that it consists of tutorial DVDs residing on a server, accessed via an intranet, and used to supplement classroom instruction. This scenario is technically "computer-aided instruction" or

computer training used in conjunction with lecture-type classroom instruction; but to simplify, this study will refer to the UW-Stout lynda.com training with the umbrella term CBT.

While the technology involved with lynda.com is relatively new and evolving rapidly, CBT has been around for years. The effectiveness of this type of training has been studied and documented extensively. In 1990, author Barbara Ladd wrote an article in *Training Magazine* tracing the history of CBT titled "Early CBT, How We Got Here from There." She noted that in the beginning, "Computer-Based Training started back in the mid-1950's with US military efforts to track aircraft and predict potential threat. The system was computer-based and called 'Semi-Automatic Ground Environment', or SAGE" (p. 9). The data obtained from the tracking efforts were stored and used to train new operators of the equipment. The data storage and retrieval was the feature that seemed to encourage early training adaptation.

Ladd (1990) noted that in the 1960's, CBT evolved with the Programmed Logic for Automatic Teaching Operations (PLATO) system at the University of Illinois. Then, in the 1970's there was the Time-Shared Interactive Computer-Controlled Information Television (TICCIT). However, Ladd points out that CBT has really led a torturous existence. This was due mainly to the fact that early machines were slow and difficult to use. Aside from technology shortcomings, it was further discovered that the biggest obstacle to CBT acceptance, however, had nothing to do with this new way of doing things. Analysis suggested that the culprit was the instructors, themselves. It seems that the traditions of teaching are extremely deep and that most instructors thought that students simply could not learn on their own; a skill which is at the heart of computer-based learning.

Things have changed. There is now a generation of students who have grown up with computers and the technology has improved substantially. How, then, does CBT fare today? In the journal, *Computers in Human Behavior*, Kulik and Kulik (1991) addressed the issue in an

article titled "Effectiveness of Computer-Based Instruction: An Updated Analysis." They point out that since the early 1960's, educational technologists have been developing computer programs to drill, tutor, and test students and manage instructional programs. Most recently, these programs have been used increasingly in schools to supplement or replace more conventional methods.

Along with CBT, the internet has created another avenue for what is now being called e-learning, which is an even broader term to include the internet and the computer used for instruction. In combination, CBT and the internet hold out huge promise: "Some envision a day when computers will serve all students as personal tutors: a Socrates or Plato for every student of the 21st century" (Kulik & Kulik, 1991, p. 75).

Factors such as the proliferation of computer technology, sophistication of the technology, acceptance of the technology, economic pressures, globalization, and the internet, all wrapped into e-learning, have contributed to the adaptation of CBT to education and to the workplace. In an article titled "E-learning Hits its Stride," author Garry Kranz (2008) suggests that "e-learning has grown into an inextricable part of corporate culture. About 33 percent of training hours are delivered via technology. Experts foresee an increase in the amount of technology used in training programs because instructor-led class costs are rising" (p. 1). In education, there is a growing awareness that students are expecting to use e-learning technology such as CBT. In an article titled "Our Ethical Obligation," author Scott McLeod (2007) suggests that students desire CBT and instruction. "The first generation of students that has grown up with digital technologies is hitting our campuses. They have deeply held expectations about how those technologies should be used..." (p. 38).

Computer-Based Training at UW-Stout

Given this brief historical overview of CBT, how does it work at UW-Stout? What are its salient features? More importantly, what are the advantages and disadvantages over other types of training? First of all, the training process involves a computer which the students must use to access the training tutorial. (UW-Stout requires undergraduate students to have a computer for their courses and there are many labs, so access should not be a problem.) In the lynda.com CBT program at UW-Stout, the process is a bit unique. Each tutorial is an actual DVD, which is typical, but which has been recorded onto a central server and accessed via a firewall protected intranet. Each tutorial consists of lecture and corresponding application screens which illustrate what the student will view when performing the same operation using the application on their own computer. The student logs in and simply selects the title to view. The tutorial is viewed using streaming technology which sends the files out in a continuous stream from the server; therefore, there is no need to download the entire tutorial. Each tutorial does include sample work files which can be downloaded so the student can interact and manually replicate the steps instead of just watching them.

Key advantages to this type of training include the asynchronous nature and the learner control over the learning. "Perhaps the most frequently cited advantage of these emerging computer-based technologies is that they allow learners to have considerable control over different aspects (e.g., content, sequence, pace) of their learning process" (Bell & Kozlowski, 2001). Classic CBT requires that the material be inclusive of all information since the learner cannot obtain clarifications from the instructor. In the case of lynda.com at UW-Stout, there is the advantage that instructors can add information in the classroom in conjunction with the training received via the computer outside of class.

In their study titled "Evaluation and Implementation of Distance Learning: Technologies, Tools and Techniques," Belanger and Jordan (2000) identified a number of additional advantages and disadvantages to this type of CBT. They break their analysis down to consider the learner, instructor, and the institution. Advantages for the learner include improved learning; increased learner centeredness since learners can study tutorials or add-on materials at their own pace and at the appropriate time for them; scheduling flexibility as learners often have the flexibility of deciding when they want to take the particular computer modules that are necessary for them to complete their classroom work; modularity of courses- designing a modular course is easy in this CBT environment; and multiple modes of learning since courses can be designed to use a variety of stimuli including audio, video, and text. The instructor gains, too, with teaching flexibility and more individual attention to learners. Finally, the institution gains with reduced operational costs, course standardization, and improved learning.

There are disadvantages cited in Belanger and Jordan's study, too. It seems that there is little interaction between learners in the training since they may be using the computers on their own. Instructors who adopt this training tool require increased coordination demands to mesh the training into their classroom curriculum. In another study, Bell and Kozlowski (2002) point out that "the learner control inherent in these applications is typically perceived as a positive feature that will enhance motivation" (p. 268). However, they go on to say that motivational change has not been detected. They state that today's cognitively complex and dynamic training environments seem to make it more difficult for trainees to effectively utilize learner control (Bell & Kozlowski, 2002).

Donald Kirkpatrick's Four Levels of Training Evaluation

Prior to discussing a model for evaluating training, it is helpful to make a distinction between what is meant by *education* and what is meant by *training.* The two processes are

similar in that they both involve teaching and learning, but they are fundamentally different processes (Johnson, 2007). Two important differences between training and education may be seen in the subject matter taught in each process and the manner in which learning is measured with each process.

In the case of education, the subject matter is broad and all inclusive, such as theory (Johnson, 2007). The student is exposed to a wide variety of information which is assimilated over time. In education, learning is typically measured as norm-referenced where a standard curve is used to compare and separate students. The students' learning or performance is relative to the group or "norm" and student achievement is based on a comparison of each student relative to the group over the curve.

With training, the subject matter is very specific and narrowly focused, for example, how to drive a car (Johnson, 2007). Performance measurement is also very narrow and specific and uses what is called "criterion-referenced" measurement. In this case, task and content performance measures are used to indicate student achievement. With criterion referenced measurement, student performance is reliably and objectively compared to the standard. The student has either learned or not learned, there is little room for subjective interpretation.

Education uses evaluation for various purposes (Johnson, 2007). Students at all levels in education typically undergo some sort of testing or measurement to determine how much they have learned and how well they have learned. This measurement is typically expressed in terms of letter grades A, B, C, D, or F to indicate a spectrum of proficiency. In addition, in higher education, both the students and the teachers may undergo evaluation. The students receive grades from their teachers, and teachers receive reaction survey results from the students. Evaluation in training, however, may not be assumed. Training in both an educational setting

and a business setting can occur without any effort to formally measure the effects of the training on the trainee.

When professional trainers confront a situation in which an organization's performance expectations are not met, they approach the performance problem very deliberately. The trainers have at their disposal a number of performance improvement models which may be adopted depending on the specific circumstance. One of the oldest tried and true models is referred to as the ADDIE model. This acronym stands for analyze, design, develop, implement, evaluate.

To use the ADDIE model in response to a performance problem, the first step is to analyze the problem systematically through needs assessment to determine whether the problem requires a training or a non-training solution (Johnson, 2007). Trainers give this step high priority since the tendency for most is to assume that training is the solution. During the needs assessment process, the trainer looks at such factors as people, equipment, materials, methods and environment (PEMME) that are involved. About 20% of the time, the needs assessment reveals that people lack knowledge, skill, or ability to perform at the required level of competence. This is when a training solution is recommended. When training is identified as the performance solution, then the trainer moves forward to design, develop, implement and evaluate the results of the training program.

The lynda.com software training was adopted by the Art and Design Department to meet a perceived training need without the benefit of a model, such as ADDIE. The software tutorials were implemented to mesh with the classroom curriculum. Just as there was no prior formal needs assessment, no evaluation was conducted to determine the effectiveness of the training itself. This research study was conducted to begin that evaluation process using the Kirkpatrick evaluation model.

Kirkpatrick first developed and published his four-level model for evaluation as a series of four articles published in *T&D magazine* in 1959, (then known as the *Journal for the American Society of Training Directors)*(Kirkpatrick, 1996). The purpose for the articles was to "stimulate training directors to increase their efforts in evaluating training programs" (Kirkpatrick, 1996, p.54). These four articles were eventually combined into book form: *Evaluating Training Programs: The Four Levels* (Kirkpatrick & Kirkpatrick, 2006). The book is now in its third edition.

Why Evaluate?

Kirkpatrick began by tackling this question with the most obvious answer: "to determine the effectiveness of the training program" (2006, p. 3). But he went on to state three reasons why training is important: evaluation can tell us how to improve future programs; it can determine whether the training program should be continued or dropped; and it can justify the existence of the training effort and its budget. In his model, evaluation should take place in four steps, or levels: reaction, learning, behavior, and results. Kirkpatrick regards the four levels as a sequence of ways to evaluate the training; each is important, necessary, and affects the next level. He further maintains that the evaluation process becomes progressively more difficult and time-consuming, as each level is completed. Each level is necessary and none of the levels should be bypassed.

Level One - Reaction

Kirkpatrick's training evaluation model derives largely from his experience with training in business and industry, but the lessons hold true for training in the realm of education, too. He employed his own model with training seminars at the University of Wisconsin Management Institute (Kirkpatrick & Kirkpatrick, 2006). For Kirkpatrick, evaluating reaction is the same thing as measuring "customer satisfaction" (p. 27). He goes on to state that for training to be

effective, it is important that trainees react favorably to it, otherwise they will not be motivated to learn. Measuring reaction is usually conducted in the form of a survey or questionnaire that will serve to quantify the reactions to the training.

Typically, the reaction survey consists of enough questions to fill one page and includes questions that rate the training experience on a Likert scale, as well as questions that are open ended and allow for comments and suggestions. Kirkpatrick (2006) recommends administering the survey immediately after the training, obtaining 100% response, determining standards, measuring reaction against the standards, taking appropriate action, and communicating results accordingly.

Measuring the trainees' reaction or satisfaction with the training is the first, easiest, and most common type of evaluation (Kirkpatrick & Kirkpatrick, 2006). Thus, it is a natural place to start the four-step process. Kirkpatrick cites several reasons for measuring reaction, and very specific methodology for doing it correctly. Training is important because it gives trainers valuable feedback that helps to evaluate the program as well as offering suggestions for future courses; it tells trainees that trainers are there to help them and need to know how effective they are; and reaction sheets provide quantitative information about the training program that can be used to establish standards for future programs.

To design such an evaluation instrument Kirkpatrick recommends a series of steps (Kirkpatrick, 2006). First, it is imperative to determine what you want to find out with the evaluation. In the case of this study, five factors were identified as "inputs" into the training process. These inputs served as the training factors that would eventually produce the training results. By first measuring reaction to these five factors, a quantitative result could be determined. These five factors are people, equipment, material, methods and the environment (PEMME).

The next step is to design a form that will quantify the reactions (Kirkpatrick, 2006). There are numerous designs and methods for this, but a common design is to use closed ended questions with a range of responses or reaction- such as a Likert scale numbering 1-5. These responses can be statistically treated and the mean and standard deviation can be derived. It is recommended to keep the questionnaire to one page for ease of use and scoring.

Another step is to encourage written comments and suggestions (Kirkpatrick, 2006). This can be achieved with open-ended questions in which the trainees can respond to reaction questions in their own words. This will also provide an opportunity to make recommendations or suggestions that could help future versions of the training program.

Kirkpatrick recommends obtaining a 100% immediate response to the questionnaire (Kirkpatrick, 2006). This is something most test measurement strives for, but in the case of measuring reaction it is more easily done. One should survey the trainees immediately following the training while all are still in attendance and the experience is fresh in their minds.

The last step is to ensure that the questionnaires are anonymously completed (Kirkpatrick, 2006). This helps guarantee that students provide honest answers without fear of recrimination.

Level Two-Learning

Kirkpatrick (2006) stated that there are three things instructors in a training program can teach knowledge, skills, and attitudes. Measuring learning, therefore, means determining what knowledge was learned, what skills were developed or improved, and what attitudes were changed. For this level of evaluation to take place, it is recommended to use a control group, if practical; do both a pre-test and post-test to evaluate knowledge, skills, and attitudes before and after the training; use a paper-and pencil test to measure knowledge and attitudes; use a

performance test to measure skills; get 100% response; and use the results of the evaluation to take appropriate action.

Level Three-Behavior

Level three involves measuring the performance of trainees after the training back on the job (Kirkpatrick, 2006). In this study, what happens after the students complete the lynda.com training and return to their classes to apply the knowledge, skills, and attitudes? Kirkpatrick pointed out that this level is more difficult to measure because trainees cannot change their behavior until they have a chance to do so. In this case, the training has to mesh with the curriculum so that they can use the new skills appropriately for purposes of the class. Also, it is impossible to predict when the change in behavior will take place because the change is dependent upon other variables in the application of the training. Last, the trainee may decide the training was good and proceed to change behavior, but the environment does not allow the skills to be applied. Again, Kirkpatrick recommends allowing time for the behavior to change to occur. In general, level three evaluation should be conducted three to six months after the training was completed.

Level Four- Results

This level is the last, least undertaken, and, by Kirkpatrick's admission, the most important and most difficult to complete (Kirkpatrick, 2006). He goes on to suggest that ultimately, it should be demonstrated that the results of the training should "show some tangible results that more than pay for the cost of the training" (Kirkpatrick, 2006, p. 69). He further maintained that if the training aims at tangible results instead of teaching concepts, principles, and theories, then it is desirable to evaluate in terms of results. This evaluation is achieved by using a control group if practical; allowing time for the results to be achieved (usually a year); measuring organizational performance both before and after the program; repeating the

measurements at appropriate times; considering cost versus benefits; and being satisfied with evidence if proof is not possible. It is a truism that cause and effect relationships are tough to establish in any kind of analysis, but every effort must be made to do so with training. If proof is not possible, Kirkpatrick stressed that evidence should be provided to show a relationship between the training and the business or education outcome-the return on investment. For training to continue, there should be some measure of its effectiveness and how it benefits the organization.

Examples of CBT Evaluation

Given that CBT in some form or another has been in use since the 1950's, one can infer that this e-learning impact has probably been evaluated. Prior to examining the results of this particular study regarding the use of computer-based lynda.com training, it is instructive to examine what similar studies have found.

In one study, "Evaluating Technology's Role in the Classroom" (Rother 2004), the author sought to evaluate several factors including the benefits of classroom-based computers to student performance and recommendations for educators on implementing training programs in technology. The study surveyed 1,012 kindergarten through 12th grade teachers nationwide and identified three priorities: First, more training for the teachers; second, more computer access for the students; third, high quality technology that is appropriate for the classroom. The results of the study include findings that suggest that, increasingly, teachers are expected to use technology tools to increase academic performance. Eight out of 10 teachers surveyed have requested more training to keep abreast of the technology skills.

> In some cases, technology may offer a solution to these training dilemmas. Delivering professional development online, for instance, gives time-strapped educators 24/7 access to training. While face-to-face sessions are still the norm, many schools and districts have

augmented professional development with this anytime, anywhere deployment. (Rother, 2004, p. 3)

It seems in this case that on-line training for the teachers, themselves, has been promoted.

Key findings from Rother's 2004 study include the following:

- 81% of the teachers said that classroom computer availability increases student academic performance.
- 62% of the teachers indicated that computer technology aids student performance on standardized tests, an 8% increase over 2003.
- 57% of the teachers said that they believe computer technology increases parent-teacher communications.

While performance seems to have been improved, findings indicate some shortcomings that had to do primarily with the technology as well:

- Two-thirds reported that they do not have the right number of computers in their classrooms.
- 48% reported that having enough time to become skilled with computer equipment and software is an "extremely" or "very" serious problem. (p. 5)

Another study that focused specifically on evaluating student attitudes toward CBT was titled "Learning Preferences, Computer Attitudes, and Student Evaluation of Computerized Instruction" (Steele, Palensky, Lynch, Lacy, Duffy, 2000). A "mixed methods design combining attitudinal measures, and qualitative interviews," (p. 225) was used to obtain student reactions to a computer assisted instruction program. A total of 151 medical students were studied and involved an eight-week clerkship which included lectures, small group discussion and the CBT program. The results of this study suggested

> no relationship between learning preferences, computer attitudes, and evaluation of the CBT program. Students were very positive about the program's content, clarity, organization, and ease of use...however, many still indicated a preference for lecture and text-based learning. Qualitative interviews suggest that students worry that computers will supplant teacher-student interaction. (p. 225)

In another fairly recent and related study, Chen and Jones (2007) compared student perceptions regarding traditional classroom delivery with what is called "blended learning." This is yet another term similar to "hybrid learning" in which CBT or computer-related technology is incorporated into the curriculum along with some class discussion and traditional lecture. The study is titled "Blended Learning vs. Traditional Classroom Settings: Assessing Effectiveness and Student Perceptions in an MBA Accounting Course."

Again, the Chen and Jones (2007) begin by acknowledging that computer-based technology is now universal and that college course delivery will be affected. In an attempt to measure this effect, the authors chose to survey a group of students in a Masters of Business Administration (MBA) program in a university in the Northern United States. One group was students who took an accounting class with traditional classroom delivery; another group was students in the same class, but who had chosen a section that was taught with blended-learning. In this case, the blended learning group accessed most of the course via the internet, and met periodically in a regular class for discussions.

The results of Chen and Jones' 2007 study were mixed, and in effect, blended as well. Overall perceptions of course, instructors, and learning outcomes were positive for both groups. But, students in the traditional setting were more satisfied with the clarity of instruction. On the other hand, students in the blended learning section felt more strongly that they gained an appreciation for the concepts. Blended-learning students also indicated more strongly that their

analytical skills improved as a result of the course. What seemed significant about the results was the conclusion: "the two delivery methods were similar in terms of final learning outcomes, but that both could be improved by incorporating aspects of the other" (p.1). Neither the blended-learning, nor the traditional model seemed dominant, but it was suggested that both had merit and each could benefit the other.

A final study to consider that exemplifies the evaluation of CBT used in conjunction with traditional classroom learning delivery is called "Streaming Student Speeches on the Internet: Convenient and 'Connected' Feedback" (Sims, 2003). In this situation, undergraduate students enrolled in speech classes at a Wisconsin liberal arts university were surveyed to determine their reaction to using the internet to critique speech assignments. Traditionally, students in these classes would each present a type of speech in class and other members of the class would critique the speech all during regular class time. To make the critiquing process more effective, efficient, and add the element of self-analysis, the teacher used a method whereby each speech was videotaped while the speech was given in class. The tape containing all the speeches was then put on reserve in the school library and students were required to check the tape out at a later time to view themselves for self-analysis and feedback.

The self-analysis was deemed very beneficial, but access to the tape in a reserve library and other tape technology issues seemed cumbersome (Sims, 2003). With the proliferation of personal computers, a school intranet, and video streaming technology, the thought was to eliminate the shortcomings of tape and make the speeches accessible 24-7. Eventually, the teacher wanted to determine the student reaction to using this new CBT which would supplement classroom lecture, provide self-paced learning, and offer more flexibility of access. She developed a survey with 10 questions (open-ended and closed-ended) and 91% of her students agreed to participate.

According to the survey results (Sims, 2003), the students found this technique of self-analysis using a computer and streamed video via the internet very favorable.

> A strong majority or 62 of 73 students (85%) chose to view their informative speech on the internet...and over half the students who viewed their speech on the internet indicated that they had watched their speech from a home computer. (p. 13)

A strong majority of these students (96%) agreed that this sort of learning experience be continued and offered to future speech classes (Sims, 2003).

Summary

This review has demonstrated that the use of lynda.com software tutorials by the Art and Design Department at UW-Stout constitutes a type of training designated computer-based training (CBT). CBT consists of many types and goes by many labels. The type of CBT used by the Art and Design Department is called computer assisted instruction and consists of classroom instruction enhanced, or assisted by additional self-paced training using computers and the school intranet. The students are expected to train themselves via the intranet in the use of software using lynda.com tutorials outside of class.

Fundamental problems in this particular training scenario were identified to be a lack of formal needs assessment prior to the adoption of lynda.com, and a lack of formal training evaluation during and following the implementation of lynda.com. It was also suggested in this review that an appropriate training evaluation model could be provided using Dr. Donald Kirkpatrick's four levels of evaluation: reaction, learning, behavior, and results. Given these four levels of evaluation, it was decided to limit the evaluation to Kirkpatrick's level one, or the immediate reaction of the students following the training.

Finally, this literature review noted previous forms of CBT have existed for over 50 years and much research has been performed. This study provides additional information related to the

ongoing evaluation of CBT. Specifically, it evaluates student reaction to the lynda.com training used to supplement an educational curriculum at UW-Stout.

Chapter III: Methodology

Introduction

The lynda.com software tutorial training was first adopted by the Art and Design Department at UW-Stout in 2005. This CBT is self-paced and designed to supplement classroom instruction. By 2007 UW-Stout had increased the contract with lynda.com to include more tutorial titles and to make the training available to all students enrolled at UW-Stout. This training became widely available at the school, but no formal needs assessment was conducted prior to adopting lynda.com. In addition, little has been done to formally evaluate this training method.

This study was conducted to begin a formal training evaluation using Kirkpatrick's four-level evaluation model. Specifically, it was decided to limit the evaluation to level one, and to measure student reaction to the training in the Art and Design Department. A population of test subjects was defined and a sample of classes was selected for reaction testing. To measure the student reaction, a questionnaire was designed administered, and scored in accordance with Kirkpatrick's level one - reaction evaluation recommendations. Discussed in this chapter is a detailed account of subject selection, instrumentation, data collection, analysis, and limitations.

Subject Selection

Given the large population of lynda.com users across the whole campus at UW-Stout during the 2007 spring semester, a cluster sampling technique was utilized to select subjects for this study. This technique was chosen because it broke the whole population into a smaller more representative group or cluster and the technique assured random selection of the subjects from the cluster. The group or cluster chosen for this study was the Art and Design Department at UW-Stout. This department was chosen because they were first on campus to adopt lynda.com

for software tutorial training, and they had the largest number of lynda.com users among all the departments at UW-Stout.

From this population, 11 classes were identified by the Art and Design department as using lynda.com training for the 2007 spring semester. From these 11 classes, two classes were selected using random sampling. One class consisted of 23 students, and the other class consisted of 17 students, for a total of 40 students to evaluate.

Instrumentation

The instrument, or questionnaire, for this study was designed in accordance with Kirkpatrick's guidelines for evaluating trainees' reaction to training. Kirkpatrick specifies eight guidelines for evaluating reaction:

1. Determine what you want to find out.
2. Design a form that will quantify reactions.
3. Encourage written comments and suggestions.
4. Get 100% immediate response.
5. Get honest responses (anonymous).
6. Develop acceptable standards.
7. Measure reactions against standards and take appropriate action.
8. Communicate reactions as appropriate. (Kirkpatrick & Kirkpatrick, 2006, p. 28)

Process Model and Five Inputs

With these eight guidelines in mind, the first step was to define what was to be discovered with this evaluation. It was decided to specifically measure student/trainee reaction to five inputs into the lynda.com training process.

A process is a basic building block to any system. The system requires inputs that are acted upon and which then produce an output. The output then should be evaluated and the

inputs re-adjusted according to the goals of the process. The model for this process system is shown below in Figure 5.

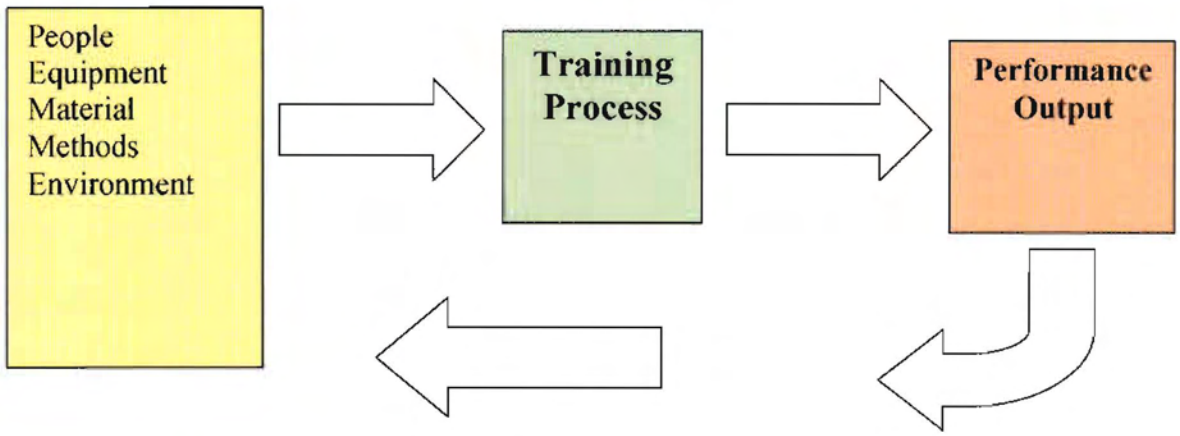


Figure 5. Training Process Model (PEMME)

With the training process, the output is new knowledge, skills, and attitudes. The five inputs for the training process are defined as people, equipment methods, material, and environment (PEMME).

Questionnaire

Based upon this process model and using Kirkpatrick's guidelines for evaluating reaction a questionnaire was designed with 15 closed-ended questions with three questions assigned to each of the five inputs. The questions were answered using a five-point Likert scale ranging from 1) strongly disagree, 2) disagree, 3) undecided, 4) agree, to 5) strongly agree. In addition, there were five open-ended questions, each of which dealt with one of the five inputs. The questionnaire was designed to be a single page and easily and quickly answered following training (see Appendix A).

Honest responses were assured with both questionnaires since the classes were chosen randomly and the subjects told that their responses would be anonymous. No reference to their

identity or the specific class would be made in the study, and their class grades were not affected by their responses.

Data Collection

Kirkpatrick stipulates in the fourth guideline for evaluation that responses (to training) be immediate and 100% (2006). To that end, the questionnaires for students in both classes were administered in person on the last day of semester class. Between the two classes, 36 survey responses of 40 possible students were obtained, for a 90% response rate. Several students were absent from one class, and one student arrived late for the other. None declined to complete the survey.

Data Analysis

Prior to analysis, the data from each class were gathered and kept separate. One class was designated sample class "A" and the other sample class "B." The data for each class were analyzed by recording the 15 Likert scale responses (1 through 5), and then noting and recording the responses to the five open ended questions. The responses for the two classes were first analyzed as separate classes, and then the A results and B results compared to note similarity and dissimilarity between the classes. This was done because a single class sample in a cluster sample study seemed less representative of the population. Finally, the 15 Likert scale responses for both classes were combined for the overall reaction to each question.

Next, the 15 questions were grouped into the categories which reflected responses to the five training inputs or PEMME. Questions 1, 8, and 10 reflected the "people" input; questions 12, 6, and 2 reflected the "equipment" input; questions 15, 5, and 13 reflected the "materials" input; questions 3, 7, and 9 reflected the "methods" input; and questions 4, 11, and 14 reflected the "environment" input. The questions were deliberately ordered non-sequentially in an effort

to avoid a predictable pattern. Also, the questions were worded in both the "positive" and "negative" to discourage a predictable pattern of response.

In the first step of analysis the arithmetic mean or average response for each question was calculated for each class. The standard deviation was calculated as well to measure the amount of variance in the responses both within the separate class, and this process repeated with the combined responses of A and B.

For the last step in the Likert analysis, the mean response was calculated for each of the five inputs for the combined A and B responses. This last step gave the overall response, or reaction, to the five inputs: PEMME.

The five open-ended questions, which represented the five training inputs, were also examined for the combined A and B classes. Open ended reaction to the inputs was noted and a sample of the results recorded.

Limitations

The first limitation of both the study and the analysis is the fact that this study focused only on the first of Kirkpatrick's four levels of evaluation: reaction. The results of this study reflect the student reaction to the five inputs of training for two classes in the Art and Design Department of UW-Stout. Future studies could take a more thorough approach to include a broader sampling, and to evaluate in terms of all four levels of Kirkpatrick's model of evaluation.

The second limitation is the type of sampling utilized. In this study of the Art and Design Department at UW-Stout student population, cluster samples of two classes out of 11 were randomly chosen. Cluster samples work best when the clusters are defined. In this study the clusters were not defined and this limitation was addressed by using two instead of one class for a sample.

Summary

In summary, the student reaction to lynda.com software tutorials in terms of the five training inputs (PEMME) was measured for both classes A and B. These measurements were recorded as individual classes for comparison, and as a combined sample for overall reaction. The student responses were measured by determining the average response and standard deviation for each Likert question as individual and combined classes. Then, the average response for each group of three questions was calculated to give the average response for the combined classes to the five training inputs.

In addition, the five open ended questions were reviewed and common themes recorded as responses to the five training inputs. The average of these responses was factored in with the Likert questions to determine the cumulative reaction.

Chapter IV: Results

Introduction

The results of this study are a measurement of student reaction to the use of lynda.com software tutorial training as a supplement to the classroom curriculum. The subjects of the study are two classes randomly chosen from the Art and Design Department at UW-Stout during spring semester in 2007. Specifically, these results indicate how students reacted to five variables, or inputs into their training: PEMME. In addition, the students responded to five open ended questions that gave them the opportunity to reflect and make suggestions regarding the five inputs of the training. The methodology for this study was based upon Kirkpatrick's four level model for training evaluation, and was limited to the first level: trainee reaction to the training.

This chapter will first examine the responses to the 15 Likert questions. The responses of each class, A and B, were recorded and the arithmetic mean determined for the responses. These responses, or reactions, were graphed and superimposed to reveal what, if any, variance may be found between the two classes.

Next, the 36 responses of both classes were averaged and the mean determined to measure the combined reaction of the classes. These results were charted and the findings indicated.

Then, the five open ended questions were sampled from both classes with a total of four responses noted for each question. These responses represent reaction from the combined classes with two responses for each question from each class recorded.

Finally, the student reaction to the Likert questions and the open ended questions was averaged as a positive or negative reaction to the five PEMME training inputs of the lynda.com training experience.

Likert Scale Comparison of Class A and B

The results of the study reflect the reaction of students in two classes of the Art and Design Department at UW-Stout evaluated during spring semester, 2007.

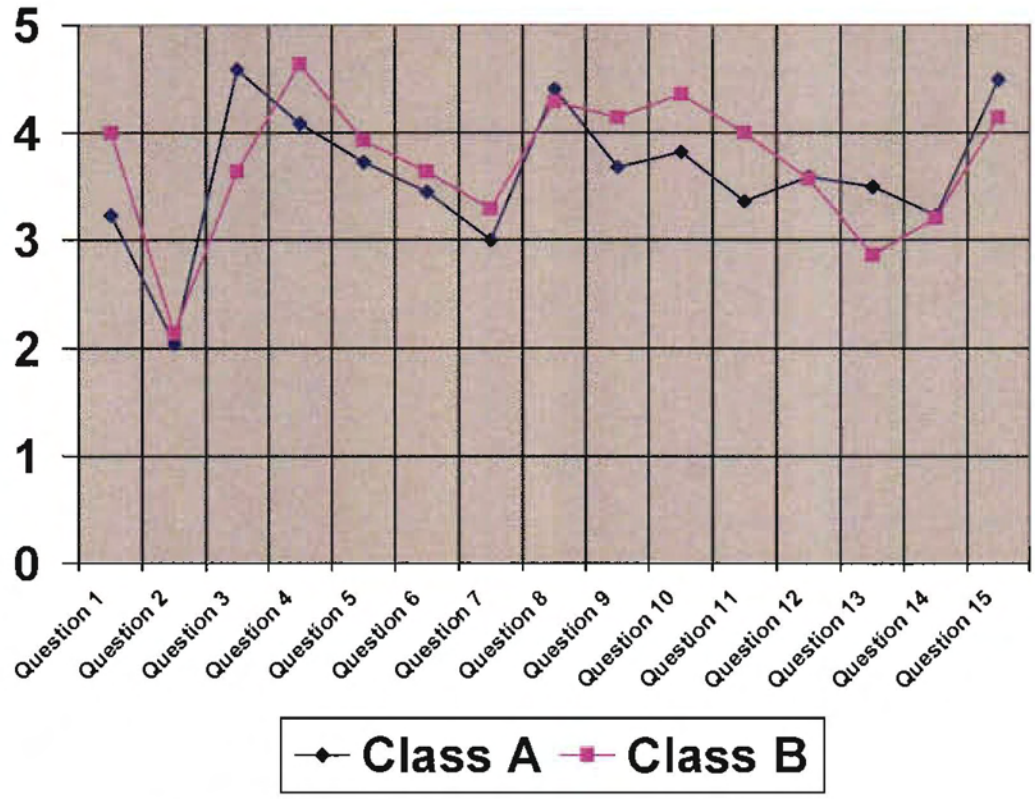


Figure 6. Likert Scale Comparison of Class A and B

As can be seen in Figure 6, the difference in response to the 15 survey questions is minimal between the two classes. This comparison, along with the standard deviation measurement was intended to measure any variance between the two sample classes. This comparison was in response to the fact that the sampling was a cluster sample that potentially leaves a study exposed to variance between the sample and the overall population of the study. This uniform finding lends more confidence to the combined reaction of the classes.

PEMME Results

The next step with the results involves determining the combined average response to the Likert questions in terms of the five inputs, or PEMME. These results provide essential student/trainee reaction to the lynda.com training experience in quantifiable terms specified by Kirkpatrick in his guidelines. The mean response of the students in the combined classes was determined, and a synopsis of these findings along with a chart follows.

The Likert response code is as follows: 1-Strongly Disagree (SD); 2-Disagree (D); 3-Undecided (U); 4- Agree (A); 5-Strongly Agree (SA).

People.

- The students somewhat agreed that they enjoyed the lynda.com training experience. Their mean response was undecided to agree (3.62).
- The students emphatically agreed (4.35) that the teacher was helpful with the training experience.
- They also agreed (4.09) that the experience was of such value that it was recommended to others.

Equipment.

- Students' responses were in between undecided and agree (3.58) that there was never a technical problem with accessing the tutorials online.
- Similarly, they were in between undecided and agree (3.55) that computer interaction with the tutorial worked well.
- Students disagreed (2.10) that equipment problems were an issue in the training.

Materials.

- Students' responses ranged from agree to strongly agree (4.32) that they had easy access to a computer for using the lynda.com tutorials.
- In regard to whether students downloaded the lessons for interactive learning and only viewed the streamed tutorial presentation, responses indicated that students' responses were on the high end of undecided (3.83).
- Students were undecided (3.18) whether additional print materials would have helped with the video tutorials.

Methods.

- When the tutorials were required by the instructor, the students agreed (4.12) they were highly motivated to train with them.
- Most students were undecided (3.32) about whether they were self-directed learners and preferred learning on their own.
- Students agreed (3.91) that the tutorials helped to learn the classroom course material.

Environment.

- Students agreed (4.37) that access to the tutorials at any time was beneficial.
- Most were undecided (3.68) about whether working with the tutorials outside of the class was a good experience.
- Students were undecided (3.22) about not having enough time to master the tutorial lessons.

The breakdown of the input, the relevant survey questions, the mean response, and the corresponding values can be seen in Table 1.

Table 1

Combined PEMME Reaction for Classes A & B

Survey Questions	Mean	Value	Input
1. I enjoyed using lynda.com	3.62	U - A	P
8. The teacher was helpful with questions about the tutorials.	4.35	A plus	P
10. I recommend this type of training to others.	4.09	A	P
12. I had no technical problems with lynda.com	3.58	U - A	Eq
6. Computer interaction with the tutorial worked well.	3.55	U - A	Eq
2. Equipment problems were an issue with the training.	2.10	D	Eq
15. I had easy access to a computer for working on the tutorials.	4.32	A - SA	Ma
5. I didn't download the lessons (only viewed streamed video).	3.83	U - A	Ma
13. Additional printed materials would have helped learn the video tutorials.	3.18	U	Ma
3. I was highly motivated to use the tutorials because they were required by the instructor.	4.12	A	Me
7. I'm a self-directed learner and prefer learning on my own.	3.32	U	Me
9. The video tutorials helped me learn the other course material.	3.91	A	Me
4. Access to the tutorials at any time was beneficial.	4.37	A - SA	En
11. Working with the tutorials outside of class was a good experience.	3.68	U - A	En
14. I didn't have time to master the software tutorial lessons satisfactorily.	3.22	U	En

Note:
1-Strongly Disagree, SD; 2-Disagree, D; 3-Undecided, U; 4- Agree, A; 5-Strongly Agree, SA
P=People, Eq=Equipment, Ma=Materials, Me=Methods, En=Environment

Open Ended Questions

The five open ended questions represented each one of the five training inputs (PEMME). Below is a sampling of five responses to each of the five questions from both A and B classes. Class A responses are identified with (A) and class B with (B).

Question 1 (people) read "What did you like most about lynda.com tutorials?"

- (A) "They were concise and told you the info that you needed to know without extra info to confuse you."
- (A) "It showed you how to do it as he (the tutorial instructor) talks."
- (A) "I did not use them much."
- (A) "I could skip ahead and learn in any order."
- (A) "I liked the easy access. I could learn from home or on campus."
- (B) "How thorough they were. They covered a lot of info that would have been too much to cover in class."
- (B) "Clean, clear, and concise. Full of valuable knowledge."
- (B) "When I had a question about the software, lynda.com gave me an answer quickly so I didn't have to bug my professor outside of class."
- (B) "They are split up in sections so you don't have to watch a whole video just to learn one aspect of the program."
- (B) "Each lesson was clearly labeled, so you knew where to go. Also, the speaker on the lynda tutorials was thorough and spoke clearly- easy to understand."

Question 2 (equipment) read "How could the technology be improved?"

- (A) "Have them be shorter. Some got to be really long to watch."
- (A) "Somehow shorten them. Maybe have a section of the basic need-to-know areas."
- (A) "They were boring."

- (A) "Not sure."
- (A) "Could be a little more exciting. Voices were very mono-tone."
- (B) "It would be nice if you didn't have to connect to the network to use it. Also, if you could save them for future reference."
- (B) "Not so dry. I don't really know how to do that, but sometimes it's hard to watch the videos."
- (B) "The videos could be shortened- a quicker version, maybe."
- (B) "Print out versions; Ability to have the tutorials go faster; Interaction between viewer and tutorial: almost student/teacher-like."
- (B) "That you wouldn't have to log onto the VPN number to access lynda."

Question 3 (material) read "What supplemental materials would have helped?"

- (A) "Maybe some handouts on the materials that are a little harder to grasp."
- (A) "An assignment after watching."
- (A) "None."
- (A) "Quick reference charts. Not sure."
- (A) "Maybe some handouts with a few 'helper' notes."
- (B) "Some printed visuals would be nice to accompany the audio."
- (B) "Have outline of each section."
- (B) "Printed step-by-step instructions (with pictures) so you can scan and get questions answered quicker."
- (B) "Print out materials."
- (B) "Downloadable "quick steps" would be helpful for each lesson to refer to later."

Question 4 (method) read "What is your preferred learning method: classroom, computer, or combination?"

- (A) "Combination."
- (A) "Combination."
- (A) "Classroom- hands on."
- (A) "Combination."
- (A) "Combination."
- (B) "Combination."
- (B) "Combination. I can learn from the computer, but prefer the classroom experience."
- (B) "Classroom."
- (B) "Combination."
- (B) "Combination."

Question 5 (environment) read "What is the best learning environment for these tutorials: home alone, or in a supervised lab?"

- (A) "Both work well."
- (A) "Either one."
- (A) "Home."
- (A) "Lab- easy to get sidetracked alone."
- (A) "Home alone."
- (B) "Home alone."
- (B) "Home alone."
- (B) "Home alone."
- (B) "Home alone, so there is no distraction."
- (B) "Home alone."

Summary of Results

The methodology for this study involved evaluating student reaction to their training. Likert scale format questions provided quantifiable data and open-ended questions supplied opinions, feelings, and suggestions. Both types of questions were further broken down into the five primary inputs: PEMME. To control for possible variance with a cluster sample, two separate classes (A and B) were randomly chosen and evaluated separately and as a combined sample.

Likert scale results.

- Students in both classes responded favorably to the people involved in the training. The teachers, both in the classroom and in the videos were capable and helpful. It was decided that others would benefit from the tutorials as well.
- It was agreed that the equipment was suitable and did not cause any problems. The equipment used included primarily computers, intranet connection, and video server.
- With materials, it was definitely agreed that computers were readily available and working properly. It was undecided whether print materials would have been of benefit.
- Students agreed that the methods worked: they were motivated to learn the tutorials; and the tutorial material helped them learn the classroom course lessons. The students were undecided whether they considered themselves self-learners.
- As to the environment, the students were very enthused about accessing the tutorials at their discretion while at home or on campus.

Open-ended question responses.

The five open-ended questions also reflected student reaction to the five input model of training (PEMME). Sampling the responses of the combined classes, A and B, the results were

similar to the Likert scale results, with the difference being the students had a chance to offer their thoughts in their own terms.

1. With question one, some common themes had to do with personal reaction to using lynda.com. Most students used the tutorials, with only a few acknowledging that they did not view them completely. The overwhelming response was positive in that the tutorials were "clear and concise" and that easy access was of high value. Another theme was the non-linear nature of the tutorials: "you don't have to watch the whole tutorial just to learn a part of it."
2. Question two solicited suggestions on how to improve the equipment, or technology. No one reported problems with the hardware, but some common themes regarding the programs themselves include: "making the tutorials shorter". Another theme was, "could be a little more exciting- voices were very mono-tone." Finally, students felt that having to log on and use the VPN intranet off campus was a bit cumbersome.
3. Students were asked to suggest supplemental materials in question three. The common reaction in this case included requests for supplemental printed handout materials, tutorial outlines, and assignments to perform after viewing the tutorials.
4. Question four had to do with methods, and sought a response as the ideal method for learning, whether with computer, classroom, or a combination. Seven of the 10 responses cited all preferred a combination as a teaching method. Three participants preferred classroom instruction, or hands-on.
5. The fifth question sought a response regarding the ideal environment for learning the tutorials. The overwhelming response was "at home, alone" as opposed to learning in class or in a supervised lab.

Chapter V: Discussion

As mentioned in Chapter I, the purpose of this study was to formally measure and evaluate student reaction to the use of lynda.com software tutorials as implemented by the Art and Design Department UW-Stout. Given this purpose, the identified problem was addressed through measurement and evaluation of the training using Donald Kirkpatrick's level one - reaction evaluation methodology. A survey instrument was developed and Kirkpatrick's evaluation procedures were used to determine the students' reaction to this training.

The three-fold purpose of this chapter is to review the results of the study; evaluate the effectiveness of Kirkpatrick's model of evaluation in this study; and finally to offer some suggestions for further study and evaluation of lynda.com and similar types of CBT or e-learning.

Review of Results

Based upon the data obtained from the survey instrument, the overall student reaction to the lynda.com training appears positive. Student response was favorable to the PEMME involved with the lynda.com experience. An analysis of the student responses revealed the following:

- People: The teachers were very helpful with the training experience; the training experience was enjoyable; and the students would definitely recommend the training for others.
- Equipment: The equipment was sufficient and worked well. With a technology-intensive training program this measurement was important. The tutorials had to be accessed via an intranet either at home or in a lab, and so were vulnerable to problems given the various equipment and number of stages in the process. There were no reports of equipment failure or training shortcomings due to the equipment.

- Materials: The students generally agreed that there were sufficient materials available to perform the tasks required of the lynda.com training. Computers were readily available (a frequent complaint in the early days of CBT was the lack of computer availability); few of the students downloaded the files for interaction with the tutorials; and print materials were not an issue. However, several students suggested in the open-ended questions that hard copy of an outline of the tutorials, and printed follow-up exercises might be beneficial to the otherwise electronic learning experience.
- Methods: It was also agreed that the training methods were positive. The students had access to the tutorials 24-7, and the teachers required the tutorials for the class. If the tutorials were not mandatory the students were not sure how motivated they would be to view them. The question of motivation was important because the training was required over and above the classroom instruction and performance.
- Environment: The fact that the students had easy and unlimited access to the training tutorials was greatly appreciated. Most strongly agreed that this self-paced learning environment was good. Students agreed that the training outside the classroom environment was good, but were unsure if there was enough time to process all the training. Some suggested that the training modules be shorter in length.

The Effectiveness of Kirkpatrick's Evaluation Model

Kirkpatrick's four level evaluation model which includes reaction, learning, behavior, and results was chosen for this study chiefly because the model is tried and tested and it is fairly easy to implement. Kirkpatrick is an oft-cited proponent of training evaluation and he makes a strong case for the benefit of training evaluation. As was mentioned earlier, Kirkpatrick cites three main reasons for evaluating training: "The most common reason is that evaluation can tell us how to improve future programs. The second reason is to determine whether a program

should be continued or dropped. The third reason is to justify the existence of the training department and its budget" (Kirkpatrick & Kirkpatrick, 2006, p. 19).

This study was limited to the first evaluation level, reaction, so the scope of the results are limited accordingly. The information gleaned from this evaluation is important, but it must be stressed that the other evaluation levels should be implemented to gain the maximum benefit of Kirkpatrick's model. Again, Kirkpatrick stated,

> The four levels represent a sequence of ways to evaluate programs. Each level is important and has an impact on the next level. As you move from one level to the next, the process becomes more difficult and time-consuming, but it also provides more valuable information. None of the levels should be bypassed simply to get to the level that the trainer considers the most important. (p. 21)

Evaluating student reaction is important then, since it is the first step in a model that is meant to be sequential.

Another benefit of measuring reaction is that quantifiable data was obtained as a result. The Likert scale and open ended questions measured the five inputs (PEMME) to the training process and provided empirical data for the record. This data can serve as baseline information for additional evaluation, or for validating an instrument for future studies. Subsequent lynda.com system evaluation can be conducted and training effectiveness can be determined. At the very least, measuring student reaction to this training will help improve future programs.

Suggestions for Further Study

Kirkpatrick's model of training evaluation came about as a series of articles first published in 1959 - almost 50 years ago. The history of CBT dates back even further to post World War II developments with computers. There is nothing entirely new about lynda.com

training or the methods to evaluate it. However, it might be prudent to examine this training phenomenon since, in combination with the internet and intranets, lynda.com types of training seem to be increasingly popular. Currently computers are essential tools at all levels of training and education, and the internet challenges the traditional classroom. Do the old models of evaluation hold true for these new developments dubbed e-learning?

In the 2006 third edition of his book, *Evaluating Training Programs, The Four Levels* Donald Kirkpatrick includes a chapter written by William Horton (2006). The chapter is titled, "So How is E-Learning Different?" The sub-title reads, "Evaluating E-Learning is the Same, But..." In this chapter Horton began by pointing out that traditionally "What we evaluate is not the artifacts or apparatus of learning but the outcomes. The outcome of learning resides with the learners, not the pens, pencils, chalkboards, whiteboards, hardware, software, or other paraphernalia of learning" (p. 95). Horton went on to suggest, though, that electronically delivered learning could merit some techniques of electronic evaluation.

The whole of Horton's essay was spent demonstrating new techniques for achieving Kirkpatrick's four levels of evaluation as applied to electronic learning, similar to lynda.com and other forms of delivery. Evaluating level one – reaction, Horton (2006) suggested ways for trainees to register their response to training through electronic means:

- Let learners vote on course design. Online polls and ballots give learners the opportunity to comment on aspects of e-learning design and delivery.
- Set up a course discussion thread. Let learners talk about their experiences in taking e-learning through forums.
- Use chat or instant messaging for a focus group. This sort of thing is already popular with many people and is an immediate and economical way to record trainees' opinions.

- Gather feedback continuously. Providing the ability to send feedback at any time lets learners report problems, confusion, insights, and triumphs immediately.
- Record meaningful statistics automatically. Web servers, virtual-classroom systems, learning management systems (LMSs), and learning content management systems (LCMs) all record detailed information about what the learner did while taking e-learning. (pp.96- 102)

The last suggestion is already in place for lynda.com at UW-Stout. With the lynda.com managed multi-user system there is software loaded on the stout server that tracks every time a user logs on to a specific training title. This information is currently being used to track title usage for future contract purposes. Those titles that are not used may be discontinued in favor of more popular titles thereby making the system more economical and efficient.

Conclusion

Evaluating lynda.com software tutorial training at UW-Stout has yielded some basic yet worthwhile information. Students affirmed that in terms of the five inputs (PEMME) the lynda.com training was a positive addition to the classroom instruction. Kirkpatrick's level one-reaction evaluation is the first step toward future evaluation. By adopting some of the methods tailored for e-learning, evaluation at all four levels should yield an even better determination of the effectiveness of e-learning.

References

Belanger, F., & Jordan, D. H., (2000). *Evaluation and implementation of distance learning: Technologies, tools, and techniques.* Hershey, PA: Idea Group Publishing.

Bell, B. S., & Kozlowski, S. W. J. (2002) Adaptive guidance: Enhancing self-regulation, knowledge, and performance in technology-based training *Personnel Psychology, 55, 267-306.*

Chen, C. C., & Jones, K. T. (2007). Blended learning vs traditional classroom settings: Assessing effectiveness and student perception in an MBA accounting course. *The Journal of Educators Online, 4*(1), 1-15.

Johnson, D. A. (2007) Training design and evaluation. Unpublished class notes. University of Wisconsin- Stout, Menomonie.

Kirkpatrick, D. L. (1996). Great ideas revisited: techniques for evaluating training programs. *Training & Development,* January

Kirkpatrick, D. L., & Kirkpatrick, J. D. (2006). *Evaluating training programs: The four levels* (3rd Ed.). San Franciso, CA: Berrett-Koehler.

Kranz, G. (2008). E-learning hits its stride. *Workforce Management Online.* Retrieved November 8, 2007, from http://www.workforce.com/archive/feature/25/38/45

Kulik, C. C., & Kulik, J. A. (1991). Effectiveness of computer-based instruction: An updated analysis. *Computers in Human Behavior, 7, 75-94.*

Ladd, B. (1990, May). Early CBT remembered: How we got here from there. *CBT/Interactive Technologies- Training Magazine, 7*(4), 8-10.

lynda.com. (2008). *About lynda.com.* Retrieved September 21, 2007, from http://www.lynda.com/aboutus/

McLeod, S. (2007). Our ethical obligation: Students are unimpressed by tech-phobic professors. *Technology & Learning, 28*, 38.

Rossett, A. (2007, February). Leveling the levels. *T & D, 49-53.*

Rother, C. (2004, October). Evaluating technology's role in the classroom. *Teachers Talk Tech: T.H.E. Journal,7,1-5.*

Sims, J. R. (2003). Streaming student speeches on the Internet: Convenient and "connected" feedback in the basic course. *Basic Communication Course Annual, Deanna D. Sellnow, ed. 15, 1-41.*

Steele, D. J., Palensky Johnson, J. E., Lynch, T. G., Lacy, N. L., & Duffy, S. W. (2002). Learning preferences, computer attitudes, and student evaluation of computerised instruction. *Medical Education, 36,* 225-232.

Appendix A: Lynda.com Software Tutorial Survey

Directions: Please respond to each of the following statements based on your experiences with the Lynda.com training tutorials used in this class.

1 = SD = Strongly Disagree
2 = D = Disagree
3 = U = Undecided
4 = A= Agree
5 = SA = Strongly Agree

Characteristics of the Training Program	Responses SD 1	D 2	U 3	A 4	SA 5
1. I enjoyed using the Lynda.com software tutorials for this class.	1	2	3	4	5
2. Equipment problems were an issue with the training...	1	2	3	4	5
3. Did the instructor require the use of the Lynda.com materials?.	1	2	3	4	5
4. Access to the tutorials at any time was beneficial.	1	2	3	4	5
5. I didn't download the lessons, and only viewed the streamed presentation.	1	2	3	4	5
6. Computer interaction with the tutorial worked well	1	2	3	4	5
7. I'm a self-directed learner and prefer learning on my own	1	2	3	4	5
8. The teacher was helpful with any questions and assistance with the tutorials.	1	2	3	4	5
9. The video tutorials helped me learn the other course material.	1	2	3	4	5
10. I would recommend this type of software training to others	1	2	3	4	5
11. Working with the tutorials outside of class was a good experience.	1	2	3	4	5
12. I never had a technical problem with access to the tutorials online.	1	2	3	4	5
13. Additional printed materials would have helped me learn the video tutorials..	1	2	3	4	5
14. I didn't have enough time to master the software tutorial lessons satisfactorily	1	2	3	4	5
15. I had easy access to a computer for working on the tutorials.	1	2	3	4	5

Completion Questions: Please supply your own brief answers to the questions below:

1. What did you like most about the Lynda.com tutorials?

2. How could the technology be improved?

3. What supplemental materials would have helped?

4. What is your preferred learning method?- classroom, computer, or combination?

5. What is the best learning environment for these tutorials?- home alone, or in a supervised lab?

Appendix B: lynda.com approval for screen shots

From: Sharon Seiders [mailto:sharon@lynda.com]
> Sent: Tue 3/11/2008 11:36 AM
> To: Dybvik, Bruce
> Subject: Re: follow-up
>
> Hello Bruce,
>
> We would be willing to grant access to the images if we could get a
> copy of your final paper. We wouldn't use it without your permission,
> but would like to see the results and how the images are portrayed.
> We would request that, at the bottom of the screen capture of Deke
> McClelland, the link to your website be removed.
>
> Glad to hear you're still actively involved with this project!
>
> Thank you for your interest in lynda.com,
> Sharon Seiders
> 888-335-9632 ext.114
> 805-477-5612 fax
> Learning@Your Own Pace
>
> new contact info:
> 805-477-3900 main office
> 4171 Market St., Suite C
> Ventura, CA 93003