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SATISFACTION OF PARTICIPANTS WITH THE BUSINESS TRAINING  
NETWORK (BTN) E-TRAINING COURSES IN 2004 IN TAIWAN

A Thesis in  
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by

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## ABSTRACT

The purpose of this study was to explore the relationship between participants' satisfaction with and motivation to attend the Business Training Network (BTN) e-training courses in 2004 in Taiwan. A BTN-developed e-survey questionnaire was used to collect data on participants' satisfaction level, motivation factors for attending the BTN e-training, and demographic variables. Seven hundred six (706) participants responded to the BTN e-learning e-survey.

Descriptive statistics, logistic regression, and Chi-square analysis methods were employed to analyze the relationships between the participants' satisfaction with and motivation to gain job training while attending the BTN e-training, and their opinions of the BTN e-course content, by age, gender, education level, position, employment status, industrial category, and frequency of attendance. The study results revealed that the participants' satisfaction with the BTN e-training was significantly related to their age and frequency of attendance; the participants' top three motivation factors for attending the BTN e-training were significantly related to age, industrial category, employment status, position, and frequency of attendance of BTN e-training courses; and the participants' opinions about the BTN e-training courses showed that younger participants and those with less than four years of college were most likely to disagree with the BTN e-training course content. A brief discussion of implications and suggestions for future research are provided.

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## CHAPTER 1

### Introduction

#### *Background of the Study*

Technological innovation has revolutionized our global economy and has redefined requirements for successful businesses, professional careers, and productive jobs in what is now called the knowledge economy, a term currently used by many respected economists and business leaders (Lytel, 1999; Moe, Bailey, & Lau, 1999; Stuart, 1999). In the knowledge economy, knowledge is the raw material that fuels the economy, and it has greater value and power than natural resources. As Block (1999) observed, “companies have access to the same tools, raw materials and markets as their competitors. One of the few remaining advantages that businesses retain is their ability to squeeze more out of the input by applying another input—knowledge—in a more cost-effective, productive fashion” (p. 4). Not only have economists and business leaders involved themselves and their workers in adapting to and succeeding in the knowledge economy, but political winds are blowing as well, and many key political figures have made workforce education a national priority. As Florida and Kenney (1993) reported:

Capitalism is undergoing an epochal transformation from a mass production system where the principal source of value was human labour to a new era of ‘innovation-mediated production’ where the principal component of value creation, productivity and economic growth is knowledge (p. 637).

As a result of globalization, countries and organizations have greater access to capital and raw materials. Yet despite the ease of access to such assets, “knowledge is now fast becoming the sole factor of production, sidelining both capital and labor” (Drucker, 1994, p. 13). However, one country that has not realized an increased ease in access to natural resources is Taiwan. Since that country lacks many of the natural resources available in other countries, it must rely heavily on the development, mobilization, and utilization of training, which is crucial to developing and maintaining the high-quality human resources needed to fuel the country’s economic development. According to Thurow (1992), the capability to produce quality goods at the most competitive price is becoming globally equal. Currently, skills and training are as necessary for the bottom 50% of the workforce as for the top 25%. This shift has made training the significant factor in winning an edge in today’s business environment. Thus, qualified, knowledgeable, and dedicated workers are the most essential resource in enabling countries and organizations to become and remain competitive. Increased availability of technology has created a workplace in which “today workers have a non-traditional orientation to time and space, believing that as long as the job gets done on time, it is not important where it gets done” (Edge interactive, n.d., p. 1). Additionally, workers want the opportunity to allocate time toward learning as needed. Ideally, modern training methods need to reflect changes in workplace habits.

One challenge faced by countries and corporations is maintaining competent workforces. Currently, many significant demographic trends have resulted in increased demand for education and training. In order to maintain a competitive edge, organizations, government agencies, and even entire countries have begun to realize that learning must

become a lifelong activity, one that occurs both within and outside a traditional classroom setting. Therefore, in business, in the workplace, and in governmental arenas, investigations of training techniques and delivery methods that enhance motivation, performance, collaboration, and innovation, and result in a commitment to lifelong learning become important. Another factor to consider is accountability. Emphasis on accountability in education and training has made assessment and testing a hot button globally. Advancements and enhancements in technology have created tremendous opportunities to create new and unique business and education paradigms in the new economy driven by knowledge and information access. One of the most powerful technological advancements is the Internet, which in a few short years has become the foundation for information, communication, and commerce. In traditional educational facilities, as well as in the workplace, the Internet may serve as a conduit for programs that provide opportunity for e-learning. As long as a decade ago, Winner (1995) stated that the Internet held vast opportunities for learning potential. Today, and undoubtedly in the future, rapid expansion of the Internet provides substantial promise for developing nations that can benefit greatly from Internet communication and information delivery capabilities to connect individuals, organizations, and countries to any information they seek. Education, health, social policy, commerce and trade, government, agriculture, communications, and science and technology may all benefit from information available via Internet access.

Taiwan is only one country that may benefit greatly from increased Internet access. Today, Taiwan faces global issues in common with other societies, such as the need for access to reliable and current global information, the challenge in maintaining its position in the face of globalization, the ever-present environmental issues, and the

availability of energy and resources. Also critical are specific issues that relate to the country's employment. Taiwan is currently in a phase of economic stagnation that has created a prolonged economic recession, mainly as a result of the conflict between China and Taiwan. Workers encounter challenges in finding and changing employment. Currently, the overall unemployment rate is still on the rise, yet the ratio of job offers to applicants is falling.

In addition to the political conflict between China and Taiwan, another issue that is significant when evaluating the stagnation in Taiwan's economic growth is the country's lack of foresight in education and training, which has contributed to decreasing workplace competitiveness. In many ways, Taiwan has attempted to become a global competitor in a world where national boundaries no longer exist; yet, with this competition comes an increased need for knowledge and technical ability.

Today, Taiwan's lack of foresight in keeping technologically current with the rest of the industrialized world has resulted in the lack of a highly skilled and knowledgeable workforce. While the country's older industries are quickly being replaced by completely new manufacturing sectors and service industries, these new sectors are unable to maintain any competitive edge because few workers are qualified to fill key positions.

One solution to this challenge may be for Taiwan's government to provide workplace training by utilizing global technological advancements. E-training could enhance the skill levels of workers by enabling sufficient numbers of qualified workers to be trained quickly, effectively, and efficiently. One key ingredient in this training is the Internet, which provides an opportunity to implement effective education and training for anyone seeking access to information, anytime and anywhere. Therefore, using e-training

as the delivery method will provide equal opportunities for, as well as fulfilling the needs of, both the organization and the individual worker in Taiwan.

In order to investigate ways in which the workplace in Taiwan could benefit from e-training opportunities, in 1997, the Business Training Network (BTN) is a government entity developed by the Employment and Vocational Training Administration (EVTA), under the auspices of the Ministry of the Interior. The purpose of the BTN is to re-align human resources and development (HRD) with the central government, regional administrations, and enterprises in Taiwan. Its mission is to provide vocational training, guidance, and labor market data, and facilitate relationships among government, employers, and employees in order to reinforce workforce competitiveness by fully utilizing the allied training sources and information available from the BTN. The BTN is the vocational center/platform that provides both classroom and online training for people seeking employment, as well as helps employers identify qualified employees. Since 2002, the BTN has been providing e-training courses. Feedback has been anticipated from this e-training, and would be used to improve and develop additional effective e-training courses.

#### *Statement of the Problem*

e-Learning is a global phenomenon currently utilized by many organizations and countries as a training method. Since 2002, the BTN has embarked on the e-learning journey of discovery. Since this investigation began only three years ago, it is still in its infancy. Yet, expectations are that the identification of existing opportunities for online learning in the workplace in Taiwan will provide effective and efficient possibilities for developing e-training. That identification of opportunity, in addition to suggestions to

increase worker participation in e-training from the BTN, is the focus of this study. Studies of developing strategies show that educational level, employment status, age, industrial category, and frequency of attendance are factors that cause a digital divide, which is the disconnect between the technology available and the technology used as a result of workers' perceptions about said technology. The digital divide in the workplace is evidenced in the minimal use of computers and the Internet. Since there is evidence that the digital divide does exist in the Taiwan workplace, there is a need to reassess participants' perceptions of the BTN e-training courses, including matching individual interests and skill levels with appropriate industries. In addition, there are factors inherent in the digital divide that merit consideration in order to resolve the problem. Not everyone feels at ease in using computers or the Internet in order to learn, and others may be positively afraid of, or overwhelmed by, technology. Therefore, it is imperative for the BTN to discover whether the e-training courses were perceived as a positive experience for those who had participated in e-training in the past, and to identify those aspects of the e-training courses that made the experience enjoyable. In gaining an understanding of learners' perceptions of e-training, administrators and educators can modify approaches to training that will provide more positive learning experiences in future online courses.

#### *Purpose of the Study*

The purpose of the present study is to explore how participants' satisfaction in the BTN e-training courses was influenced by their gender, age, educational level, employment status, industry category, and frequency of attendance. This study used

survey questionnaire data from the BTN, a non-experimental database, to analyze participant satisfaction with an online training course. Kirkpatrick's four-level evaluation model served as the theoretical framework for this study. According to Kirkpatrick (1998), in the four-level evaluation mode, each level of measurement is dependent both on the previous level and on each level itself, and is interdependent with the other levels. Kirkpatrick, in reference to Level 1 measurement, indicates that "evaluation on this level measures how those who participate in the program react to it. Level 1 is called a measure of customer satisfaction" (p. 19). Kirkpatrick's first level of evaluation is the most common type of evaluation. It focuses on what the participant says about the value of the training. Level 1 reaction also considers the participants' motivation to apply the material they have learned from training (Kirkpatrick, 1998; Warr, 1999). Many training professionals rely strictly on this level of evaluation, as it does provide much valuable information (Alliger et al., 1997; Warr, 1999). In its most basic sense, the purpose of training is to increase participants' willingness to apply or transfer the material that is covered in the training, but "there is often scope for variation in the degree to which course material is later applied in a job, and motivational differences between individuals at the end of a training may be linked to variations in subsequent job behavior" (Warr, 1999, p. 352). Often, Level 1 responses yield information that may improve proactive opportunities for future training applications.

No useful training system exists without attendance and participation. Business theory suggests that participants who do not like an educational program will not return to participate in subsequent training programs. However, participants are in an optimal position to suggest improvements to a training activity that does not work well. Therefore,

with the BTN e-training in its infancy, an understanding of participants' satisfaction will help the BTN to improve e-training course development from its inception and motivate more participants to attend e-training courses. Appropriately then, this study focused on Kirkpatrick's Level 1 reaction evaluation, which offers administrators and policy makers an interpretation of data that can be used to identify the challenges inherent in using online learning as a training method in the workplace in Taiwan. Obstacles and barriers must be removed in order to champion online learning successfully; therefore, any perceived deficiencies in the online environment must be addressed, just as the satisfaction of learners engaged in e-learning must be recognized, discussed, and analyzed. In this study, research results will help identify appropriate, enjoyable, low-stress e-training methods in order to increase learners' satisfaction level and willingness to learn online. This model may also benefit educators, learners, and instructional designers involved in vocational education and training. Moreover, in addition to current benefits resulting from this study, it is important to keep in mind the frequent changes in workplace demographics. Within five to ten years, the next generation entering the workforce will have spent most of their youth in the Internet era. Therefore, ongoing measurement and analysis of the perceptions and abilities of online learners is crucial in the development of additional e-training.

### *Research Questions*

The research questions for this study examined and evaluated participants' satisfaction with the BTN e-training in Taiwan.

*Q1.* What is the relationship between participants' satisfaction with BTN e-training and gender, age, education level, employment status, position, industrial category, and frequency of attendance?

*Q2.* What is the relationship between the top three participants' choices from seven motivation factors (listed below) and participants' gender, age, educational level, employment status, position, industrial category, and frequency attendance?

Seven factors of motivation:

- Improving work competence
- Decreasing difficulty in finding a job
- Promoting job satisfaction
- Providing qualifications
- Solving job difficulty
- E-training services follow-up
- Offering free tuition

*Q3.* What is the relationship between the participants' opinions about the content and delivery of the BTN e-training courses and the participants' age and education level?

### *Limitations*

Since the BTN e-training in Taiwan was initially offered in 2002, it is still in the experimental stage. The survey questionnaire has been distributed since 2004 via the

BTN website; therefore, it cannot be generalized, but nevertheless describes the participants' satisfaction.

### *Definition of Terms*

*E-learning/training:* "E-learning/training is defined as learning/training delivered on a computer (including DE-ROM, internet, or intranet) that is designed to support individual learning or organizational performance goals" (Clark & Mayer, 2002, p. 11).

*Participants' satisfaction:* "Conceptualized as a feeling developed from an evaluation of the use experience" (Cadotte, Woodruff, & Jenkins, 1987, p. 305).

*Motivation:* "Motivation is typically defined as the forces that account for the arousal, selection, direction, and continuation of behavior" (Blumenfeld et al., 1991, p. 399).

*Demographic:* Population characterized by age, gender, educational level, job position, employment status.

## CHAPTER 2

### Literature Review

The literature review supported the focus of this study, which is an investigation of the relationship between Business Training Network (BTN) e-training participants' satisfaction with their online course experience and demographic variables for this participant group. To provide an overall perspective on e-learning/training satisfaction research, the first section of the review of literature reports e-learning/training definitions and current trends. The next section contains a discussion of e-learning/training background and the digital divide in Taiwan, and its effects on the BTN e-training. Third, research relating to participants' satisfaction with e-learning/training is presented, and whenever possible, specific literature related to factors and variables that affect e-learning/training is included. e-Training in educational facilities and workplaces, both in Taiwan and other countries, is also included in this review. Finally, a brief description is provided of the research methodology and the conceptual model used to discuss and evaluate the research in this study.

#### *A Review of Related e-Learning/Training Definitions*

Economic, social, and technological forces continue to effect change in the global economy; specifically, these forces continue to revolutionize teaching and learning in organizations worldwide. Urdan and Weggen (2000) believed that technology, with its ability to rapidly make knowledge and training obsolete, in concert with the need for just-in-time training delivery and the search for cost-effective ways to meet the learning needs of a globally distributed workforce, has redefined the processes that underlie design,

development, and delivery of training and education in the workplace. In addition, the need for varied learning models to compensate for the skills gap created by the constant changes in technology, as well as demographic changes, and a demand for flexible access to lifelong learning, all have affected how teaching and learning occur (Urda & Weggen, 2000). Hall (2000) contended that e-learning will continue to be a lifelong process that may be accessed anywhere, at any time, to meet a specific need or wish for just-in-time learning.

As teaching and learning evolve, several new terms have been coined to characterize the innovation and creation that has been occurring in this environment. Such terms include technology-based training, computer-based learning/training, online learning/training, e-learning/training, and distance learning. Next we will review and summarize definitions for these terms that relate to e-learning/training.

Kruse and Keil (2000) defined technology-based training as “[t]he all-inclusive term for training delivered by a number of means. In the past, these have included the use of mainframe computers, floppy diskettes, multimedia, CD-ROMs, and interactive videodisks. Most recently, Internet and Intranet delivery have become preferred delivery options” (p. 8). Zahm (2000) described computer-based training as “usually delivered via CD-ROM or as a Web download and that it is usually multimedia-based training” (p. 44). Similarly, Hall (1997) and Karon (2000) described computer-based training as an all-encompassing term used to describe any computer-delivered training, including CD-ROM and World Wide Web. Hall (1997) further explained that the term computer-based training refers only to old-time and text-only training.

Like computer-based training, online training was classified as an all-encompassing term that refers to all training done with a computer over a network that

consists of Internet and Intranet (Gotschall, 2000). Urdan and Weggen (2000) stated that online learning constitutes just one part of e-learning because it is delivered via Internet, Intranet, and Extranet. Also, Schreiber and Berge (1998) and Gotschall (2000) believed that online learning is any technology-based learning. In a recent study, Clark and Mayer (2002) defined the e-learning/training as “learning/training delivered on a computer (including DE-ROM, Internet, or Intranet) that is designed to support individual learning or organizational performance goals” (p. 11). Because e-learning covers a wide set of applications and processes and has been customized to deliver learning via all electronic media, including Internet, Intranets, Extranets, satellite broadcast, audio/videotape, interactive TV, and CD-ROM, Hall (2000) defined e-learning as a all-inclusive form; thus, distance learning, or planned interactive courses with the acquisition of knowledge and skills at a distance through various technological mediums as their goal, is one of many possible delivery systems of e-training/learning. Interestingly, Urdan and Weggen (2000) saw e-learning as a subset of distance learning; online learning a subset of e-learning; and computer-based learning as a subset of online learning. According to Berge (1998), “distance learning was seen as the acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance” (p. 20); thus, Berge argued that the term “subset” does not appear to be the most appropriate word to describe the relationship among these forms of learning. Since many technologies could be used to deliver distance learning (Porter, 1997a, 1997b), using “interrelation” to describe the relationship among these forms of learning may be more appropriate.

*e-Learning Trends in the Knowledge Economy*

As a result of globalization, organizations are able to operate from any geographic location. During the last two hundred years, organizations have transitioned from the industrial age to the information age to the knowledge age (Lytel, 1999; Moe, Bailey, & Lau, 1999; Stuart, 1999). At present, the knowledge age is characterized by continuous learning that often decides the success or failure of organizations and individuals in environments subject to dynamic change (Block, 1999; Florida & Kenney, 1993). The speed of knowledge acquisition has become the key differentiator for organizations and individuals in their attempts to maintain a competitive advantage and keep information current (Florida & Kenney, 1993; Moe et al, 1999; Stuart, 1999); therefore, training has become a valuable tool in knowledge acquisition, as it provides opportunities for both a strategic initiative and a competitive edge in the workplace. Economic studies identified training and development investments as key determinants of organizational performance and economic growth (Mason, Van Ark, & Wagner, 1996; Prais, 1995; Romer, 1993).

In order to harness and disseminate the constant flow of information in the global economy, training must be timely and must be customized to meet the needs of each employee who is a key contributor to workplace objectives. For this task, electronic learning (e-learning) utilizes technology to deliver, interact with, or facilitate information in this current knowledge age (DeSantis, 2003), and provides a convenient and immediate delivery system that enhances the effectiveness of skills and knowledge acquisition within the workplace; moreover, e-learning increases relevance and retention of training due to its “just in time” delivery, as the training may be scheduled for delivery at or near the moment it is needed (Chadha & Kumail, 2002). Since the 1990s, e-learning has become immensely popular. The popularity of e-learning is not only limited to the

business world—governments have also realized its potential. According to Harrison (2001), e-learning is a global phenomenon that no human resource development practitioner can afford to ignore. Use of technology with Internet access provides logical e-training solutions for workforce education, with its convenient connection to information anywhere, anytime, and by anyone. Utilizing e-learning not only enhances the capabilities and usefulness of information technology, but it also offers ever-increasing capabilities well-suited for teaching and learning. Because the e-training/learning phenomenon has become a global innovation, the Business Training Network (BTN) was developed in 2002 by the Taiwan government to implement an e-training program. This study reviewed and evaluated participants' satisfaction with the BTN e-training, as reported in a post-training survey. Before beginning the review of the research conducted for this study, a brief history of e-learning in Taiwan is provided below.

### *e-Learning in Taiwan*

Because Taiwan lacks many of the natural resources available in other countries, workplace initiatives must focus on the development, mobilization, and utilization of the training that is crucial to developing and maintaining the high-quality human resources needed to fuel the country's economic development, rather than on new investments or discoveries to procure scarce natural resources. Also, since Taiwan works with global agencies such as the World Trade Organization (WTO), it is imperative for the Taiwan government, as well as industry, to cultivate professionals with global perspectives in order to cope with challenges derived from internationalization and digitization. As opportunities become increasingly global and move westward into China, industry in

Taiwan must remain current with up-to-date management, knowledge, and technology. One viable way to remain current is to implement e-learning, which provides an environment for learning beyond time and geographic limitations. e-Learning can transform Taiwan businesses into Knowledge and Learning Logistic Centers where industry can preserve and enhance its strengths in the critical know-how and core competencies that have worked so well for so many years. As a first step toward its e-learning plan, on January 15, 2002, the Taiwan government approved the “Challenge 2008: National Development Plan.” One initiative in the overall plan is called the “e-Taiwan Construction Plan.” This initiative dedicated approximately \$4 billion which would be used to develop a five-year plan to implement e-training/learning systems in the workplace in Taiwan. This initiative also included the Plans for National Development in the New Century as a significant program of “Facilitating e-Life in a Digital Taiwan” (National Science Council, n.d.). The objective of this program is to create a favorable environment in which to integrate up-, mid-, and down-stream research and development resources, to facilitate cooperation among government, industry, and academia, and to apply what is learned from the initiative in society, industry, and research. “e-Learning for everyone” will be implemented through educational and promotional campaigns by cultivating digital learning habits as a result of increased demand, in turn enhancing business and ultimately the market economy.

To facilitate “e-Learning for everyone,” the initiative’s primary task is the integration of domestic soft/hardware resources that can be included in the new construction of, or renovation to, existing community e-learning centers, enabling “Easy access to Internet, Information available everywhere” (National Science Council, n.d.). In addition to facility enhancements, e-learning activities will be designed to facilitate

popular learning so that current employees, teachers and students, civil servants, the unemployed, active-duty military personnel, housewives, retirees, and the underprivileged all are able to engage in diversified e-learning. In the social dimension, the program will lead Taiwan to evolve into a “learning society,” and further into an “e-society” with a goal of upgrading national competitiveness at all levels in the current global knowledge economy. In the industrial dimension, the program starts with e-learning, which was the focus of this study, and then gradually expands into other applications to create both domestic demand and an international market for industry.

In order to discuss e-learning performance, the digital divide, which would certainly affect e-learning performance, should be explored. According to Hoffman and Novak (1998), the term digital divide was first used by Lloyd Morrisett, who vaguely conceived of a divide between the information haves and have-nots. The term digital divide in this study refers to the gap between people who can effectively use new information and communication tools, such as the Internet, and those who cannot. For any e-learning to be effective, it is necessary to minimize the digital divide. A serious hindrance to the administration of an effective e-training program is an existing digital divide that may influence the participants’ reaction to e-learning. As long as the digital divide exists, it will be difficult for countries, organizations, and individuals to efficiently and effectively administer e-training via the Internet or Web. In order to develop and participate in e-learning effectively, the digital divide that exists in Taiwan in general, and specifically in Taiwan’s workplaces, merits discussion.

*The Digital Divide in Taiwan*

In 2002, the Development and Evaluation Commission (DEC) of Taiwan reported the digital divide within the population in general. At that time, income, region, age, gender, and education were factors that correlated with the digital divide. Further, in 2003, the Employment and Vocational Training Administration (EVTA) conducted a survey on the development of strategies to use in narrowing the digital divide in Taiwan's workplaces. The survey questionnaire consisted of five sections: computer and Internet usage and application; computer and Internet skill requirement in the workplace; opinions on developing strategies to narrow workplace digital divide in Taiwan; type of training needed; and demographic information. The research participants were divided into three groups—employed, unemployed, and disabled. The employed population consisted of employees who had been attending EVTA training courses. The unemployed population consisted of people who registered as job seekers and needed to receive EVTA cultivation training in one of the many regional EVTA career service centers in Taiwan. The disabled population included people who registered as having a disability, and who needed the services of an EVTA career link center to provide skill training. The sampling was a proportional stratified selection of three categories, based on each region's percentage of three population categories.

The total population sample was 12,045—6,000 employed, 4,500 unemployed, and 1,545 disabled participants. A total of 12,045 survey questionnaires were mailed, with 963 returned, yielding an 8.3% return rate. The total number of surveys returned was 460 out of 6,000 distributed to employed participants, for a 7.9% return rate. For the unemployed, 351 out of 4,500 surveys were returned for a return rate of 8.1%. A total of

155 out of 1,545 surveys were returned by those with a disability, for a 10.3% return rate. The study outcomes showed the majority of currently employed workers to be between the ages of 26 and 55. These workers accounted for 80.6% of the employed workforce. Males accounted for 58.73% of the workers and females accounted for 41.27%. The majority of unemployed workers were age 25 or younger than age 45; this group accounted for 78.36% of the unemployed workforce. These findings combined with research suggested that the new technology is used mainly by young people between the ages of 16 and 30 (DEC, 2002) in Taiwan, and indicated that the age-gap factor influenced the workforce digital divide.

According to the findings from the EVTA study (2003), people with higher levels of education form the major group of Internet users, and educational attainment is a factor that accounts for computer and Internet use in Taiwan. People with higher levels of education are more comfortable using technology and accessing the Internet. Educational level relates to work position in that a higher education degree is most often sought by those doing the hiring in technological industries. Moreover, people with a lower level of education who work in manufacturing often have fewer chances to use a computer or the Internet in the workplace. These workers are uncomfortable using computers and unfamiliar with Internet access. In terms of gender, research suggests that females are more comfortable using computers than males, because a greater number of females are employed in positions where computer use is required to perform their duties. In addition, employed people have greater opportunities to use a computer and access the Internet than do the unemployed. In sum, study results concluded that age, gender, education level, income, position, location, and industry category were all factors that correlated significantly with the workplace digital divide in Taiwan (EVTA, 2003).

According to the e-Taiwan Construction Plan, the Business Training Network (BTN) has provided e-training for workers in Taiwan since 2002. Since the e-training program began just three years ago, it is still in its infancy. Yet, there are expectations that better identification of existing opportunities for online learning in the workplace in Taiwan will provide effective and efficient possibilities for further development of e-training. That identification of opportunity, combined with suggestions for increased motivation resulting in additional worker participation in e-training from the BTN, was the focus of this research. In order to implement e-learning effectively, methodical gathering and review of information from research and best practices in both technology and learning is required. The study of the digital divide in the workplace in Taiwan indicated that gender, educational level, employment status, age, and industrial category all contribute to the digital divide. The result of the presence of this divide is reflected in the protracted use of computers and the Internet. Since there is evidence that the digital divide does exist in Taiwan's workplaces, there is a need to assess the participants' perception of the BTN e-training courses, including matching individuals with appropriate industries for their interests and skill level. In addition, factors inherent in the digital divide merit consideration in order to mitigate, or perhaps even solve, the problem.

### *The Review of Related Research*

Just as learning and education have been changed by technological innovations, the role of the learner is changing as well. Traditionally, learners have met with instructors face-to-face in a physical setting. Nowadays with e-learning, learners meet instructors virtually via electronic media. As a result of this change in traditional

educational processes, certain learner-related issues must be discussed when considering an e-learning platform in any organization or country. Therefore, the significance of administering and analyzing an e-learning evaluation, understanding the learners' satisfaction with e-learning, and relating the analysis of e-learning evaluation to future e-training course development, both in Taiwan and in other countries, will be reviewed.

### *Evaluation of e-Learning*

Although training may be delivered in a traditional classroom or via e-learning, the goal of training is to provide educational opportunities that will increase personal and workplace satisfaction, motivation, and productivity (McArdle, 1999). However, the effectiveness of any training method, defined as “the benefits that the company and the trainees receive from training” (Noe, 1999, p. 130), should first be determined by an evaluation of that training: “Training evaluation definition is the process of assessing the results or outcomes of training” (King, King, & Rothwell, 2001, p. 348). In other words, training evaluation determines the value of the training, including to what extent and how well the training met the identified learners' needs. Experts within the training field believe that the evaluation must not only be an add-on to the training program or just a step in the training, but should be included within any training process in order to determine the effectiveness of the training program (Kirkpatrick, 1998; McArdle, 1999). An effective training program has to meet the learners' and/or organizations' needs. A good training provider should want to know to what degree the training has worked and how it will benefit the learners or organizations (McArdle, 1999). A valuable opportunity for making training count will be missed if evaluation is ignored. Evaluation may be used to improve the training program, enabling learners to embed the learning into the working

process in order to solve the learners' and organizations' problems (Kirkpatrick, 1998). To accomplish training goals, evaluation must occur throughout the training program. Evaluation is a vital part of any training, and instructional design is incomplete without it. Evaluation is also a significant part of the instructional design and delivery process, because it can help training succeed and stop poorly executed training programs from happening. According to Kirkpatrick (1998), there are three specific reasons for evaluation:

- To justify the existence of the training department by showing how it contributes to the organization's objectives and goals;
- To decide whether to continue or discontinue training program; and
- To gain information on how to improve future training programs (p. 16).

Many trainers do attempt to evaluate their programs; unfortunately, some trainers gather data for evaluation, but do not analyze it for trends or use it to improve existing training programs. Such an oversight can be costly, especially in light of the billions of dollars that have been and will continue to be spent annually on training efforts.

Effective evaluation is multifaceted. Much of the literature (Alliger et al., 1997; Bartram & Gibson, 1999; Kirkpatrick, 1998; Nelson & Dailey, 1999; Noe, 1999; Rae, 1999) recognizes the importance of evaluation in terms of participant satisfaction and economic return. In other words, most researchers in the field understand that trainees, whether they have hired the trainer and/or have participated in the training, must be satisfied with that training. If trainees do not perceive a return on their time and money investment, whether measured in terms of time or dollars, they may not be willing to

continue to invest additional time or money in training. Therefore, evaluation is necessary to ensure the effectiveness of a training program.

#### *Kirkpatrick's Four-Level Evaluation Model*

Kirkpatrick (1976) is well known as a visionary and pioneer who provided learning professionals with a methodology that could be used to measure the effectiveness of their initiatives from a performance improvement perspective by measuring the feedback from participants in the training programs (King et al., 2001; Shelton & Alliger, 1993). The Kirkpatrick model has served as the primary organizing design for training evaluations in for-profit organizations for over thirty years (Shelton & Alliger, 1993). The following examples show how to apply Kirkpatrick's four levels in an evaluation process (King et al., 2001; Kirkpatrick, 1998). Level 1 focuses on learners' reactions to/satisfaction with the training. Trainees are asked to evaluate the training after completing the program. The most common way to measure the reactions/satisfaction is by using a "smile sheet" or "happy sheets" (Kirkpatrick, 1998) because in their simplest form, they measure how well students liked the training (for this study, the evaluation used in the BTN e-survey questionnaire is the Level 1 reaction evaluation). Level 2 focuses on learning; Knowledge, Skill, and Attitude (KSA) are the most common items measured. In other words, Level 2 evaluation seeks to ascertain whether the trainees actually learned the knowledge, skills, and attitudes that were supposed to be taught in the training program. A pre-test and post-test are the most common evaluation instruments. Although this level is not used as often as Level 1, it is still very common (Kirkpatrick, 1998; Kruse & Keil, 2000). Level 3 focuses on behavioral changes by evaluating how much or how well learners apply what they have learned from training to

their job performance. Usually the most common evaluation of Level 3 is conducted three to six months after the training program by using either observation or surveys. Such observation or surveys can be conducted and completed by supervisors, colleagues, or customers (Kirkpatrick, 1998; Kruse & Keil, 2000). Finally, Level 4 focuses on the results, as it evaluates to what extent the training has influenced organizational results, such as higher productivity, greater profitability, higher return on equity, and so on (King et al., 2001; Kirkpatrick, 1998; McArdle, 1999).

In recent years, however, there has been growing criticism of Kirkpatrick's approach to the evaluation of training programs. For example, some research has indicated that the four-level model presents an oversimplified view of training effectiveness that does not consider individual or contextual influences in the evaluation of training (Cannon-Bowers, Salas, Tanenbaum, & Mathieu, 1995; Ford & Kraiger, 1995; Salas & Cannon-Bowers, 2001; Tannenbaum & Yukl, 1992). Several researchers found little evidence either of substantial correlations between measures at different outcome levels or evidence of the linear causality suggested by Kirkpatrick's four-level model evaluation (Alliger & Janak, 1989; Alliger, Tannenbaum, Benett, Traver, & Shotland, 1997; Bernthal, 1995; Hesketh & Ivancic, 2001). However, many of Kirkpatrick's detractors fail to escape what we will call the Kirkpatrick Paradigm, where the training executives make virtually all decisions about what is important, what should be measured, what should be reported and what constitutes return on investment (ROI) for the training. Frequently, these determinations occur as soon as a request for training is made, and prior to any serious discussion with the stakeholder who requested the learning initiative. In response, Kirkpatrick (1996) pointed out that "the model doesn't provide details on how to implement all four levels. Its chief purpose is to clarify the meaning of evaluation and

offer guidelines on how to get started and proceed” (p. 55). Thus, Kirkpatrick’s (1998) four levels of training evaluation—reaction, learning, behavior change, and results—are still a useful framework for considering evaluation techniques, as evidenced by the frequency with which they are referenced in the training-evaluation literature (Antheil & Casper, 1986; Ban & Faerman, 1990; Carnevale & Schulz, 1990; Endres & Kleiner, 1990; Fisher & Weinberg, 1988; Kruse & Keil, 2000).

Kirkpatrick’s four-level evaluation is still popular and useful for several reasons. First, the model addressed the need of training professionals to understand training evaluation in a systematic way (Shelton & Alliger, 1993). Also, the four-level model has provided a straightforward system or language for talking about training outcomes (Shelton & Alliger, 1993). Moreover, information could be provided to assess the success of the training program objectives. Second, the four-level model offers a means for trainers and organizations to describe the results of what they do in business terms. Many see this description as critical if training is to become a crucial factor in organizational success (Shelton & Alliger, 1993). Finally, the four-level model represents a straightforward guide for appropriate and effective questions and criteria (Newstrom, 1995). There is no doubt that Kirkpatrick’s model has made valuable contributions to training evaluation thinking and practice. It has helped focus training evaluation practice on outcomes (Newstrom, 1995), fostered the recognition that single outcome measures cannot adequately reflect the complexity of organizational training programs, and underscored the importance of examining multiple measures of training effectiveness (Newstrom, 1995). Kruse and Keil (2000) asserted that Kirkpatrick’s four-level model could also be applied to technology-based training as well as to more traditional forms of delivery. The model promoted awareness of the importance of thinking about and

assessing training in business terms (Wang, 2003). The model has also served as a useful heuristic model for training evaluators (Alliger & Janak, 1989) and it has been the basis of many other evaluation models (Holton, 1996; Jackson & Kulp, 1978).

### *Learner Satisfaction with e-Learning*

The proliferation of e-learning or distance learning course and delivery methods has created the need for extensive monitoring of quality-related learner experiences (Sherry, Fulford, and Zhang, 1998). Learner satisfaction is an important component in the effectiveness of e-learning systems (Chute, Thompson, & Hancock, 1999; Smith, 1998). Like any other information system, the success of learning management systems largely depends on user satisfaction (Bharati, 2003; DeLone & McLean, 1992; Doll & Torkzadeh, 1992; Seddon, 1997) as well as other factors. Moreover, Stokes (2001) indicated that learner satisfaction in the digital environment is very important. A high level of learner satisfaction led to students' increased willingness to continue in online programs as evidenced by lower attrition rates, more referrals from enrolled students, greater motivation, better learning achievement, and increased commitment to the program. (Biner, Dean, & Mellinger, 1994; Chute et al., 1999; Tallman, 1994) The learners' level of satisfaction with the media and processes used to create the learning environment enhanced the learners' participation in future e-learning courses. Because learner satisfaction is a major component of successful training and particularly important to e-learning course development, careful analysis of the different aspects of learner satisfaction is an important component in evaluating e-learning (Chute et al., 1999). Wisher and Priest (1998) suggested that while favorable reactions to training alone do not necessarily indicate that learning has taken place, such reactions are useful to collect for

the following reasons: first, positive reactions help to gain or maintain organizational support for training; second, reaction measures can serve as a source of immediate feedback to training providers, including instructors, production staff and training event organizers; third, insight can be gained from subgroup analysis, allowing for analysis of training impact across subgroups; and fourth, like traditional classroom-based instruction, e-learning contains multiple aspects that impact the learner's experience. Level of participation and interaction, the amount and quality of feedback, the learning environment, and technology are frequently mentioned in the e-learning literature as factors that have a significant impact on the learners' satisfaction.

The definition of Kirkpatrick's Level 1 is focused on the participant's response to questions regarding the value of the training (Kirkpatrick, 1998). Santos and Stuart (2003) suggested "that by taking into account the actual recipients' view of training our understanding of the factors affecting training effectiveness can be enhanced" (p. 27). Level 1 reaction also deserves consideration of the extent to which the participants' motivation affects their application of the knowledge, skill, or material they have gained from training (Kirkpatrick, 1998) to their work performance. The purpose of training is to increase participants' willingness to apply or transfer the material that is covered in the training. "There is often scope for variation in the degree to which course material is later applied in a job, and motivational differences between individuals at the end of a training may be linked to variations in subsequent job behavior" (Warr, 1999, p. 351). Therefore, the Level 1 reaction clearly has a proactive emphasis.

Level 1 reaction is commonly obtained at the end of a seminar or workshop by simply asking the participants to fill out an evaluation form. The reaction evaluation gives participants a chance to express what they feel about a training program they have

attended. Depending on the questions, they can evaluate the instructor and instruction material. Questions such as “How do you like/feel about the training?” may be included in such an evaluation. The evaluation form is usually designed as a questionnaire. The questionnaire measures participants’ reactions, which can help training providers determine the effectiveness of a program and instruction and how it can be improved. Applying Level 1 evaluation to recognition programs affords the evaluator the most direct, and probably the most common, measure of recognition (Nelson & Dailey, 1999). “A questionnaire asking about participants’ reaction to the training could include simple questions about the clarity of the training instructions” (Nelson & Dailey, 1999, p. 75).

Kirkpatrick (1998) asserted that trainers cannot bypass Level 1 evaluation—if participants do not react favorably to training programs, they will not be motivated to learn. In another study, Jones and Bowler (1997) found that learning is influenced by the learner’s perception of the quality and usefulness of the training. Therefore, it will be increasingly difficult to keep the participants engaged in the training activity if they do not enjoy the training program (Nelson & Dailey, 1999). In addition, research showed that the typical dissatisfied trainee will tell at least ten other people about the poor training programs (Becker & Wellins, 1990). Conversely, positive reactions to the training can provide information for continued support and enable trainers to leverage the success of the training.

### *Learner Satisfaction Studies*

Most of the e-learning research focused on levels of learner and technological development. Without the user’s acceptance of and satisfaction with e-training, implementation of the new technology will be difficult. Huang, Wei, Yu, and Kuo (n.d.)

conducted an empirical investigation on learners' acceptance of e-learning for public unemployment vocational training. The study was based on the Technology Acceptance Model (TAM) developed in Taiwan, which investigated the factors that influenced the unemployed laborers' acceptance of e-learning. The hypothesis was that motivation to learn will affect the unemployed participants' responses regarding the perceived usefulness and the perceived ease-of-use of the e-learning. The sampling involved a total of 322 unemployed people who received cultivation training in the South Taiwan Vocational Training Center in 2003. The survey questionnaire was distributed after the participants completed a trial use of e-learning systems. The total number of surveys returned was 309 (95.96%) out of 322. The data was analyzed through descriptive statistics and multiple regression based on SPSS. Among the descriptive statistics, males accounted for 81.55% of the participants, and females accounted for 18.45%. Of the participants, 58.9% were between 21 and 30 years old. Educational level responses indicated that about half of the respondents were high school or college graduates and above. The results showed that public vocational training learners accepted the e-learning technology and that content usefulness was a major factor that impacted the learner's adoption decision. Although the study showed that unemployed people accepted the public vocational e-training, it could not be generalized that all workers would accept the public vocational e-training in Taiwan because the sampling was only obtained from one regional training center in Taiwan.

Chen, Lin, and Kinshuk (2004) conducted an assessment of e-learning satisfaction from a critical incidents perspective based on negative critical incidents and examined whether critical incidents affect e-learning satisfaction. The study was based on Friman's Satisfaction Assessment from Frequency of Negative Critical Incidents Perspective for E-

learning (SAFE) model. The sampling totaled 230 students who were taking master's online credit-bearing courses at National Sun Yat-Sen Cyber-University in Taiwan. An anonymous survey questionnaire was given while students were physically sitting for the mid-term examination. The questionnaire consisted of three parts: overall cumulative satisfaction; description of the frequency of negative critical incidents; and demographic questions. The hypotheses were set and tested the relationships among negative critical incident frequency, attribute-specific cumulative satisfaction, and overall cumulative e-learning satisfaction. The Chi-square test provided a statistical test for the hypotheses.

The results showed that the SAFE model is valid and can provide 71% of the explanatory power for overall cumulative satisfaction with e-learning. The factors that affected e-learning were categorized as administration, functionality, instruction, and interaction; however, interaction and functionality were found to be the most important factors affecting e-learning satisfaction. The functionality in the study revealed the learners' perspectives on instruction, course planning, design, materials, lecturing, and learning activities, learner characteristic would affect learning style and perception. Similarly, the interaction, which was identified as the interaction between the learner and the e-learning course, also would relate to learning style and perception, which differed according to age, gender, and educational level. Since the BTN e-learning offers e-training to people in Taiwan, the BTN should explore the relationship between learners' satisfaction and demography before developing e-learning instruction in the future.

Wu (2003) conducted a study of the learning behavior, satisfaction, and performance of on-line learning for business employees in Taiwan. The study attempted to investigate the interrelationships between learning performance and on-line learning behavior for employees and to understand how various learning characteristics and

behaviors influenced learning. A survey questionnaire was used to collect data. The questionnaire consisted of an inventory that assessed personality, learning style, learning motivation, on-line learning attitudes, learning satisfaction, and learning performance. The sampling involved the employees of the Far Easton Telecommunications Co. A total of 93 valid surveys were returned. Collected data were analyzed using descriptive statistics, t-test, ANOVA, Chi-square test, and multi-regression. The analysis of the results showed that individual variance and learning performance were related in the on-line learning environment. Moreover, there was a strong positive correlation between personality traits and learning satisfaction level and learning performance; learning motivation and satisfaction level; on-line learning attitudes and satisfaction level and performance; and self-directed learning and satisfaction level and performance. The study suggested that in developing e-learning, the trainer/program developer should have an understanding of individual learning characteristics and learning behavior in order to create an e-learning program that will be conducive to learning satisfaction and positive performance. Most readily, the individual learning characteristics and learning behavior related to age and education level; therefore, the motivation for learning may be related to various opportunities such as promotion, finding jobs, and certification. According to information gained from the BTN e-learning course participants, the participants stated that the findings for different ages, positions, and education levels revealed different needs. If the BTN e-courses met their needs, the participants would be more satisfied and more highly motivated to participate. Therefore, understanding the relationship between and being sensitive to the participants' satisfaction, motivation, and demographics will help the BTN develop more effective e-learning courses in the future.

Lin (2003) conducted a study in Taiwan that investigated whether the e-learning moderator had any effect on the learner's satisfaction with Internet learning. The study used Expectancy-Disconfirmation Theory (EDT) to discuss the causal relationship among the e-learning user's perceived performance expectancy disconfirmation, satisfaction, and intent to continue training. Hierarchical regression analysis attributed Internet self-efficacy and volitional control to the moderator. The results of this study suggested that web designers and e-learning instructors who design and/or implement e-learning systems in the future should have more expertise in individual psychology.

In addition, Lin (2003) studied key influential factors on learners' expressions of satisfaction with e-learning in Taiwan. A survey questionnaire was utilized to collect the data. The 97 responses came from students who were taking e-learning courses at the National Kaohsiung Teaching University. The data were analyzed using Pearson's correlation and stepwise regression statistics. The finding showed that the key influential factors were Internet self-efficacy, perceived interaction, flexibility of the e-learning curriculum, and perceived usefulness.

In a related study, Wu (2002) investigated the status of the Internet user, learning motivation, and learning satisfaction with a learning web site, and explored the relationships among these variables. The study methodology was document analysis and questionnaire investigation. The cluster sampling involved 1,190 respondents, consisting of teachers and students in upper grades in the primary schools in Kaohsiung City, Taiwan. There were 974 valid questionnaire responses. The data were analyzed using descriptive statistics, t-test, one-way ANOVA, Pearson Product-moment correlation, and stepwise multiple regression. Study results showed that Internet users had the capability for web-based learning; various Internet users were suitable for web-based learning; users

had different learning motivations and satisfactions during web-based learning, but held a positive attitude; users' motivation increased in relation to their increase in computer experience; users' motivation decreased when the users became confused by the Internet; different motivations and satisfaction levels were expressed by persons in different positions in the room as they worked with the Internet; and there was high correlation between learning motivation and satisfaction. According to the digital divide gap in Taiwan, people holding different industry and job positions create their own level of comfort with computers and Internet use in the workplace; therefore, information on the relationship between participants' satisfaction and position and industry category will be useful for the BTN as it develops effective e-learning courses in the future.

Chang (2002) studied distance learning satisfaction in Taiwan by adapting the Critical Incident Technique (CIT) for use in qualitative research. Telephone surveys and face-to-face interviews were utilized in data collection. The sampling contained students, teaching assistants, and lecturers from the National Chengchi University in Taiwan. The study categorized distance learning into "Synchronous," "Personal Instruction and Video Recording," "Personal Instruction and Asynchronous," and "Distance Asynchronous" and conducted student satisfaction analysis to ascertain individual satisfaction factors. The study results identified factors that influence distance learning, and are shown below.

Students' satisfaction/dissatisfaction levels noted:

Teaching enthusiasm and skill

Emotional interaction

Feedback interaction

- Knowledge interaction
- Information transmission
- Distance-learning system hardware/software usage
- Curriculum design
- Non-computerized class facility.
- Teaching assistants' satisfaction/dissatisfaction levels noted:
  - Motivational needs
  - Influences of information technology infusion toward work performance
  - Working Salary
  - Achievement
  - Social needs
  - Teaching support
- Lecturers' satisfaction/dissatisfaction levels noted:
  - Positive efficiency—Recognition of technology efficiency and innovativeness
  - Negative efficiency—Insecurity and discomfort

The study results revealed that various factors affect distance learning satisfaction when considering the needs of people in different workplace positions.

*Studies of Learner Satisfaction with e-Learning in Other Countries*

Bynum, Cranford, Irwin, and Denny (2002) conducted a study at the University of Arkansas of the University's Medical Sciences School's Telehealth Education Program. The researchers assessed perceptions of program satisfaction among participants by age, gender, ethnicity, education, community size, and program topics for years 1997–1999. A convenience sample included 3,319 participants in junior high and high schools. The School's Telehealth Education Program was provided free of charge to participants. After each program session, participants completed a program evaluation. Data were analyzed using one-way and two-way ANOVA and the t-test. Independent samples were used to assess significant differences in program satisfaction by age, gender, ethnicity, education, community size, and program topics for years 1997–1999. The results showed program year, community size, gender, age, and education significantly affected participants' satisfaction with the program. Isman (1997) conducted an Ohio University study that examined students' perceptions of distance education and compared perceptions based on age, gender, educational level, instructional site, number of distance education course taken, academic major, being a full-time or part-time student, and content taught. The sampling consisted of 210 Ohio University undergraduate and graduate students. A survey questionnaire was used to collect the data. Chi-square test results showed that students' attitudes towards age, college classification were strongly related to students' satisfaction. Although the study was not based in Taiwan, the results were somewhat similar to those for the Taiwan research in that results indicated that age and education level were strongly related to students' satisfaction.

In sum, the above research results, which described participants' satisfaction with e-learning or distance learning, indicate that age, gender, education level, position status, and motivation are all factors that affect e-learning satisfaction. These studies provide

useful information that should be considered in e-learning development by the BTN in Taiwan, but also perhaps by anyone or any organization that is developing e-training courses. Moreover, the related statistical techniques would assist in additional studies with data analysis. With the literature review for this study completed, we next describe the research conceptual model and methodology for the research process.

### *The Research Conceptual Model and Methodology*

The purpose of this study was to explore how participants' perceived satisfaction and motivation with the BTN e-training courses in Taiwan are influenced by age, gender, educational level, employment status, position, industry category, and frequency of attendance. However, limited research is currently available to explain how learners' satisfaction is related to age, gender, education level, and other factors. Only minimal research exists about the learners' reactions to the online experience in workforce education in Taiwan, and in other countries as well, according to Zariskie and Styles (2000). The conceptual model for this study was based on Kirkpatrick's four-level evaluation model (Kirkpatrick, 1998), in which the measurement for each level is dependent both on the previous level and on each level itself, and is interdependent with the other two levels. The use of Level 1 evaluation in assessing participants' reactions according to Kirkpatrick's model is significant in helping administrators and policy makers gain a better understanding of the perceptions of online learning in the workplace in general, and for this study, in Taiwan specifically. Since e-training is in its infancy in Taiwan, an understanding of participants' perceptions will help lead to appropriate, yet enjoyable, low-stress e-training, and result in an increase in the learners' satisfaction level,

as well as a greater degree of willingness to learn online. The definition of Kirkpatrick's Level 1 evaluation is focused on the participant's response to the value of the training (Kirkpatrick, 1998). Santos and Stuart (2003) suggested "that by taking into account the actual recipients' view of training our understanding of the factors affecting training effectiveness can be enhanced" (p. 27). Level 1 reaction also deserves consideration in relation to the extent to which the participants' motivation affects their application of the knowledge, skill, or material they have gained from training (Kirkpatrick, 1998) to their work performance. The purpose of training is to increase participants' willingness to apply or transfer material that is covered in training. "There is often scope for variation in the degree to which course material is later applied in a job, and motivational differences between individuals at the end of a training may be linked to variations in subsequent job behavior" (Warr, 1999, p. 351). Therefore, the Level 1 reaction clearly has a proactive emphasis, as effective e-learning should be emphasized not only through technology or multimedia application and instruction, but also through a clearer understanding of participants' reactions to e-learning (Gagne & Briggs, 1997).

The BTN-developed e-survey questionnaire was used to collect data used in this study. The BTN e-survey questionnaire consisted of two sections. Section one elicited feedback and information about participants' educational level, years of employment, computer and Internet equipment and usage, attitude toward an e-government source, perception of significant skills and knowledge for careers, value and satisfaction with the BTN e-training course content, context, and training provided. Section two gathered demographic information about participants.

All participants in the BTN e-training courses received the anonymous e-survey questionnaire via an e-periodical from the BTN registration department after they completed e-training courses. When the anonymous e-survey questionnaire was completed and submitted, the data were automatically transferred into the BTN database. The data, which consisted of information from 706 participants, were sent electronically from the BTN database by the BTN to the researcher. Descriptive statistic, logistic regression, and Chi-square were used to assess the relationship between dependent and independent variables in this study.

## CHAPTER 3

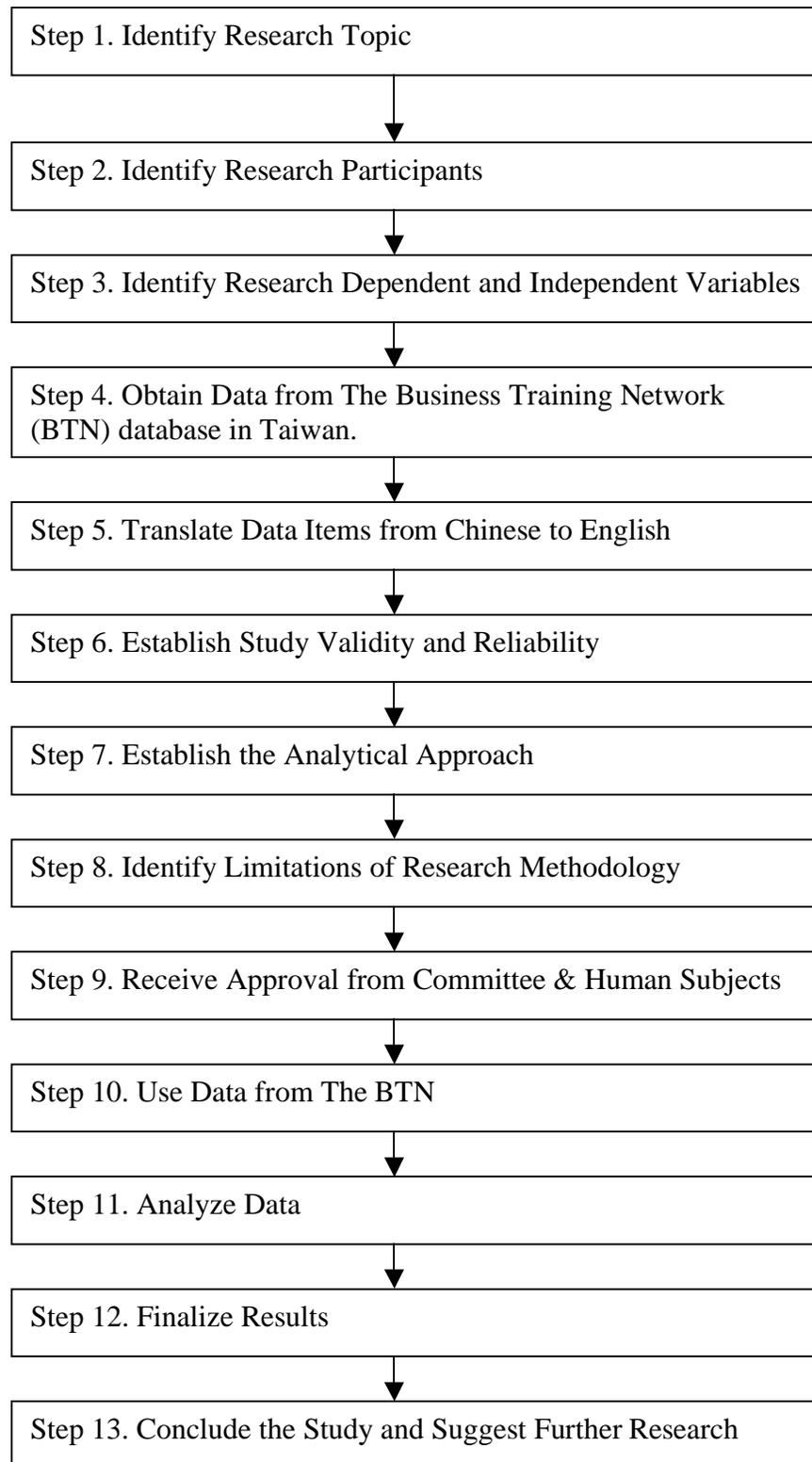
### Methodology

#### *Introduction*

The Business Training Network (BTN) has provided e-training courses for workers in Taiwan since 2002. Since e-training course opportunities have been provided for only a short time, the courses are still in development. Thus, to ensure the successful and effective development of future e-training courses in Taiwan, measurement of participant satisfaction prior to, during, and following the e-training courses is important. Such measurement and the subsequent information gathered will enable the BTN to improve its e-training course development and may result in increased participation in e-training courses.

#### *Overall Methodology Description and Diagram*

The basic methodology for this study included both descriptive correlational research (Graziano & Raulim, 2000) and cross-sectional research. Figures 1 and 2 present a step-by-step research action plan for this study.



*Figure 1.* Sequential diagram of the research processes

What is measured?

The relationship between participants' satisfaction and motivation with age, gender, education level, employment status, position, industry category, and frequency of attendance in order to improve the Business Training Network (BTN) e-course development in Taiwan.



What was involved in the sampling?

706 participants who completed the BTN e-training courses in Taiwan during 2004



What instrument was used?

An e-survey questionnaire was developed by the BTN which consisted of two sections (see Appendix A): Section one consisted of 20 multiple-choice questions measuring satisfaction with and motivation for attending the BTN e-training courses, and section two identified demographic information about the participants



How were the measurement data obtained?

- The e-survey of the BTN was sent to all participants after completion of e-training courses through an e-periodical during 2004.
- The data from the completed e-survey were automatically transferred into the BTN database.
- Secondary data were sent from the BTN database by the BTN to the researcher.
- Questionnaire items 10, 14, 16, and 20 and the participants' demographic information were related to the three research questions; these data were recoded by the researcher in this study.



Variables

Participants' satisfaction with the BTN e-training and opinion of content of the e-training course instruction, seven motivation factors, age, gender, education level, employment status, position, industry category, frequency of attendance.



Using mode split procedure to group people into Satisfaction and Non Satisfaction

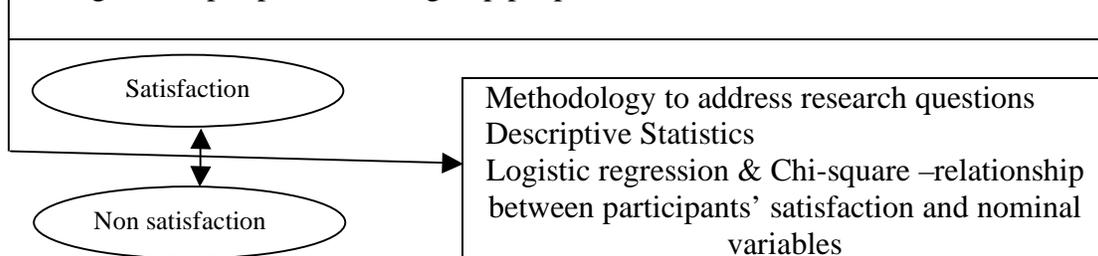


Figure 2. Diagram of research processes for this study identifying the measurement

Based on the above diagrams, the following sections describe the details for each step in the research action plan.

### *Identify Research Topic*

The purpose of this study was to examine participants' perceived satisfaction with and motivation for attending the BTN e-training. Participants' motivation related to seven factors (improving work competence; decreasing difficulty in finding a job; promoting job satisfaction; providing qualifications; solving job difficulty; offering free tuition, and other benefits after e-training). Participants' satisfaction with the e-training courses and the motivation for attending (both dependent variables) were examined by age, gender, educational level, employment status, position, industry category, and the frequency of attendance of the BTN e-training courses (the independent variables).

Since e-training in Taiwan is only in its infancy, an understanding of participants' reactions may assist in the development of appropriate, yet enjoyable, low-stress e-training, resulting in increased levels of learner satisfaction as well as in increased willingness to participate in e-learning. According to Kirkpatrick's four-level model (1998), evaluation at Level 1 measures how the learners react to the training. This level measures the learner's perception (reaction) to the training. Learners are keenly aware of what they need to know to accomplish a task. When a training program is first presented, whether it is e-learning or classroom training, the learner has to make a decision whether he or she will pay attention to the instruction. If the goal or task is judged to be important and doable, then the learner is usually motivated to engage in a training program (Markus & Ruvulo, 1990). On the other hand, if the training program fails to satisfy their needs,

the learners usually are reticent to engage in future training; therefore, a determination and revision should be made in order to improve design or delivery of the training program. Kirkpatrick's Level 1 is not indicative of the training's performance potential, as it does not measure the new skills the learners may have acquired or ways in which those skills will transfer back to the working environment. This lack of skill measurement has caused some evaluators to downplay the value of Level 1 evaluation. However, the interest, attention and motivation of the participants are factors critical to the success of any training program. People learn more readily when they react positively to the learning environment (Bharati, 2003; Biner, Dean, & Mellinger, 1994; Chute et al., 1999; DeLone & McLean, 1992; Doll & Torkzadeh, 1992; Jones & Bowler, 1997; Nelson & Dailey, 1999; Seddon, 1997; Sherry, Fulford, and Zhang, 1998; Smith, 1998; Stokes, 2001; Tallman, 1994; Warr, 1999; Wisher & Priest, 1998).

Therefore, Level 1 responses yield information that may result in proactive opportunities for future training applications, and elicit information to identify ways to add improvements to any training program. Using Kirkpatrick's Level 1 in this study to examine participants' reactions, administrators and policy makers may gain a more complete understanding of the challenges in, motivation for, and satisfaction with online learning via courses offered in the workplace. The results of this study also offer administrators and policy makers an opportunity to gain a better understanding of the challenges of online learning in the workplace in Taiwan.

#### *Identify Research Participants*

According to McMillan (2000), "the matter in which subjects are selected has important implications for identifying factors that affect subject performance and for

generalizing the results” (p. 102). Therefore, it is necessary to understand who the participants were and how they were selected. The target population in this study were workers who had participated in the BTN e-training courses in Taiwan. Since the BTN e-survey population frame is a list of all participants in Taiwan obtained from the BTN registration department, any generalization of this study would be most accurately limited to the BTN e-training participants. The BTN e-survey distributed in 2004 through e-periodicals shows the total number of participants in the e-survey completed in 2004, and may be accessed through the BTN database. The BTN database showed responses from 706 participants in the BTN e-training courses in Taiwan who completed and submitted the e-questionnaire on line during 2004.

#### *Identify Research Dependent and Independent Variables*

The research questions were developed to permit an examination of the relationships between participants’ satisfaction with the BTN e-training courses and participants’ gender, age, educational level, employment status, position, industry category, and frequency attendance. The variables for this study were identified in the BTN e-survey and correspond to the variables in the study research questions (see Table 1). Data for the variables were collected through the e-survey questionnaire which was developed by the BTN. The researcher used descriptive and inferential statistical techniques (logistic regression and chi-square), which provided information needed to answer the three research questions.

Table 1.  
*Research Questions, Variables, and Statistical Techniques*

| Research questions   | Variables   | Survey questionnaire Items | Type of Data | Data Technique   |
|--|---|----------------------------|--------------|--|
| Q1. What are the relationships between participants' satisfaction with BTN e-training and gender, age, education level, employment status, position, industrial category, and frequency of attendance? | (y)Satisfaction with BTN e-training<br>(x)Gender, Age, Educational level, Industrial category, Employment status, Frequency of attendance   | Item 10<br>Item 14         | Nominal      | Logistic Regression                                    |
| Q2. What are the relationships between the seven motivation factors and participants' gender, age, education level, employment status, position, industrial category, and frequency of attendance?     | (y)Improving work competence, Decreasing difficulty in finding a job, Promoting job satisfaction, Providing qualification, Solving job difficulty, After e-training service, Offering free tuition (x)Gender, Age, Educational level, Industrial category, Employment status, and frequency of attendance | Item 16                    | Nominal      | Logistic Regression                                    |
| Q3. What is the relationship between the participants' opinions about the content and delivery of the BTN e-training courses and the participants' age and education level?                            | (y)Participants' satisfaction of training instruction<br>(x)Age, Educational level  | Item 20                    | Nominal      | Crosstab table with frequency and percent & Chi-square |

### *Dependent Variables*

E-survey questionnaire item 10 (*How satisfied are you with the e-training courses provided by the Business Training Network?*), measured satisfaction using four levels: very satisfied, satisfied, unsatisfied, and very unsatisfied. Item 10 represented the dependent variable for research question one. The four levels of satisfaction were grouped into a dichotomous variable: Satisfied was defined as those that answered satisfied or very satisfied and was coded 1, and unsatisfied included those answering very unsatisfied or unsatisfied and was coded 0.

Item 16 (*What are the first three outcomes that motivate you to attend the e-training course from Business Training Network?*), included a list of seven reasons for attending the BTN e-training. This item represented the dependent variable for research question two. The following shows the seven reasons that the researcher identified as factors in motivation:

- Improving work competence (Factor 1)
- Decreasing difficulty in finding a job (Factor 2)
- Promoting job satisfaction (Factor 3)
- Providing qualification (Factor 4)
- Solving job difficulty (Factor 5)
- After e-training service (Factor 6)
- Offering free tuition (Factor 7)

Before performing 0 and 1 coding to utilize the binary logistic regression analysis technique, prior frequency analysis had to be completed for the top three participants' choices from the seven motivation factors. The top three participants' choices from seven motivation factors were coded 1 if the participants checked it within the first three motivation factors, and 0 if not within the first three motivation factors.

Item 20 (*What is your opinion of attending the Business Training Network E-training courses from the following list?*) included seven dimensions that related to the BTN e-training participants' opinions about the content and delivery of the BTN e-training courses. The response scale included five levels: strongly agree, agree, fairly agree, disagree, and strongly disagree. The seven dimensions follow:

- The course content progresses gradually and is easy to learn

- The course will help me to perform work later
- The course met my learning needs and could also apply to my other courses
- If a chat room were added as part of course, it would increase the number of participants who discuss the course content
- Similar e-training courses should be developed in order to assist knowledge learning
- The e-training has no value for me and so I choose not to participate
- I am going to check the BTN e-training course website to obtain the information and knowledge of workplace

The researcher grouped responses for each of the seven dimensions into dichotomous variables: agree was assigned a value of 0, or disagree was assigned a value of 1, in order to use the chi-square and crosstabs statistic technique.

### *Independent Variables*

The independent variables in this study were age, gender, education level, employment status, position, industry category, and frequency of attendance (e-survey questionnaire Item 14). These variables were treated as nominal variables. With regard to the requirements for using logistic regression, the independent variable should be classified as dichotomous (see Table 2).

*AGE* measured the participants' birth years to 2004. Three variables were given:

AGE1 = age less than or equal to 29 years

AGE2 = age equal to 30-34 years

AGE3 = age equal to 35-39 years

Age above 39 years was treated as the reference category for comparison with AGE1, AGE2, and AGE3.

*GENDER* referred to the participants' sex: male and female (reference category).

*EDUCATION LEVEL* referred to the participants' highest education level. Two levels of education were classified in this study: More or equal to four years of college education and less than four years of college education (reference category).

*EMPLOYMENT STATUS* referred to the participants' current employment status. Two levels of employment status were classified: Employee who works for the company; employer/self-employed who owns the company or self-employed (reference category).

*POSITION* referred to the participants' current position in the company. Two levels of position were classified: Non-management and management (reference category).

*INDUSTRIAL CATEGORY* was defined as Agriculture, Production, and Service by Account and Statistics Executive Yuan, Taiwan. Two levels of industry category were classified: Service industries and other industries (reference category).

*FREQUENCY OF ATTENDANCE* refers to the actual number of times that participants attended the BTN e-training courses. This variable was classified into two levels: 11 or more times and fewer than 11 times (reference category).

Table 2

*Independent Variables and Coding in the Study*

| Variable                | Coding   |
|-------------------------|--|
| GENDER                  | 1 = Male<br>0 = Female (rc)  |
| AGE1                    | 1 = Less than or equal to 29 yrs<br>0 = Above 39 yrs (rc)                        |
| AGE2                    | 1 = 30-34 yrs<br>0 = Above 39 yrs (rc)   |
| AGE3                    | 1 = 35-39 yrs<br>0 = Above 39 yrs (rc)   |
| EDUCATION LEVEL         | 1 = more or equal to 4 years of college<br>0 = Less than 4 years of college (rc) |
| EMPLOYMENT STATUS       | 1 = Employee<br>0 = Employer/Self employed (rc)                                  |
| POSITION                | 1 = Non management<br>0 = Management (rc)  |
| INDUSTRIAL CATEGORY     | 1 = Service industries<br>0 = Other industries (rc)                              |
| FREQUENCY OF ATTENDANCE | 1 = 11 or more times<br>0 = Fewer than 11 times (rc)                             |

*Note.* rc = Reference category

*Obtain Data from the Business Training Network (BTN) Database in Taiwan*

Surveys are a prime example of an extensive research approach in the social sciences (Cohen, Manion, & Morrison, 2000). “The survey approach gathers data at a particular point in time with the intention of describing the nature of existing conditions or identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events” (Cohen et al., 2000, p.

169). A survey counts and describes 'what is out there,' and is a detailed and quantified description (Maxim, 1999). The attractions of a survey lie in its ability to provide results that permit us to generalize or universalize information within given parameters, its ability to make statements that are supported by extensive data, and its ability to establish the degree of confidence in the information analyzed. Social surveys can play a significant part in the development and testing of sociological theory (Cohen et al., 2000). The questionnaire is a widely used instrument in collecting information, as it provides structured, often numerical, data and can be administered without the presence of the researcher (Cohen et al., 2000).

The main purpose of this study was to explore how participants' satisfaction in the BTN e-training courses was influenced by their gender, age, educational level, employment status, position, industry category, and frequency attendance, all of which may subsequently guide the selection of interventions to develop and enhance the BTN e-training courses. The results of the survey questionnaire would enable the researcher to measure the relationship between participants' satisfaction and their gender, age, educational level, employment status, position, and industry category in Taiwan.

The e-survey questionnaire developed by the BTN was the instrument used to collect data for this study. It was important to conduct an interview with the BTN administrators to gather more detail about the process of developing their e-survey. The interview provided an opportunity to learn how the questions were created, and whether procedures were followed to assess reliability and/or validity. The researcher conducted the interview with the BTN administrators in May 2005 in Taiwan. According to the BTN personnel, the e-survey questionnaire was developed by the BTN staff and reviewed

by a panel of experts in e-learning in Taiwan before beginning data collection. The panel of experts specifically examined language and format elements. The purpose of the BTN e-survey questionnaire was to explore and gain an understanding of the relationship between demographics and computer self-efficacy, learning style (active or passive), e-training needs and motivation, and e-training and job satisfaction. The BTN e-survey questionnaire consisted of two sections. Section one elicited feedback and information about participants' educational level, years of employment, computer and Internet equipment and usage, attitude toward an e-government source, perception of significant skills and knowledge for careers, value and satisfaction with the BTN e-training course content, context, and training provided. The twenty questions were multiple-choice; fourteen questions requested a single response; five questions requested a multiple response; one question consisted of sub-multiple choices with a single response; one question consisted of sub-multiple choice with a Likert scale response and two sub-open questions (see Attachment A). Certain related question items were selected for the research questions for this study (see Table 1). Section two of the survey recorded demographic information about the participants (see Attachment A).

All participants in the BTN e-training courses received the anonymous e-survey questionnaire in an e-periodical from the BTN registration department before the completion of e-training courses. When the anonymous e-survey questionnaire was completed and submitted, the data were automatically transferred into the BTN database. The data were compiled and categorized using Microsoft Excel, and sent from the BTN database by the BTN to the researcher.

### *Translate Data Items from Chinese to English*

The data were sent in a Microsoft Excel spreadsheet from the BTN database to the researcher and showed most variables in Chinese, except the numerical data, such as age and salary. As available for use in statistical analysis, the researcher used the ‘replace’ function in Excel to convert the data from Chinese to English without recoding or in any way altering the original data set. For example, gender was converted from Chinese to English, and is noted as either male or female in either version. The industry category variable was categorized into the Directorate-general of Budget, Accounting, and Statistics of Taiwan, which includes three standard industry categories: Agriculture, Goods-producing industries, and Service-producing industries as identified by job titles. After the categorization by the researcher, the data were translated from Chinese to English.

### *Establish Validity and Reliability*

#### *Validity*

Validity “looks at the quality of a measuring instrument used and whether that instrument is measuring what the researcher thinks the instrument is measuring” (Farmer & Rojewski, 2001, p. 226). Translation is one part of validity assessment. Translation validity “focuses on whether the operationalization is a good reflection of the construct” (Trochim, 2001, p. 66). It consists of face validity and content validity. In turn, face validity examines “the operationalization and sees whether on its face it seems like a good translation of the construct” (Trochim, 2001, p. 67), whereas content validity checks “the operationalization against the relevant content domain for the construct” (Trochim, 2001, p. 67).

### *Limitation of Validity*

The data for this study came from the e-survey questionnaire developed by the BTN personnel. Validity should be established before the data to be analyzed are collected; however, the establishing of validity in this study was not under the control of the researcher. The face validity of the e-survey questionnaire was assessed. According to the BTN personnel, the e-survey questionnaire was developed by the BTN and reviewed by an expert panel in e-learning in Taiwan before the data were collected. The review process reflects the method by which content validity was assessed prior to data collection. There was no evidence that a more formal construct validation process was used.

### *Reliability*

Reliability (internal consistency) became an important consideration in this research study when new variables were computed. In this study, summated Likert scale scores were used to measure responses to individual items on the e-survey. However, since the data for this study were taken from the e-survey questionnaire developed by the BTN, no evidence regarding reliability was available. However, the twentieth question on the e-survey questionnaire, which used a Likert-type response scale (1 = strongly agree to 5 = strongly disagree), is related to the Third research question in this study. The researcher used Cronbach's alpha to establish the reliability (internal consistency) of the score (value) obtained for the summated subscale variables.

Cronbach's alpha, a useful and common statistical technique for investigating the internal consistency of a score computed from a questionnaire, has been described as a measure of "internal consistency reliability" or simply "reliability" (UCLA, n.d.).

Cronbach's alpha measures the extent to which item responses obtained at the same time correlate highly with each other (Santos, 1999). The Cronbach's alpha coefficient ranges in value from 0 to 1; higher alpha values indicate higher reliability in the generated scale score/value (Trochim, 2001).

Since the twentieth question contained multiple items/data in this study, exploratory factor analysis was used in an attempt to group the items. The "objective of factor analysis is to represent each of these variables as a linear combination of a smaller set of common factors plus a factor unique to each of the response variables" (Afifi, Clark, & May, 2004, p. 393), as well as to examine the interrelationships among a set of variables (Afifi et al., 2004). The most commonly used factor analysis technique is Varimax rotation, since the Varimax rotation is more restricted than oblique in the restriction of the orthogonality of the rotated factors. Therefore, based on the recommendation from Afifi et al. (2004), the Varimax rotation technique was used to assess the interrelationships among the set of items comprising the twentieth question. Therefore, the investigator used factor analysis with principal components analysis with an orthogonal (Varimax) rotation solution. A minimum eigenvalue of 1 served as the cut-off point for identifying factors (Afifi et al., 2004). Subsequently, the Cronbach's alpha for each factor was evaluated separately.

Initially, the researcher used factor analysis to determine whether underlying mathematical factors existed for the seven items, using the criterion that a factor that had an eigenvalue value of 1 would be retained (Afifi et al., 2004). The use of that criterion resulted in the identification of two factors. Factor one was named Current and contained four items. Collectively, these four items accounted for 50.15% of the variance. The remaining three items loaded on Factor two, named Future, and those items explained or

accounted for 39.40% of the variance (see Tables 3 and 4). Further analysis indicated a positive correlation between the two primary factors ( $r=.57$ ) (see Table 5). Cronbach's alpha was calculated as a measure of reliability (internal consistency). The reliability of the factor named Current was .963 and the reliability of the factor named Future was .911. These levels of internal consistency are identified by Isaac and Michael (1995) as acceptable levels of internal consistency.

Table 3

*Final Rotated Factor Loadings Using Principal Components Analysis with Varimax Rotation*

| Item   | Rotated Loadings |        |
|--|------------------|--------|
|  | 1                | 2      |
| 1. The course content is a gradual progress and easy to learn  | 0.935            | 0.223  |
| 2. The course will help me to perform work later   | 0.939            | 0.199  |
| 3. The course met my learning needs which could also apply to my other courses.  | 0.926            | 0.306  |
| 4. If a chat room were added as part of course, it will increase the number of participants who discuss the course content.  | 0.800            | 0.468  |
| 5. Similar e-training courses should be developed in order to assist knowledge learning.                                     | 0.401            | 0.813  |
| 6. The e-training has no value for me to participate.  | 0.193            | 0.904  |
| 7. I am going to check the e-training course website from the BTN in order to get the information and knowledge of workplace | 0.239            | 0.937  |
| Percent of variance explained  | 50.152           | 39.398 |

Table 4  
*Scale Name and Reliability for the BTN E-training Course (n = 611)*

| Scale name       | Alpha coefficient | Item  |
|------------------|-------------------|---|
| Factor 1 Current | .936              | 1. The course content is a gradual progress and easy to learn<br>2. The course will help me to perform work later<br>3. The course met my learning needs which could also apply to my other courses.<br>4. If a chat room were added as part of course, it will increase the number of participants who discuss the course content. |
| Factor 2 Future  | .911              | 5. Similar e-training courses should be developed in order to assist knowledge learning.<br>6. The e-training has no value for me to participate.<br>7. I am going to check the e-training course website from the BTN in order to get the information and knowledge of workplace   |

Table 5  
*Correlation, Mean, and Standard Deviation for Opinions of the BTN E-training Courses (n = 611)*

| Variable                            | Factor 2 Future | Factor 1 Current |
|-------------------------------------|-----------------|------------------|
| Factor 1 Current                    | .572<br>(.000)  | 1.000            |
| Factor 2 Future                     | 1.000           | .572<br>(.000)   |
| Item mean for factor (4 items)      | 2.324           | 2.169            |
| Item <i>SD</i> for factor (3 items) | .670            | .694             |
| Possible Score (Theoretical range)  | 1-5             | 1-5              |

### *Establish the Analytical Approach*

Typically in social science research, the researcher is interested in finding related factors (Hinkle, Wiersma, & Jurs, 1988; Otts & Heckard, 2002; Ott & Longnecker, 2001; Pagano, 1981). Regression analysis provides a powerful tool to use in examining relationships between independent and dependent variables and to determine which independent variables have an effect on the dependent variables. In addition, the regression results indicate the degree of association between variables. Regression analyses not only examine the correlations of the independent variables with the dependent variables, but also the intercorrelations between the independent variables (Afifi et al., 2004; Hosmer & Lemeshow, 1989; Tabachnick & Fidell, 2001).

For this study, binary (two levels of the dependent variable) logistic regression was used to examine the independent variables and determine if correlations existed between the independent variables (age, gender, education, position, employment status, and industry category) and the dependent variable (participant satisfaction level coded as two levels). In conducting a logistic regression, the researcher is able to determine if changes in an independent variable correspond with changes in a binary dependent variable (Afifi et al., 2004; Bennett & Passmore, 1985; Newcombe, 1998; Reynolds, 1997; Trochim, 2001). For binary logistic regression, the independent variables may be either nominal or interval scale of measurement variables (Tabacnick & Fidell, 2001).

In addition to basic descriptive statistics, Chi-square, and crosstabulation tables were included in this study. The Chi-square is the inferential statistic calculated to determine whether there is a statistically significant relationship between two nominal variables (Hinkle, Wiersma, & Jurs, 1988; Otts & Heckard, 2002; Ott & Longnecker, 2001). In addition, crosstab tables or contingency tables show the joint distribution of two

or more nominal or ordinal scale variables. The tables are also useful for understanding in more detail the relationships between variables that are categorized as nominal and for examining the pattern of responses across the variables (Afifi et al., 2004).

#### *Identify Limitations of Research Methodology*

There were two limitations to the survey-type research in this study. First, the responses to the e-survey questionnaire were limited by the framework of the particular survey instrument. These responses were also limited by each respondent's comprehension and interpretation. Second, the data were collected through the BTN e-survey questionnaire for only one year—2004; therefore, it is not representative of, nor does it refer to, all of the BTN e-training course participants in Taiwan.

#### *Receive Approval from Committee and Human Subjects*

Secondary data were utilized in this study; however, because the data were collected through an anonymous e-survey questionnaire, human subjects were involved. The Penn State policy relating to the use of human participants in research states that, “use of previously collected data and/or human biological samples (e.g., DNA, blood, tissue, etc.) still warrants research investigators to respect the rights and welfare of the participants who have provided the data and/or samples. Participants that have previously provided data or human biological samples deserve the same respect and protection of their rights” (Office for Research Protections, n.d., p. 1). In addition, the policy states that, “proposed research for use of secondary data and/or previously collected human biological samples must be reviewed by The Office for Research Protections. This is specifically stated in The Code of Federal Regulations 45 CFR 46.101 (4), research

involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that participants cannot be identified directly or through identifiers linked to the participants" (Office for Research Protections, n.d., p. 2). For the purposes of this study, the e-survey questionnaire was anonymous and the data were automatically transferred to the BTN database; therefore, all participants who submitted their e-survey questionnaire remained anonymous.

Before collecting the secondary data for this study, the researcher submitted an application to use secondary data to verify that the data did not contain participants' identification and could not be linked to the participants. Moreover, the ways in which the secondary data related to this research had to be stated specifically. The application was reviewed and approved by the study committee and Institutional Review Board (IRB). This process was significant not only in that human subjects would be protected, but also in that the study was approved.

#### *Use Data from the BTN*

The transferred data file was converted to the SPSS format so that it could be analyzed using SPSS software after this study's approval by the researcher's dissertation committee members and the Institutional Review Board. The data were coded and processed using SPSS 13.0.

#### *Analyze Data*

Descriptive statistics, Chi-square, crosstab tables, and logistic regression were used in this study to investigate the relationships between the variables. The independent

and dependent variables, types of data, and data techniques used are listed in Table 1. The operational coding of the dependent and independent variables was described earlier.

Statistical significance was established at equal to or less .05 alpha using a two-tail test.

Each research question for this study was answered using a specific data analysis procedure. This section is organized according to the study research questions.

### *Research Question One*

*Q1.* What is the relationship between participants' satisfaction with the BTN e-training and gender, age, educational level, employment status, position, industrial category, and frequency of attendance?

The null hypothesis ( $H_0$ ) was stated as follows: There is no statistically significant relationship between participants' satisfaction with the BTN e-training and gender, age, educational level, employment status, position, industrial category, and frequency of attendance. The alternative hypothesis ( $H_1$ ) was stated as follows: There is a statistically significant relationship between participants' satisfaction with the BTN e-training and gender, age, education level, employment status, position, industrial category, and frequency of attendance.

With regard to the requirements for using logistic regression: The independent variable should be interval/ratio or dichotomous; the expected value of the error term is zero; there is no significant autocorrelation (no correlation between the size of the error term and the independent variable[s]); and no multicollinearity between the independent variables(s) (Afifi et al., 2004; Tabachnick & Fidell, 2001). Binary logistic regression was an appropriate technique for the data analysis for this research question (Afifi et al.,

2004; Bennett & Passmore, 1985; Kleinbaum & Klein, 2002; Sharma, 1996; Tabachnick & Fidell, 2001). The odds ratio is a measure of the association of a binary variable (satisfaction and dissatisfaction) with the occurrence of a given event (gender, age, education, etc.). Approximate confidence intervals for the odds ratio for a binary variable can be computed using the slope coefficient  $b$  and its standard error. The odds ratio provides a directly interpretable statistic for the relationship between the outcome variable (dependent variable) and specified predictor variables (independent variables) (Afifi et al., 2004; Haberman, 1987). Thus, using this technique, the researcher could test the null hypothesis of no relationship and determine whether to reject or not reject the null hypothesis using the following equation (Advanced technique, 2001, p. 7-4).

$$Odds = \frac{P}{1 - P}$$

$$P(event) = \frac{e^{b_0 + b_1X_1 + \dots + b_kX_k}}{1 + e^{b_0 + b_1X_1 + \dots + b_kX_k}} = \frac{Exp(b_0 + b_1X_1 + \dots + b_kX_k)}{1 + Exp(b_0 + b_1X_1 + \dots + b_kX_k)}$$

Logistic regression applies maximum likelihood estimation after transforming the dependent into a logit variable by taking the natural logarithm. Through an exponential manipulation of coefficients, an odds ratio,  $e^b$ , is derived to show whether a specific independent variable increases or decreases the odds of the occurrence of a dependent variable (Hosmer & Lemeshow, 1989).

*Research Question Two*

Q2. What are the relationships between the top three participants' choices from seven motivation factors and participants' gender, age, educational level, employment status, position, industrial category, and frequency of attendance?

The null hypothesis ( $H_0$ ) was stated as follows: There are no statistically significant relationships between the top three participants' choices from seven factors of motivation and participants' gender, age, educational level, employment status, position, industrial category, and frequency of attendance. The alternative hypothesis ( $H_1$ ) was stated as follows: There are statistically significant relationships between the top three choices from seven factors for motivation and participants' gender, age, education level, employment status, position, industrial category, and frequency of attendance. The following equation was developed to test the null hypothesis of no relationship and determine whether to reject or not reject the null hypothesis (Advanced technique, 2001, p. 7-4).

$$Odds = \frac{P}{1 - P}$$

$$P(event) = \frac{e^{b_0 + b_1 X_1 + \dots + b_k X_k}}{1 + e^{b_0 + b_1 X_1 + \dots + b_k X_k}} = \frac{Exp(b_0 + b_1 X_1 + \dots + b_k X_k)}{1 + Exp(b_0 + b_1 X_1 + \dots + b_k X_k)}$$

### *Research Question Three*

*Q3.* What is the relationship between the participants' opinions about the content and delivery of the BTN e-training courses and the participants' age and education level?

The Chi-square is used to determine whether a relationship exists between two nominal variables (Hinkle, Wiersma, & Jurs, 1988; Ott & Longnecker, 2001; Otts & Heckard, 2002). The primary use of the Chi-square test is in ascertaining whether variables are independent or not. One goal in answering research question three is to identify existing relationships between participants' opinions of the BTN e-training course content, and the participants' age and education level. All variables in this analysis represent nominal data (Afifi et al., 2004).

### *Summary*

Data collected through the BTN e-survey questionnaire instrument were used to explore the relationship between the participants' satisfaction and age, gender, education level, employment, position, and industry category. The results addressed the three research questions in this study. Logistic regression, Chi-square, crosstab tables, and descriptive statistics were used to evaluate the relationship between the participants' satisfaction and these variables. This analysis was conducted to address the stated research questions and provide useful information for administrators and policy makers—information that will allow them to gain a better understanding of the challenges of online learning in the workplace in Taiwan. In addition, this model may also benefit educators, learners, and instructional designers in vocational education and training.

## CHAPTER 4

### Results

The purpose of this study was to examine participants' perceived satisfaction with and motivation to attend the BTN e-training. Participants' satisfaction with the e-training courses and their motivation to attend were examined by age, gender, educational level, employment status, position, industrial category, and frequency of attendance of the BTN e-training courses. The study also examined the participants' opinions of the BTN e-training course content by age and education level.

The research findings are presented in this chapter in two major sections. Part one includes descriptive frequency information regarding participant demographics as obtained from the BTN e-survey questionnaire. Part two findings include data analysis results and their interpretation in light of each research question.

#### *General Information*

Each of the 706 BTN e-training participants was asked to answer demographic and employment-related questions regarding gender, age, education level, position, employment status, industrial category, and frequency of attendance of the BTN e-training. Table 6 summarizes data for each of these variables.

Table 6  
*Frequencies and Valid Percentage for Demographic and Employment-related Variables (n = 706)*

| Variable                                      | <i>n</i> | Valid % |
|---|----------|---------|
| <b>GENDER</b>                                 |          |         |
| Male  | 272      | 41.0    |
| Female  | 392      | 59.0    |
| No response                                   | 42       |         |
| <b>AGE</b>                                    |          |         |
| Less than or equal to 29 yrs                  | 166      | 24.5    |
| 30-34 yrs                                     | 196      | 28.9    |
| 35-39 yrs                                     | 154      | 22.7    |
| Above 39 yrs                                  | 162      | 23.9    |
| No response                                   | 28       |         |
| <b>EDUCATION LEVEL</b>                        |          |         |
| More or equal to 4 years of college           | 438      | 65.7    |
| Less than 4 years of college                  | 229      | 34.3    |
| No response                                   | 39       |         |
| <b>EMPLOYMENT STATUS</b>                      |          |         |
| Employee                                      | 614      | 93.5    |
| Employer/Self employed                        | 43       | 6.5     |
| No response                                   | 49       |         |
| <b>POSITION</b>                               |          |         |
| Non management                                | 313      | 46.6    |
| Management                                    | 358      | 53.4    |
| No response                                   | 35       |         |
| <b>INDUSTRIAL CATEGORY</b>                    |          |         |
| Service industries                            | 308      | 51.9    |
| Other industries (Agriculture and Production) | 286      | 48.1    |
| No response                                   | 112      |         |
| <b>FREQUENCY OF ATTENDANCE</b>                |          |         |
| More or equal to 11 times                     | 87       | 13.2    |
| Less than 11 times                            | 570      | 86.8    |
| No response                                   | 49       |         |

## Findings

### *Research Question One*

*Q1. What is the relationship between participants' satisfaction with BTN e-training and gender, age, educational level, employment status, position, industrial category, and frequency of attendance?*

For *Research question one*, the log likelihood ratio was used to test the statistical significance of the logistic model. The value of  $-2 \log$  likelihood is the natural log of the maximum likelihood value multiplied by  $-2$ , which is obtained by fitting the model (Hosmer & Lemeshow, 1989). A well-fitting model is significant at the .05 alpha level or lower ( $p$ -value  $\leq .05$ ), which means we reject the null hypothesis that none of the independent variables were related to the participants' satisfaction with the BTN e-training. Overall, the analysis for *Research question one* found statistically significant relationships between the independent variable(s) and the participants' satisfaction level ( $X^2 = 114.018$ ,  $df = 9$ ;  $p < .001$ ).

The odds ratio was computed using the slope coefficient  $b$  value and its standard error. The odds ratio provided a directly interpretable statistic for the relationship between the outcome variable (dependent variable) and specified predictor variable (independent variable) after accounting for the effects of other independent variables (Afifi et al., 2004; Haberman, 1987). The odds ratio was derived to show that if a one-unit independent variable increase (ratio  $> 1$ ) or decrease (ratio  $< 1$ ) occurred, then that dependent variable affected the independent variable (Tabachnick & Fidell, 2001). Among all independent variables examined, participants aged less than or equal to 29

years, aged 30-34 years, and frequency of attendance each had a statistically significant influence on participants' satisfaction level (see Table 7). Participants aged less than or equal to 29 years were 0.047 times less satisfied than those aged greater than 39 years (reference group) with the BTN e-training (the 95% confidence interval lay between 0.015 and 0.150). Participants aged 30-34 years were 0.27 times less satisfied than those aged 39 (reference group) with the BTN e-training (the 95% confidence interval lay between 0.099 and 0.737). Participants who attended the BTN e-training 11 or more times were 0.179 times less satisfied than the participants who attended fewer than 11 times (reference group) with the BTN e-training (the 95% confidence interval lay between 0.078 and 0.407).

Table 7  
*Summary of Logistic Regression for Variables Explaining Participants' Level of Satisfaction with the BTN e-Training (n = 706)*

| Variable                   | Coding   | <i>M</i><br>( <i>SD</i> )   | <i>b</i><br>( <i>SE</i> ) | Odds ratio<br>(95% C I) |
|----------------------------|--|---|---------------------------|-------------------------|
| AGE1                       | 1 = Less than or equal to 29 yrs<br>0 = Over 39 yrs (rc)                         | 0.24<br>(0.424)   | -3.06*<br>(0.59)          | 0.047<br>(0.015; 0.150) |
| AGE2                       | 1 = 30-34 yrs<br>0 = Over 39 yrs (rc)  | 0.28<br>(0.448)   | -1.31*<br>(0.51)          | 0.270<br>(0.099; 0.737) |
| AGE3                       | 1 = 35-39 yrs<br>0 = Over 39 yrs (rc)  | 0.22<br>(0.413)   | 0.40<br>(0.56)            | 1.497<br>(0.500; 4.478) |
| GENDER                     | 1 = Male<br>0 = Female (rc)  | 0.41<br>(0.492)   | 0.41<br>(0.35)            | 1.506<br>(0.760; 2.986) |
| EDUCATION<br>LEVEL         | 1 = More or equal to 4 years of college<br>0 = Less than 4 years of college (rc) | 0.66<br>(0.475)   | -0.21<br>(0.33)           | 0.808<br>(0.421; 1.549) |
| INDUSTRY<br>CATEGORY       | 1 = Service industries<br>0 = Other industries (rc)                              | 0.52<br>(0.500)   | -0.21<br>(0.29)           | 0.808<br>(0.455; 1.436) |
| EMPLOYMENT<br>STATUS       | 1 = Employee<br>0 = Employer / Self employed (rc)                                | 0.93<br>(0.248)   | -0.72<br>(0.59)           | 0.485<br>(0.151; 1.554) |
| POSITION                   | 1 = Non management<br>0 = Management (rc)  | 0.47<br>(0.499)   | 0.26<br>(0.33)            | 1.295<br>(0.680; 2.464) |
| FREQUENCY OF<br>ATTENDENCE | 1 = 11 or more times<br>0 = fewer than 11 times (rc)                             | 0.13<br>(0.339)   | -1.72*<br>(0.42)          | 0.179<br>(0.078; 0.407) |
|                            | Criterion variable   | 0.55<br>(0.498)   |                           |                         |
|                            | Intercept  | 2.945   |                           |                         |
|                            | Goodness-of-fit test   | Model $X^2 = 114.018$ (see Harrell, 1980, p. 83) with 9 <i>df.</i> , $p < .001$ |                           |                         |

Note. Satisfied = "1" and Unsatisfied = "0", rc = reference category

\* $p \leq .05$

*Research Question Two*

*Q2. What are the relationships between the top three participants' choices from seven motivation factors and participants' gender, age, educational level, employment status, position, industrial category, and frequency of attendance?*

According to responses to e-survey question 16— *What are the first three outcomes that motivate you to attend e-training courses from Business Training Network*— the three most frequent participants' responses were: (a) Improving work competence, (b) Solving job difficulty, and (c) Offering free tuition.

Overall, results for *Research question two* yielded statistically significant relationships between the independent variables and the motivation factor of (a) Improving work competence ( $X^2 = 38.335$ ,  $df = 9$ ;  $p < .001$ ), (b) Solving job difficulty ( $X^2 = 251.444$ ,  $df = 9$ ;  $p < .001$ ), and (c) Offering free tuition ( $X^2 = 24.601$ ,  $df = 9$ ;  $p = .003$ ).

*Improving work competence*

Among all independent variables examined, age less than or equal to 29 years, age equal to 30-34 years, age equal to 35-39 years, and frequency of attendance of the BTN e-training each had a statistically significant impact on participants' motivation to improve work competence (see Table 8).

Participants aged less than or equal to 29 years were 2.589 times more motivated than those aged above 39 years (reference group) to attend the BTN e-training in order to improve their work competence (the 95% confidence interval lay between 1.191 and 5.626). Participants aged 30-34 years were 4.578 times more motivated than those aged above 39 years (reference group) to attend the BTN e-training in order to improve their

work competence (the 95% confidence range was between 2.221 and 9.440). Participants aged 35-39 years were 4.393 times more motivated than those aged above 39 years (reference group) to attend the BTN e-training in order to improve their work competence (the 95% confidence interval lay between 2.106 and 9.167).

Participants who attended the BTN e-training 11 or more times were 0.218 time less motivated than those who attended fewer than 11 times (reference group) to attend the BTN e-training in order to improve their work competence (the 95% confidence range lay between 0.066 and 0.726).

Table 8  
*Summary of Logistic Regression for Variables Predicting the BTN e-Training by Participants' Motivation to Improve Work Competence (n = 706)*

| Variable                   | Coding   | <i>M</i><br>( <i>SD</i> )   | <i>b</i><br>( <i>SE</i> ) | Odds ratio<br>(95% C I) |
|----------------------------|--|---|---------------------------|-------------------------|
| AGE1                       | 1 = Less than or equal to 29 yrs<br>0 = Over 39 yrs (rc)                         | 0.24<br>(0.424)   | 0.95*<br>(0.40)           | 2.589<br>(1.191; 5.626) |
| AGE2                       | 1 = 30-34 yrs<br>0 = Over 39 yrs (rc)  | 0.28<br>(0.448)   | 1.52*<br>(0.37)           | 4.578<br>(2.221; 9.440) |
| AGE3                       | 1 = 35-39 yrs<br>0 = Over 39 yrs (rc)  | 0.22<br>(0.413)   | 1.48*<br>(0.38)           | 4.393<br>(2.106; 9.167) |
| GENDER                     | 1 = Male<br>0 = Female (rc)  | 0.41<br>(0.492)   | -0.37<br>(0.29)           | 0.689<br>(0.389; 1.219) |
| EDUCATION<br>LEVEL         | 1 = more or equal to 4 years of college<br>0 = Less than 4 years of college (rc) | 0.66<br>(0.475)   | 0.21<br>(0.31)            | 1.232<br>(0.671; 2.259) |
| INDUSTRY<br>CATEGORY       | 1 = Service industries<br>0 = Other industries                                   | 0.52<br>(0.500)   | 0.14<br>(0.24)            | 1.150<br>(0.714; 1.854) |
| EMPLOYMENT<br>STATUS       | 1 = Employee<br>0 = Employer / Self employed (rc)                                | 0.93<br>(0.248)   | 0.05<br>(0.45)            | 1.053<br>(0.437; 2.536) |
| POSITION                   | 1 = Non management<br>0 = Management (rc)  | 0.47<br>(0.499)   | 0.38<br>(0.32)            | 1.468<br>(0.791; 2.725) |
| FREQUENCY OF<br>ATTENDANCE | 1 = 11 or more times<br>0 = fewer than 11 times (rc)                             | 0.13<br>(0.339)   | -1.52*<br>(0.61)          | 0.218<br>(0.066; 0.726) |
|                            | Criterion variable   | 0.78<br>(0.411)   |                           |                         |
|                            | Intercept  | 1.888   |                           |                         |
|                            | Goodness-of-fit test   | Model $X^2 = 38.335$ (see Harrell, 1980, p. 83)<br>with 9 <i>df.</i> , $p < .001$ |                           |                         |

*Note.* Improving work competence = “1” and Other factors = “0”, rc = reference category  
 \* $p \leq .05$

*Solving job difficulty*

Among all independent variables examined, participants aged less than or equal to 29 years, aged 30-34 years, aged 35-39 years, employment status, and industrial category each had a statistically significant impact on the participants' motivation factor of Solving job difficulty (see Table 9).

Participants aged less than or equal to 29 years were 0.004 times less motivated than those aged above 39 years (reference group) to attend the BTN e-training, even though it could help resolve job difficulty (the 95% confidence range lay between 0.001 and 0.020). Participants aged 30-34 years were 0.008 times less motivated than those aged above 39 years (reference group) to attend the BTN e-training, even though it could help resolve job difficulty (the 95% confidence range lay between 0.002 and 0.039). Participants aged 35-39 years were 0.176 times less motivated than those aged above 39 years (reference group) to attend the BTN e-training, even though it could help resolve job difficulty (the 95% confidence range lay between 0.035 and 0.884).

Participants who worked in service industries were 0.579 times less motivated than those who worked in other industries (reference group) to attend the BTN e-training, even though it could help resolve job difficulty (the 95% confidence range lay between 0.352 and 0.953). Participants who were employees were 0.099 less motivated than employer/self-employed participants (reference group) to attend the BTN e-training, even though it could help resolve job difficulty (the 95% confidence range lay between 0.023 and 0.420).

Table 9  
*Summary of Logistic Regression for Variables Predicting the BTN e-Training by Participants' Motivation to Resolve Job Difficulty (n = 706)*

| Variable                   | Coding   | <i>M</i><br>( <i>SD</i> )  | <i>b</i><br>( <i>SE</i> ) | Odds ratio<br>(95% C I) |
|----------------------------|--|--|---------------------------|-------------------------|
| AGE1                       | 1 = Less than or equal to 29 yrs<br>0 = Over 39 yrs (rc)                         | 0.24<br>(0.424)  | -5.53*<br>(0.84)          | 0.004<br>(0.001; 0.020) |
| AGE2                       | 1 = 30-34 yrs<br>0 = Over 39 yrs (rc)  | 0.28<br>(0.448)  | -4.82*<br>(0.81)          | 0.008<br>(0.002; 0.039) |
| AGE3                       | 1 = 35-39 yrs<br>0 = Over 39 yrs (rc)  | 0.22<br>(0.413)  | -1.74*<br>(0.82)          | 0.176<br>(0.035; 0.884) |
| GENDER                     | 1 = Male<br>0 = Female (rc)  | 0.41<br>(0.492)  | -0.08<br>(0.30)           | 0.922<br>(0.512; 1.657) |
| EDUCATION<br>LEVEL         | 1 = more or equal to 4 years of college<br>0 = Less than 4 years of college (rc) | 0.66<br>(0.475)  | 0.03<br>(0.28)            | 1.035<br>(0.603; 1.775) |
| INDUSTRY<br>CATEGORY       | 1 = Service industries<br>0 = Other industries                                   | 0.52<br>(0.500)  | -0.55*<br>(0.25)          | 0.579<br>(0.352; 0.953) |
| EMPLOYMENT<br>STATUS       | 1 = Employee<br>0 = Employer / Self employed (rc)                                | 0.93<br>(0.248)  | -2.32*<br>(0.74)          | 0.099<br>(0.023; 0.420) |
| POSITION                   | 1 = Non management<br>0 = Management (rc)  | 0.47<br>(0.499)  | 0.23<br>(0.28)            | 1.263<br>(0.730; 2.183) |
| FREQUENCY OF<br>ATTENDENCE | 1 = 11 or more times<br>0 = fewer than 11 times (rc)                             | 0.13<br>(0.339)  | 0.24<br>(0.31)            | 1.269<br>(0.689; 2.335) |
|                            | Criterion variable   | 0.62<br>(0.486)  |                           |                         |
|                            | Intercept  | 4.652  |                           |                         |
|                            | Goodness-of-fit test   | Model $X^2 = 251.444$ (see Harrell, 1980, p. 83) with 9 <i>d.f.</i> , $p < .001$ |                           |                         |

*Note.* Solving job difficulty = "1" and Other factors = "0", rc = reference category  
 \* $p \leq .05$

*Offering free tuition*

Among all independent variables examined, age less than or equal to 29 years, age 30-34 years, age 35-39 years, and position each had a statistically significant impact on participants' motivation with regard to Offering free tuition (see Table 10).

Participants aged less than or equal to 29 years were 2.538 times more motivated than those aged above 39 years (reference group) to attend the BTN e-training, because of an offer of free tuition (the 95% confidence range lay between 1.333 and 4.833). Participants aged 30-34 years were 3.342 times more motivated than those aged above 39 years (reference group) to attend the BTN e-training, because of an offer of free tuition (the 95% confidence range lay between 1.894 and 5.897). Participants aged 35-39 years were 2.680 times more motivated than those aged above 39 years (reference group) to attend the BTN e-training, because of an offer of free tuition (the 95% confidence range lay between 1.524 and 4.713).

Participants who were in non-management positions were 1.577 times more motivated than those in management positions (reference group) to attend the BTN e-training, because of an offer of free tuition (the 95% confidence range lay between 1.015 and 2.448).

Table 10  
*Summary of Logistic Regression for Variables Predicting the BTN e-Training by Participants' Motivation to Attend due to an Offer of Free Tuition (n = 706)*

| Variable                   | Coding   | <i>M</i><br>( <i>SD</i> )   | <i>b</i><br>( <i>SE</i> ) | Odds ratio<br>(95% C I) |
|----------------------------|--|---|---------------------------|-------------------------|
| AGE1                       | 1 = Less than or equal to 29 yrs<br>0 = Over 39 yrs (rc)                         | 0.24<br>(0.424)   | 0.93*<br>(0.33)           | 2.538<br>(1.333; 4.833) |
| AGE2                       | 1 = 30-34 yrs<br>0 = Over 39 yrs (rc)  | 0.28<br>(0.448)   | 1.21*<br>(0.29)           | 3.342<br>(1.894; 5.897) |
| AGE3                       | 1 = 35-39 yrs<br>0 = Over 39 yrs (rc)  | 0.22<br>(0.413)   | 0.99*<br>(0.29)           | 2.680<br>(1.524; 4.713) |
| GENDER                     | 1 = Male<br>0 = Female (rc)  | 0.41<br>(0.492)   | -0.02<br>(0.21)           | 0.979<br>(0.644; 1.488) |
| EDUCATION<br>LEVEL         | 1 = more or equal to 4 years of college<br>0 = Less than 4 years of college (rc) | 0.66<br>(0.475)   | 0.23<br>(0.23)            | 1.255<br>(0.799; 1.971) |
| INDUSTRY<br>CATEGORY       | 1 = Service industries<br>0 = Other industries                                   | 0.52<br>(0.500)   | 0.33<br>(0.18)            | 1.389<br>(0.969; 1.991) |
| EMPLOYMENT<br>STATUS       | 1 = Employee<br>0 = Employer / Self employed (rc)                                | 0.93<br>(0.248)   | 0.35<br>(0.38)            | 1.420<br>(0.674; 2.990) |
| POSITION                   | 1 = Non management<br>0 = Management (rc)  | 0.47<br>(0.499)   | 0.46*<br>(0.23)           | 1.577<br>(1.015; 2.448) |
| FREQUENCY OF<br>ATTENDENCE | 1 = 11 or more times<br>0 = fewer than 11 times (rc)                             | 0.13<br>(0.339)   | 0.17<br>(0.27)            | 1.181<br>(0.694; 2.011) |
|                            | Criterion variable   | 0.47<br>(0.499)   |                           |                         |
|                            | Intercept  | -1.546  |                           |                         |
|                            | Goodness-of-fit test   | Model $X^2 = 24.601$ (see Harrell, 1980, p. 83) with 9 <i>d.f.</i> , $p = .003$ |                           |                         |

*Note.* Offering free tuition = “1” and Other factors = “0”, rc = reference category  
 \* $p \leq .05$

*Research Question Three*

*Q3. What is the relationship between the participants' opinions about the content and delivery of the BTN e-training courses and the participants' age and education level?*

According to item 20 of the BTN e-survey questionnaire, seven dimensions were related to the BTN e-training participants' opinions of the content and delivery of the BTN e-training courses. The following interpretations were associated with each dimension.

*The course content progresses gradually and is easy to learn*

The value of the Chi-square statistic and  $p$  value answers the question about the two variables (i.e., agreement and age) and revealed that they were either independent (if  $p > .05$ ) or not (if  $p \leq .05$ ). The Chi-square statistic showed that AGE1 ( $X^2 = 8.933$ ,  $n = 643$ ,  $df = 1$ ,  $p = .008$ ) and EDUCATION LEVEL ( $X^2 = 4.283$ ,  $n = 629$ ,  $df = 1$ ,  $p = .047$ ) each had statistically significant (see Table 11).

The crosstabs showed participants aged less than or equal to 29 years and those who had less than four years of college education were more likely to disagree that the BTN e-training course content progressed gradually and was easy to learn. For example, 66.7 % of the participants aged less than or equal to 29 years compared to 33.3% participants of other ages disagreed that the BTN e-training course content progressed gradually and was easy to learn; likewise, 66.7% of the participants whose education level was less than four years of college compared to 33.3% of the participants whose

education level was equal to or more than four years of college disagreed that the BTN e-training course content progressed gradually and was easy to learn.

Table 11  
*Participants' Opinions of the BTN e-Training-- Course Content is Easy to Learn--by Age and Education Level*

| Independent Variable                | n   | Agreement Level  |                     | Chi-square | p    |
|-------------------------------------|-----|------------------|---------------------|------------|------|
|                                     |     | Agree<br>-- % -- | Disagree<br>-- % -- |            |      |
| AGE1                                | 643 |                  |                     | 8.933      | .008 |
| Less than or equal to 29 yrs        |     | 23.70            | 66.70               |            |      |
| All other ages                      |     | 76.30            | 33.30               |            |      |
| AGE2                                | 643 |                  |                     | .068       | ns   |
| 30-34 yrs                           |     | 29.30            | 33.30               |            |      |
| All other ages                      |     | 70.70            | 66.70               |            |      |
| AGE3                                | 643 |                  |                     | 2.658      | ns   |
| 35-39 yrs                           |     | 22.90            | 0.00                |            |      |
| All other ages                      |     | 77.10            | 100.00              |            |      |
| EDUCATION LEVEL                     | 620 |                  |                     | 4.283      | .008 |
| Less than 4 years of college        |     | 33.70            | 66.70               |            |      |
| More or equal to 4 years of college |     | 66.30            | 33.30               |            |      |

Note.  $p \leq .05$ , ns = not significant

*The course will help me to perform work later*

The Chi-square statistic showed AGE1 ( $X^2 = 44.335$ ,  $n = 639$ ,  $df = 1$ ,  $p < .001$ ), AGE2 ( $X^2 = 4.574$ ,  $n = 639$ ,  $df = 1$ ,  $p = .021$ ), and EDUCATION LEVEL ( $X^2 = 13.575$ ,  $n = 626$ ,  $df = 1$ ,  $p < .001$ ) each had statistically significant (see Table 12).

The crosstabs showed that participants aged less than or equal to 29 years and those who had fewer than four years of college education were more likely to disagree that the BTN e-training course content could help them perform work later. For example, 75 % of the participants aged less than or equal to 29 years compared to 25% of participants of other ages disagreed that the BTN e-training course content would help them to perform work later; likewise, 65.6% of the participants whose education level was less than four years of college compared to 34.4% of the participants whose education level was equal to or more than four years of college disagreed that the BTN e-training course content would help them perform work later.

Table 12  
*Participants' Opinions of the BTN e-Training Course as Helping Them to Perform Work Later*

| Independent Variable                | n   | Agreement Level |          | Chi-square | p     |
|-------------------------------------|-----|-----------------|----------|------------|-------|
|                                     |     | Agree           | Disagree |            |       |
|                                     |     | -- % --         | -- % --  |            |       |
| AGE1                                | 639 |                 |          | 44.335     | <.001 |
| Less than or equal to 29 yrs        |     | 22.60           | 75.00    |            |       |
| All other ages                      |     | 77.40           | 25.00    |            |       |
| AGE2                                | 639 |                 |          | 4.574      | .032  |
| 30-34 yrs                           |     | 30.10           | 12.50    |            |       |
| All other ages                      |     | 69.90           | 87.50    |            |       |
| AGE3                                | 639 |                 |          | 3.342      | ns    |
| 35-39 yrs                           |     | 23.20           | 9.40     |            |       |
| All other ages                      |     | 76.80           | 90.60    |            |       |
| EDUCATION LEVEL                     | 626 |                 |          | 13.575     | <.001 |
| Less than 4 years of college        |     | 33.70           | 65.60    |            |       |
| More or equal to 4 years of college |     | 66.30           | 34.40    |            |       |

Note.  $p \leq .05$ , ns = not significant

*The course met my learning needs and could also apply to my other courses*

The Chi-square statistic showed only AGE1 ( $X^2 = 24.609$ ,  $n = 643$ ,  $df = 1$ ,  $p < .001$ ) and EDUCATION LEVEL ( $X^2 = 6.734$ ,  $n = 630$ ,  $df = 1$ ,  $p = .009$ ) each had statistically significant (see Table 13).

The crosstabs showed that participants aged less than or equal to 29 years and those who had less than four years of college education tended to be more likely to disagree that the BTN e-training course met their learning needs and could also apply to their other courses. For example, 76.5 % of the participants aged less than or equal to 29 years compared to 23.5% participants of other ages disagreed that the BTN e-training course content met their learning needs and could also apply to their other courses; 64.7% of the participants who had less than four years of college education compared to 35.3% of the participants who had equal to or more than four years of college education, disagreed that the BTN e-training course met their learning needs and could also apply to their other courses.

Table 13  
*Participants' Opinions of the BTN e-Training Course Met My Learning Needs and Could Also Apply to My Other Courses*

| Independent Variable                | n   | Agreement Level |          | Chi-square | p     |
|-------------------------------------|-----|-----------------|----------|------------|-------|
|                                     |     | Agree           | Disagree |            |       |
|                                     |     | -- % --         | -- % --  |            |       |
| AGE1                                | 643 |                 |          | 24.609     | <.001 |
| Less than or equal to 29 yrs        |     | 23.60           | 76.50    |            |       |
| All other ages                      |     | 76.40           | 23.50    |            |       |
| AGE2                                | 643 |                 |          | 1.161      | ns    |
| 30-34 yrs                           |     | 29.70           | 17.60    |            |       |
| All other ages                      |     | 70.30           | 82.40    |            |       |
| AGE3                                | 643 |                 |          | 2.740      | ns    |
| 35-39 yrs                           |     | 22.80           | 5.90     |            |       |
| All other ages                      |     | 77.20           | 94.10    |            |       |
| EDUCATION LEVEL                     | 630 |                 |          | 6.734      | .009  |
| Less than 4 years of college        |     | 34.30           | 64.70    |            |       |
| More or equal to 4 years of college |     | 65.70           | 35.30    |            |       |

Note.  $p \leq .05$ , ns = not significant

*If a chat room were added as part of course, it would increase the number of participants who discuss the course content*

The Chi-square statistic showed that AGE1 ( $X^2 = 25.584$ ,  $n = 638$ ,  $df = 1$ ,  $p < .001$ ) and EDUCATION LEVEL ( $X^2 = 7.022$ ,  $n = 625$ ,  $df = 1$ ,  $p = .008$ ) each had statistically significant (see Table 14).

The crosstabs showed the participants aged less than or equal to 29 years and those who had fewer than four years of college education tended to be more likely to disagree that if a chat room were added to the BTN e-training course, it would increase the number of participants who discussed the course content. For example, 76.5 % of the participants aged less than or equal to 29 years compared to 23.5% of participants of

other ages disagreed that if a chat room were added to the BTN e-training course, it would increase the number of participants who discussed the course content; 64.7% of the participants who had fewer than four years of college education compared to 35.3% of participants who had four or more years of college education disagreed that if a chat room were added to the BTN e-training course, it would increase the number of participants who discussed the course content.

Table 14  
*Participants' Opinion about Whether Adding a Chat Room to the BTN e-Training Course Would Increase the Number of Participants Who Discuss the Course Content*

| Independent Variable                | n   | Agreement Level  |                     | Chi-square | p     |
|-------------------------------------|-----|------------------|---------------------|------------|-------|
|                                     |     | Agree<br>-- % -- | Disagree<br>-- % -- |            |       |
| AGE1                                | 638 |                  |                     | 25.584     | <.001 |
| Less than or equal to 29 yrs        |     | 23.00            | 76.50               |            |       |
| All other ages                      |     | 77.00            | 23.50               |            |       |
| AGE2                                | 638 |                  |                     | 1.202      | ns    |
| 30-34 yrs                           |     | 30.00            | 17.60               |            |       |
| All other ages                      |     | 70.00            | 82.40               |            |       |
| AGE3                                | 638 |                  |                     | 2.783      | ns    |
| 35-39 yrs                           |     | 23.00            | 5.90                |            |       |
| All other ages                      |     | 77.00            | 94.10               |            |       |
| EDUCATION LEVEL                     | 625 |                  |                     | 7.022      | .008  |
| Less than 4 years of college        |     | 33.70            | 64.70               |            |       |
| More or equal to 4 years of college |     | 66.30            | 35.30               |            |       |

Note.  $p \leq .05$ , ns = not significant

*Similar e-training courses should be developed in order to assist knowledge learning*

The Chi-square statistic showed only EDUCATION LEVEL ( $X^2 = 6.264$ ,  $n = 628$ ,  $df = 1$ ,  $p = .021$ ) statistically significant (see Table 15).

The crosstabs showed that the participants who had less than four years of college education tended to be more likely to disagree that similar e-training courses should be developed in order to assist in learning. For example, 83.3% of the participants who had less than four years of college education compared to 16.7% of the participants who had four or more years of college education disagreed that similar e-training courses should be developed in order to assist in learning.

Table 15  
*Participants' Opinions of Whether Similar e-Training Courses Should Be Developed in Order to Assist Knowledge Learning*

| Independent Variable                | n   | Agreement Level |          | Chi-square | p    |
|-------------------------------------|-----|-----------------|----------|------------|------|
|                                     |     | Agree           | Disagree |            |      |
|                                     |     | -- % --         | -- % --  |            |      |
| AGE1                                | 641 |                 |          | .236       | ns   |
| Less than or equal to 29 yrs        |     | 24.70           | 33.30    |            |      |
| All other ages                      |     | 75.30           | 66.70    |            |      |
| AGE2                                | 641 |                 |          | 1.226      | ns   |
| 30-34 yrs                           |     | 29.30           | 50.00    |            |      |
| All other ages                      |     | 70.70           | 50.00    |            |      |
| AGE3                                | 641 |                 |          | 0.117      | ns   |
| 35-39 yrs                           |     | 22.50           | 16.70    |            |      |
| All other ages                      |     | 77.50           | 83.30    |            |      |
| EDUCATION LEVEL                     | 628 |                 |          | 6.264      | .021 |
| Less than 4 years of college        |     | 34.40           | 83.30    |            |      |
| More or equal to 4 years of college |     | 65.60           | 16.70    |            |      |

Note.  $p \leq .05$ , ns = not significant

*The e-training has no value for me and so I choose not to participate*

The Chi-square statistic showed that AGE1 ( $X^2 = 14.783$ ,  $n = 639$ ,  $df = 1$ ,  $p < .001$ ), AGE2 ( $X^2 = 20.692$ ,  $n = 639$ ,  $df = 1$ ,  $p < .001$ ), and AGE3 ( $X^2 = 12.913$ ,  $n = 639$ ,  $df = 1$ ,  $p < .001$ ) each had statistically significant (see Table 16).

The crosstabs showed that the participants aged less than or equal to 29 years, those aged 30-34 years, and those aged 35-39 years tended to disagree less frequently that the BTN e-training had no value for them as participants. For example, only 7.5% of the participants aged less than or equal to 29 years, 7.5% of the participants aged 30-34 years, and 6.3% of the participants aged 35-39 years disagreed that the BTN e-training had no value for them as participants. Therefore, they felt that the BTN e-training did have value for them as participants.

Table 16  
*Participants' Opinion about Whether the BTN e-Training had Value, Affecting Decisions to Participate*

| Independent Variable                | <i>n</i> | Agreement Level  |                     | Chi-square | <i>p</i> |
|-------------------------------------|----------|------------------|---------------------|------------|----------|
|                                     |          | Agree<br>-- % -- | Disagree<br>-- % -- |            |          |
| AGE1                                | 639      |                  |                     | 14.783     | <.001    |
| Less than or equal to 29 yrs        |          | 27.40            | 7.50                |            |          |
| All other ages                      |          | 72.60            | 92.5                |            |          |
| AGE2                                | 639      |                  |                     | 20.692     | <.001    |
| 30-34 yrs                           |          | 32.20            | 7.50                |            |          |
| All other ages                      |          | 67.80            | 92.50               |            |          |
| AGE3                                | 639      |                  |                     | 12.913     | <.001    |
| 35-39 yrs                           |          | 24.00            | 6.30                |            |          |
| All other ages                      |          | 76.00            | 93.80               |            |          |
| EDUCATION LEVEL                     | 625      |                  |                     | 3.680      | ns       |
| Less than 4 years of college        |          | 35.80            | 24.70               |            |          |
| More or equal to 4 years of college |          | 64.20            | 75.30               |            |          |

*Note.*  $p \leq .05$ , ns = not significant

*I am going to check the BTN e-training course website to obtain information and knowledge of workplace*

The Chi-square statistic showed that no variables were statistically significant (see Table 17).

Table 17  
*Participants' Opinions about Checking the BTN e-Training Course Website to Get Information and Knowledge of Workplace*

| Independent Variable                | n   | Agreement Level |          | Chi-square | p  |
|-------------------------------------|-----|-----------------|----------|------------|----|
|                                     |     | Agree           | Disagree |            |    |
|                                     |     | -- % --         | -- % --  |            |    |
| AGE1                                | 627 |                 |          | .154       | ns |
| Less than or equal to 29 yrs        |     | 25.40           | 20.00    |            |    |
| All other ages                      |     | 74.60           | 80.00    |            |    |
| AGE2                                | 627 |                 |          | .001       | ns |
| 30-34 yrs                           |     | 29.70           | 30.00    |            |    |
| All other ages                      |     | 70.30           | 70.00    |            |    |
| AGE3                                | 627 |                 |          | .431       | ns |
| 35-39 yrs                           |     | 21.40           | 30.00    |            |    |
| All other ages                      |     | 78.60           | 70.00    |            |    |
| EDUCATION LEVEL                     | 614 |                 |          | 1.693      | ns |
| Less than 4 years of college        |     | 34.70           | 55.60    |            |    |
| More or equal to 4 years of college |     | 65.30           | 44.40    |            |    |

Note.  $p \leq .05$ , ns = not significant

### Summary

The findings for *Research question one* showed that the participants' satisfaction with the BTN e-training was significantly related to age and frequency of attendance. Participants aged less than 40 years and those who attended the BTN e-training were more frequently less satisfied. The findings for *Research question two* (the top three

motivations for attending the BTN e-training) were: (a) participants aged less than 40 years and those who attended fewer times were more motivated to attend the BTN e-training because it could improve their work competence; (b) participants aged less than 40 years, those who worked in service industries, and those who were employees were less motivated to attend the BTN e-training courses even though it could help them to resolve job difficulty; and (c) participants aged less than 40 years and those who were in non-management positions were more motivated to attend the BTN e-training due to the free tuition offer.

The findings for *Research question three*, which sought participants' opinions about the BTN e-training courses, showed that participants aged less than or equal to 29 years and those who had fewer than four years of college education tended to be more likely to disagree with the following four dimensions: (a) the content of the BTN e-training courses progressed gradually and was easy to learn; (b) the content of the BTN e-training courses would help them to perform work in the future; (c) the BTN e-training courses met their learning needs, which could also apply to their other courses; and (d) adding a chat room to the BTN e-training course would increase the number of participants who discussed the course content. Participants who had fewer than four years of college education tended to disagree more that similar e-training courses should be developed in order to assist in their knowledge learning. Participants aged less than 40 years tended to disagree less frequently that the BTN e-training has no value for them and affecting their decision to participate.

## CHAPTER 5

### Summary, Conclusion, and Recommendations

This study explored participants' perceived satisfaction with and motivation to attend the BTN e-training courses in Taiwan. Using statistical analyses, the researcher examined the relationships among participants' demographics, satisfaction levels, motivation, and opinions to determine whether significant relationships existed among these variables. The results may help to identify appropriate, enjoyable, low-stress e-training methods that will serve to increase learners' satisfaction level and willingness to learn online. This chapter contains three sections: first, a summary of the purpose of the research; then, a discussion of the implications of the findings as they relate to the research questions; and finally, recommendations for future research.

#### *Summary*

In chapter 1, the researcher examined whether e-learning could serve as a useful delivery mechanism for workforce education in Taiwan. The possibility of transforming Taiwan's vocational training system through implementation of e-learning established the groundwork for discussion of the importance of measuring participants' satisfaction with and motivation to attend e-training. Effective implementation of the BTN e-training available in Taiwan appeared to be a viable means of increasing and enhancing Taiwan's workforce competitiveness in today's knowledge economy. The literature review in chapter 2 highlighted the significance of training evaluation and noted the importance of evaluation in determining participant satisfaction with the development of e-learning systems.

In chapter 3, the methodology and conceptual framework examined the relationship among demographics, satisfaction, and motivation of the BTN e-training participants. An e-survey questionnaire was developed, tested, and used to collect data relating to the BTN courses. All participants in the BTN e-training courses received the anonymous e-survey questionnaire via an e-periodical from the BTN registration department upon their completion of e-training courses in 2004. The data collected consisted of information from a total of 706 participants who responded to the anonymous survey. All data were coded and processed using SPSS 13.0. Descriptive statistics and logistic regression analysis were used to analyze the responses to Research questions one and two to determine the relationships between the participants' satisfaction with and motivation for job training while attending the BTN e-training by age, gender, education level, position, employment status, industrial category, and frequency of attendance. The third research question utilized the Chi-square to uncover existing relationships between participants' ages and education level and the participants' opinions of the BTN e-training course content.

Major findings from each research question were summarized in chapter 4. All findings were based directly on results from statistical tests. Results for *Research question one* showed participants' satisfaction with the BTN e-training were significantly related to age and frequency of attendance. Findings for *Research question two* indicated that participants' top three motivation factors in attending the BTN e-training were significantly related to age, industrial category, employment status, position, and frequency of attendance. Findings for *Research question three*, which reflected the

participants' opinions about the BTN e-training courses, showed that participants aged less than or equal to 29 years, and those had less than four years of college education disagreed with the following four statements: (a) the content of the BTN e-training courses progresses gradually and is easy to learn; (b) the content of the BTN e-training courses would help them to perform work in the future; (c) the BTN e-training courses met their learning needs, which could also apply to their other courses; and (d) adding a chat room as part of the BTN e-training course would increase the number of participants who discuss the course content. Participants whose education was less than four years of college disagreed with the statement that similar e-training courses should be developed in order to assist learning. Participants aged less than 40 years significantly disagreed that the BTN e-training has no value for them.

### *Conclusion*

The discussion of the research study focused on the statistical tests and the researcher's personal opinions. The rationale for the statistical tests and the researcher's personal opinions include: (a) The BTN e-training is in a developmental stage and courses were not completely developed when this study was undertaken; and (b) in terms of the availability of similar research studies that focus on learners' satisfaction in developing e-learning programs, only a limited number of studies exist, and those do not focus on government-sponsored initiatives. The extensive search conducted for this study showed that any correlated current research is based on learners' satisfaction studies in higher education and private organizations (Bynum et al., 2002; Chang, 2002; Chen et al.,

2004; Huang et al., n.d.; Isman, 1997; Lin, 2003; Wu, 2002, 2003). The e-learning programs noted in existing studies in higher education and private organizations have very specific target learners, such as students of the same ages or employees with similar job descriptions or responsibilities. Also in existing studies, the e-training programs noted are well-developed and have been offered for several years; therefore, it is not appropriate to make comparisons between those studies and this study.

### *Research Question One*

*Q1. What is the relationship between participants' satisfaction with BTN e-training and gender, age, highest educational level, employment status, position, industrial category, and frequency of attendance?*

Findings from *Research question one* showed participants aged less than 40 years and those who attended the BTN e-training more frequently were less satisfied. Participants younger than 40 years accounted for 76.1% of respondents to the BTN e-survey. The responses from participants aged younger than 40 years are consistent with the DEC (2002) report and EVTA (2003) digital divide study findings which showed that new technology is used mainly by young people between the ages of 16 and 30 in Taiwan. Huang et al. (n.d.) showed that in Taiwan, 58.9% of participants in public vocational training were 21 to 30 years old, accepted e-learning technology, and believed that content usefulness was a major factor in their decision to participate in e-learning. These findings suggest that younger workers have more computer experience, feel comfortable,

and are proficient using and adapting to technology versus their older counterparts in the workforce. Moreover, these younger workers may have attended other e-learning courses previously. The expectations of the younger workers were higher than those of workers older than 40 years; therefore, the younger participants were less satisfied with the BTN e-training since it is still in development. Likewise, since the BTN e-training is incomplete, the 13.2% of participants who attended more frequently may feel the BTN courses were similar to other courses, and therefore incomplete when compared to the BTN courses in previous e-training.

#### *Research Question Two*

*Q2. What are the relationships between the top three participants' choice from seven motivation factors (listed below) and participants' gender, age, educational level, employment status, position, industrial category, and frequency of attendance?*

In *Research question two*, the top three motivation factors for attending the BTN e-training were: (a) Improving work competence, (b) Solving job difficulty, and (c) Offering free tuition. According to Forster (2000), the key factor in producing successful learning and satisfaction is motivation. Motivation is a person's need, interest, or desire to learn (Forster, 2000). Research studies indicated that a relationship exists between motivation and satisfaction in e-learning and distance learning. Wu's (2003) study indicated that the motivation to learn may relate to opportunities such as promotion,

finding jobs, and certification. His study showed a strong positive correlation between employee learning motivation and satisfaction. Likewise, Wu (2002) investigated the status of Internet users, learning motivation, and learning satisfaction. The results showed a high correlation between students' and teachers' learning motivation and satisfaction. Chang (2002) studied distance learning satisfaction in Taiwan and results showed that motivational needs influenced teaching assistants' satisfaction with distance-learning. Target samples of these studies were students, teachers, or employees from private organizations. However, such target samples are quite different from the sample in this study. Since the BTN e-training is being developed for all workers in Taiwan, it is essential to understand that learners in different positions have different factors that influence their motivation and satisfaction (Forster, 2000).

#### *Improving work competence*

Participants in the BTN e-training aged less than 40 years and those who attended fewer times were more motivated to attend the BTN e-training, as it could improve their work competence. As noted in *Research question one*, younger participants may have more positive attitudes and are more willing to use e-training. Also, they may be more comfortable than older workers when using technology, and realize that their knowledge and work competence may be enhanced conveniently, without time and space limitations. However, since the BTN e-training courses are not completed yet, these younger participants were less satisfied with the e-training. Perhaps they had experienced quality e-training programs prior to this study. Similarly, participants who attended more

frequently may feel the courses are similar and incomplete if they compare the BTN courses with previous courses.

### *Solving job difficulty*

Participants aged less than 40 years, those who worked in service industries, and those who were employees, were less motivated to attend the BTN e-training courses even though it could help them to resolve job difficulty. In the researcher's opinion, younger participants may have more positive attitudes and may prefer to attend e-training since they may be more comfortable than their older counterparts in using technology. Younger participants believed e-training from the BTN could improve their work competence; however, they were not motivated to attend the BTN e-training even though it could solve their job difficulty. Perhaps the BTN e-training courses offered at the time were not directly related to those participants' current positions, and the participants believed that the knowledge and skills could not be immediately applied to the solution of their job difficulty.

Another possibility, in the researcher's opinion, may be that the job difficulty resulted from interpersonal issues, and the BTN e-training may not have offered solutions. In this study, 51.9% of the participants worked in service industries, where providing good customer service, an interpersonal skill, was essential. Interpersonal skill may be developed and enhanced by working directly with customers, not necessarily a common e-training subject. In addition, 93.5% of the participants were employees whose job difficulty may have been complex as a result of numerous contributing factors. Those participants were more motivated to increase knowledge and skills to enhance their work

competence, but were not motivated to resolve their job difficulty through the BTN e-training. Again, since the BTN e-training courses are not developed completely, results from this study may be affected.

#### *Offering free tuition*

Free offerings, such as tuition or other benefits, may increase people's willingness to try or use new products. For example, software programs are available free online for download and use. As the BTN e-training is a free e-training website provided by the Taiwan government, free tuition may encourage more people to participate in the BTN e-training. In this study, research results showed that participants aged less than 40 years and those who were in non-management positions were more motivated to attend the BTN e-training if free tuition was offered. In the researcher's opinion, offering the BTN e-training tuition-free would perhaps motivate more workers to participate, since free tuition was one of the top three motivational factors in attending the BTN e-training.

Findings from *Research questions one and two* showed the age variable to be statistically significant on both satisfaction and motivation ( $p < .001$  on both satisfaction and motivation; see Tables 7, 8, 9, and 10). This finding related to studies of EVTA (2003), Huang et al. (n.d.), Bynum et al. (2002), and Isman (1997). However, gender and educational level were not statistically significant on either satisfaction or motivation. Yet, the digital divide study in Taiwan (EVTA, 2003) indicated that gender affected the digital divide in the workplace. Females were more comfortable using computers than males; however, a greater number of females were employed in positions such as administrative assistants, for which computer use was required. Moreover, Bynum et al. (2002) and Isman (1997) both reported that gender influenced satisfaction.

In this study, 59% of the respondents were female. Perhaps females are more comfortable using computers than males; yet, gender was not found to be statistically significant on either satisfaction or motivation. Similarly, education level was not found to influence satisfaction with e-learning; therefore, the results of this study were not consistent with those reported in EVTA (2003), Huang et al. (n.d.), Bynum et al. (2002), and Isman (1997). In this study, while the results of *Research questions one* and *two* should not be generalized, the information may be used to improve the BTN e-training.

### *Research Question Three*

*Q3. What is the relationship between the participants' opinions about the content and delivery of the BTN e-training courses and the participants' age and highest education level?*

In *Research question three*, there were two limitations: (a) People in Taiwan may not always give a direct answer in agreement when responding to a survey as a result of cultural teachings; and (b) as mentioned previously, the BTN e-courses have not been completely developed, and are still in the experimental stage. Findings from this study attempt to describe participants' opinions about the BTN e-training course content. Since age and educational level variables were common when considering the digital divide in Taiwan (EVTA 2003), those variables were selected to analyze the course content. The findings for *Research question three* compared to those for *Research question one* show some similarities. According to findings for *Research question one*, 93.7 % of the participants aged less than 40 years compared to 6.3 % the participants of aged above 39 years were unsatisfied with the BTN e-training. Participants' opinions about the BTN e-training courses, analyzed by age, showed that participants aged less than or equal to 29

years and those had less than four years of college education tended to be more likely to disagree with the following four dimensions: (a) the course content of the BTN e-training progresses gradually and is easy to learn; (b) the content of the BTN e-training courses would help them to perform work later; (c) the BTN e-training courses met their learning needs and could also apply to their other courses; and (d) adding a chat room as part of the BTN e-training course would increase the number of participants who discuss the course content.

In Taiwan, new technology is used mainly by young people between the ages of 16 and 30 (EVTA, 2003). As discussed in *Research question one*, those young people more readily understand, accept, and adapt to e-learning; thus, they tend to hold higher expectations for the BTN e-training. It was not surprising that participants aged younger than 30 years disagreed that the BTN e-training courses were easy to learn and helpful. The BTN e-training instructional design was incomplete. Also, there was little or no opportunity for participants to interact with each other or with the instructors. In addition, participants whose education was less than four years of college tended to disagree more that similar e-training courses should be developed to assist in learning. This finding may have been affected by the incomplete development of the BTN e-training courses. However, participants aged less than 40 years tended to disagree less frequently that the BTN e-training has no value for them, even though they were not highly satisfied. These participants may expect that the BTN e-training will improve, and they may participate when the BTN courses are completely developed.

### *Research Limitations*

The study has several limitations that need to be addressed. First, the BTN e-training in Taiwan had been initially offered in 2002, and is still in the experimental stage. Many courses had not been completely developed at the time of this study. Therefore, the findings reported here are not final conclusions. Second, the survey questionnaire was developed by the BTN. The wording of the questions elicited quite broad, non-specific responses, and was especially not specific in terms of satisfaction and motivation. Since the data were collected for one year only, the findings cannot be generalized. Given these limitations, the results of the present study nevertheless provide valuable and useful information about participants' satisfaction with and motivation to attend the BTN e-learning. Findings provide administrators or course designers with information about participants' perceptions of the BTN e-training. Such information may be helpful when making future improvements.

### *Implications of the Study*

In today's knowledge-based economy, the speedy acquisition and utilization of the latest information and skills is a key factor in gaining a competitive edge. The rationale for implementing and using e-learning in today's workplace, regardless of location, appears obvious. Best known as one of the leading providers of IT products, Taiwan now receives intense competition in the global market, particularly from Japan, South Korea, and China. Such competition affects Taiwan's economy. Research shows that Taiwan's workforce has an average Internet age of 3.5 years, and the average time spent on the Internet per person is 2 hours per day (EVTA, 2003). The necessary

infrastructure is in place, wireless technology is available, and the people have full support from the government. With these factors in place, creating an ideal environment for extensive e-learning development in Taiwan is now possible.

Results from this study indicated that age is the strongest predictor in determining participants' satisfaction and motivation. Therefore, the BTN should prioritize efforts toward designing and developing e-courses to meet younger participants' needs and expectations. Providing computer training to workers older than 39 years, who have fewer computer and e-learning experiences, may be a good idea, too. Moreover, when designing course materials, a connection between participants' motivations and needs must be made. To gain information about the participants' specific motivations and needs, future survey questionnaires should be developed that consider the ages of those who may respond. Only when participants believe that they will benefit from participation in the BTN e-training courses will they be motivated to attend often and be satisfied with the e-learning offered.

#### *Recommendations for Future Research*

To implement the BTN e-training successfully and effectively and as future studies are planned, the following recommendations are proposed for government policy makers, educators, and organizations in Taiwan.

*Recommendations for Government and Policy makers*

First, effective implementation of the BTN e-training requires the full support of the Taiwan government. The government policy makers should establish a policy to create a national e-learning infrastructure for the BTN e-training. The national infrastructure would consist of a content provider that would supply the materials, equipment, and activities that would be disseminated throughout the country—ideally in schools, classrooms, family homes, offices, and Internet cafés. Using currently available technology, people will be able to connect to the BTN e-training at a location and time convenient for them.

Second, government policy makers may wish to establish a standard certificate system that encourages organizations and workers to take advantage of the BTN e-training. In addition, to positively influence organizations' and workers' perceptions, EVTA administrators need to become familiar with basic technologies that they encourage workers to utilize within the BTN e-learning programs.

Third, the provision of both human and technical support is absolutely critical to the narrowing of the digital divide in the workplace in Taiwan. When implementing any program, relevant training is required to ensure the success of that program. Adequate equipment or software training and a facilitator who will listen to and help solve problems are required. Opportunities to learn online need to be encouraged and supported by both education and administration.

Fourth, a research, development, and evaluation commission should be organized to conduct longitudinal studies. Longitudinal studies are needed to gain insight into

changes in patterns of participant satisfaction and motivation according to age and to identify predictors of persistence with the BTN e-training.

Fifth, the BTN must continue to collect data from participants. One suggestion would be to collect data when participants register for e-training, and conduct a follow-up survey at a later time. A larger and more representative sample would be desirable to expand the generalizability of the levels of satisfaction and motivation found in this study.

Finally, precise survey questionnaires should be replicated to explore participants' satisfaction with and motivation to attend the BTN e-training by using findings from this study. There are many existing survey questionnaires to use in evaluating participants' satisfaction and motivation; however, because of the cultural differences that are inherent in the workplace in Taiwan, a strong suggestion is to develop a survey questionnaire based on Taiwan's workforce culture and background. The survey questionnaire should be narrowly focused on satisfaction and motivation. To ascertain validity and reliability, the survey should be reviewed by a panel of e-training experts in Taiwan as well as by the evaluation commission, tested by a pilot study, and then analyzed using factor analysis. In addition, results from qualitative studies would offer more extensive and deeper insight into participation in the BTN e-training. The use of a semi-structured in-depth interview as a data collection strategy could help illuminate quantitative findings from survey instruments.

#### *Recommendations for Educator/Instruction Designers*

First, specific target areas should include training educators/instructional designers who could suggest and design effective e-training courses to improve the BTN

e-training. Educators must also recognize that teaching and designing courses in an online learning environment requires at least as much, but perhaps even more research, planning, organization, and support than a traditional classroom environment.

Second, educators and instructional designers need to determine program effectiveness not only for relevance, but also for cost-effectiveness, when evaluating delivery online versus traditional classroom delivery. Perhaps e-training courses could be designed using easily accessible, inexpensive or free software that replicates successful e-training coursework already in use. Then the savings could be passed on to participants.

#### *Recommendations for Organizations*

First, the BTN e-learning should be included as an integral part of the organizations' pre-appointment training standards. Ensure that e-training is defined as an integral part of each employee's job requirements.

Second, appraisal and reward systems must become part of the BTN e-learning so that employees are willing to attend and learn via e-training. Create monitoring systems that will note incidences of e-learning skills transferred back to the job, and perhaps include recognition or reward for those employees. Organizations must take an active participatory role in the BTN e-training so that the government will recognize an organizational need for e-training. When organizations encourage employees to attend the BTN e-training, productive partnerships can be developed with the BTN that will benefit employees, organizations, and the entire country of Taiwan. Development of the BTN e-training is an important initiative in workforce education in Taiwan, especially now that the country is seeking a competitive edge in today's knowledge

economy. If the government merely provides the BTN e-training and expects workers to automatically accept, participate in, and embrace the BTN e-training, the miraculous potential of the BTN e-training will not bear fruit. Participants' satisfaction and motivation are not the only elements needed in developing and implementing the BTN e-training; the government, policy makers, educators, instructional designers of e-learning, and organizations all must cooperate in supporting the BTN e-training as well.

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Appendix A.

The BTN E-Survey Questionnaire

**Survey questionnaire**

1. What is your highest educational level?
  - a. Master degree or above
  - b. Bachelor degree
  - c. Associate degree
  - d. High school (vocational high school) diploma
  - e. Junior high school or below
  
2. How many years have you been employed?
  - a. less than 6 months
  - b. 6 months ~ 1 year
  - c. 1 year ~ 5 years
  - d. 6 years ~ 15 years
  - e. More than 16 years
  
3. How did you hear about the Business Training Network e-training courses?
  - a. Relative
  - b. Classmates
  - c. Schools
  - d. Computer retailers or Exhibition
  - e. Commercial and Media
  - f. Internet
  - g. Newspaper or Magazine
  - h. Other
  
4. On average, how many hours of your time do you spend on line per week?
  - a. less than 2
  - b. 2 to 5
  - c. 6-10
  - d. 11-15
  - e. 16-20
  - f. 21-25
  - g. 26~30
  - h. 30 or above
  
5. On average, how many hours of your time do you spend on E-training courses per week you spend your time on e-training course(s)?
  - a. less than 2
  - b. 2 to 5
  - c. 6-10
  - d. 11-15
  - e. 16-20
  - f. 21-25
  - g. 26~30
  - h. 30 or above
  
6. What is your Internet speed?
  - a. 28.8K or less
  - b. 56K
  - c. ISDN
  - d. ADSL or Cable
  
7. Please check five catalog websites you visit often.
  - a. Organization and Products information
  - b. Searching engine
  - c. Personal website
  - d. News media
  - e. Shared software
  - f. Shopping website
  - g. Entertainment
  - h. Government service website
  - i. Games
  - j. Academic website
  - k. Chat room
  - l. Other
  
8. How often do you visit government service website?
  - a. Often
  - b. Sometimes
  - c. Few
  - d. Never
  
9. How satisfied are you with the information and service provided by government public service websites?
  - a. Very satisfied
  - b. Satisfied
  - c. Unsatisfied
  - d. Very unsatisfied
  - e. No opinion
  - f. Don't know
  
10. How satisfied are you with the E-training courses provided by Business Training Network?
  - a. Very satisfied
  - b. Satisfied
  - c. Unsatisfied
  - d. Very unsatisfied
  - e. No opinion
  - f. Don't know
  
11. Do you agree that e-training is more convenient than class room training?

- a. Strongly agree   b. Agree   c. Disagree   d. Strongly disagree   e. No opinion  
f. Don't know
12. Do you agree that e-training is more useful than classroom training?  
a. Strongly agree   b. Agree   c. Disagree   d. Strongly disagree   e. No opinion  
f. Don't know
13. What kind of Banner advertising is more attractive to you?  
a. Public welfare information   b. News   c. Product information  
d. Product Promotion/ Gift   e. Governmental Bulletin   f. New website  
g. Academic information   h. Entertainment information   i. Others
14. How many times have you attended the e-training course last year?  
a. 1 ~5 times   b. 6~10 times   c. 11~30 times   d. 31 times or more
15. What are the first three factors why employees get laid off?  
a. Educational level (too high)   b. Educational level (too low)   c. Gender (male)  
d. Gender (female)   e. Age (older)   f. Age (younger)   g. Work experience (long)  
h. Work experience (short)   i. Marital status (married)   j. Marriage status (single)  
k. Job position (higher level)   l. Job position (lower level)
16. What are the first three outcomes that motivate you to attend e-training course from Business Training Network?  
a. Improving work competence   b. Decreasing difficulty in finding a job  
c. Promoting job satisfaction   d. Providing qualification   e. Solving job difficulty  
f. After E-training service   g. offering Free tuition   h. Other
17. Will you consider attending e-training courses from Business Training Network in order to improve your work competence the coming year?  
a. Yes   b. No
18. Do you agree that education level is a factor in finding a job?  
a. Agree   b. Disagree
19. What do you use your computer for the most? (You may choose more than one)

| Work Item                  | First often | Second often | Third often | Fourth often | Fifth often |
|----------------------------|-------------|--------------|-------------|--------------|-------------|
| Word processing            |             |              |             |              |             |
| Computer game              |             |              |             |              |             |
| Internet                   |             |              |             |              |             |
| E-mail                     |             |              |             |              |             |
| Programming                |             |              |             |              |             |
| E-learning                 |             |              |             |              |             |
| Work/assignment Management |             |              |             |              |             |
| Others                     |             |              |             |              |             |

20. What is your opinion of attending Business Training Network E-training courses from following list?

| Item   | Strongly agree | Agree | fairly | Disagree | Strongly disagree |
|--|----------------|-------|--------|----------|-------------------|
| 1. The course content progresses gradually and is easy to learn  |                |       |        |          |                   |
| 2. The course will help me to perform work later   |                |       |        |          |                   |
| 3. The course met my learning needs and could also apply to my other courses.  |                |       |        |          |                   |
| 4. If a chat room were added as part of course, it would increase the number of participants who discuss the course content. |                |       |        |          |                   |
| 5. Similar e-training courses should be developed in order to assist knowledge learning                                      |                |       |        |          |                   |
| 6. The e-training courses has no value for me and so I choose not to participate   |                |       |        |          |                   |
| 7. I am going to check the BTN e-training course website to obtain the information and knowledge of workplace                |                |       |        |          |                   |

8. What do you like most about BTN e-training courses?

9. What do you dislike most about BTN e-training courses?

### Demography

Name:

E-mail:

Gender: a. Male b. Female

Age: a. below 23 b. 23~29 c.30~34 d. 35~39 e. 40~45 f. above 45

Current Employment Status: a. Employee b. Employer c. SOHO d. Self-employed e. others

Marital Status: a. Single b. Married

Salary rate (monthly, NT dollar): a. Below \$17, 999 b. \$18,000~\$24,999

c. \$25,000~\$29,999 d. \$30,000~\$39,999

e. Above \$40,000

Category of industry:

Current Position: a. Decision maker b. Middle manager c. Employee d. Other

## 勞動力教育程度調查

隨著景氣逐漸加溫，國內企業人力過剩情況比去年同期好轉，從去年的18%降至13%，為近三年最低。各行各業除了金融業因金控合併導致人力過剩外，情況都比去年好轉，四成新竹科學園區廠商反因景氣好轉業務增加出現缺工，反映廠商僱用需求大增。人力資源是企業決戰於全球化競爭的沙場中，運籌帷幄必備的競爭武器！今年一【勞委會職訓局】為培育企業內部人才核心職能，特別開設線上人資學習課程，由企業訓練聯絡網專案辦公室負責執行，「尤其針對企業員工教育程度之各項關聯性」積極瞭解員工真正的想法及需要來作規劃前分析，俾利設計出最完善之課程，讓各企業內因工作繁忙而沒有時間出來上課的朋友，也能彈性運用時間學習，為自己以及企業建立核心競爭力。

● 填問卷抽贈品：工業雜誌、企業人力資源管理手冊 各10名

● 企訓奇遇大道

調查重點：

1. 企業員工教育程度狀況。
2. 員工教育程度與自我進修（主、被動）的關聯性，—尤針對「二專（技）」、「高中職」部份。
3. 員工教育程度與工作滿意度的關係。
4. 員工教育程度與優退方案（主動辭職、被動資遣、屆齡退休）的關聯。
5. 員工教育程度與職業（工作性質）、年齡、性別、婚姻的關聯性。
6. 員工教育程度與找工作難易度的關聯。

### ● 填寫問卷：

1. 請問您的教育程度為何？

碩士（含）以上      大學      專科      高中（職）      國中（含）以下

2. 請問您工作的年資為何？

半年以下      半年~一年      一年~五年      六年~十五年      十六年以上

3. 請問您主要從哪裡獲得與線上課程相關的資訊？

親友      同學      學校課堂      電腦賣場或展覽會場

廣電媒體      網際網路      報章、雜誌或書籍      其他

4. 您每週平均花多少時間上網際網路？

2小時以下      2-5小時      6-10小時      11-15小時      16-20小時

21-25小時      26-30小時      30小時以上

5. 您每週平均花多少時間上線上課程？

2小時以下      2-5小時      6-10小時      11-15小時      16-20小時

21-25小時      26-30小時      30小時以上

6. 請問您撥接上網路所使用的速度是多少？

28.8K（含）以下      56K      ISDN      寬頻(ADSL、CABLE、固接專線)

7. 請選出五種您最常進入的網站類型？（依實際狀況，可選一~五項）

公司或產品資訊類      搜尋引擎類      個人網站      新聞媒體類  
 共享軟體類      購物網站      生活休閒資訊類      政府的公共服務網站  
 遊戲類      學術網站      社群網站/聊天室      其他

8. 請問您是否會到政府單位所建置的網站瀏覽資訊？

經常去      偶而去      極少去      從來沒有去過

9. 請問您對政府網站所提供的公共資訊或服務滿意嗎？

非常滿意      滿意      不滿意      非常不滿意      無意見

不知道

10. 請問您對政府網站所提供的線上課程滿意嗎？

非常滿意      滿意      不滿意      非常不滿意      無意見

不知道

11. 請問您同意不同意『網路線上課程比實體課程更具便利性』？

非常滿意      滿意      不滿意      非常不滿意      無意見

不知道

12. 請問您同意不同意『網路線上課程比實體課程更具實用性』？

非常滿意      滿意      不滿意      非常不滿意      無意見

不知道

13. 網頁上哪一類的Banner廣告會吸引您做進一步的連結？（可複選）

公益性活動      新聞訊息      商品資訊      贈獎促銷活動

政府公告      新站發布      學術活動      娛樂活動

其他

14. 過去一年中您會上過線上課程多少次？

1-5次      6-10次      11-30次      31次以上

15. 近年來，常聽見企業以（優退方案）來增加企業的競爭力，您認為公司在做決定時最主要考慮的三個原因？

以員工教育程度（高）考量      以員工教育程度（低）考量      以性別（男）來考量

以性別（女）來考量

以年齡（年紀大）作考量      以年齡（年紀輕）作考量      以年資（久長）為依據

以年資（短）為依據

已婚      未婚      工作職位（高階）      工作職位（基層）

其他

16. 請依序選出三個在網路上的線上課程方面您關心的問題。

可提升個人核心職能      可降低找工作的難度      可提升工作滿意度      能提供上課證

明

能解答工作上所遇到的困難

課後服務

是否免費

其他

17. 未來一年中您是否會考慮透過線上課程來自我提升核心職能？

會          不會

18. 請問您是否同意教育程度高低會對找工作的難易度產生影響。

會          不會

19. 您最常使用電腦做什麼事（依實際狀況，可選1~5項）

| 項目                | 最常用 | 次常用 | 第三常用 | 第四常用 | 第五常用 |
|-------------------|-----|-----|------|------|------|
| A.文書處理            |     |     |      |      |      |
| B.玩電腦遊戲           |     |     |      |      |      |
| C.上網際網路           |     |     |      |      |      |
| D.通訊              |     |     |      |      |      |
| E.編寫程式            |     |     |      |      |      |
| F.閱聽多媒體<br>(線上課程) |     |     |      |      |      |
| G.作業管理            |     |     |      |      |      |
| H.其他              |     |     |      |      |      |

20. 對於本網站的使用心得（針對下列問題皆有五個選擇可選，請您依照您對每一個問題的同意程度而提出您的反應。）

| 項目                               | 非常同意                 | 同意 | 尚可 | 不同意 | 很不同意 |
|----------------------------------|----------------------|----|----|-----|------|
| 1.線上課程呈現內容的方式層次分明，容易學習           |                      |    |    |     |      |
| 2.線上課程所提供的教學內容，對我未來的幫助很大         |                      |    |    |     |      |
| 3.線上課程所提供的各種資源介紹，能夠配合我其他課業的學習需求  |                      |    |    |     |      |
| 4.線上課程如增設討論區，可以激發同學之間對於該課程的討論    |                      |    |    |     |      |
| 5.我覺得應該多開發類似的線上課程，以輔助各類知識的學習。    |                      |    |    |     |      |
| 6.我覺得這類的線上課程並沒有任何學習價值。           |                      |    |    |     |      |
| 7.我以後會經常性的參考這個線上課程的資料，以隨時掌握新知。   |                      |    |    |     |      |
| 開放性問題                            |                      |    |    |     |      |
| 8.最喜歡本線上課程的地方何在？                 | <input type="text"/> |    |    |     |      |
| 9.最不喜歡本線上課程的地方何在？請針對本線上課程提供改進意見。 | <input type="text"/> |    |    |     |      |

## ● 基本資料：

|         |   |
|---------|---|
| 姓名：     | <input type="text"/>  |
| E-MAIL： | <input type="text"/><br>請填寫，以利我們在您中獎後，可以立即贈送精美小禮物給您。                          |
| 性別：     | 男 女   |
| 年齡：     | 23歲以下    23-29歲    30-34歲    35-39歲    40-45歲    45歲以上                        |
| 目前身分：   | 上班族    企業主    SOHO族    創業者    其他(請填寫)<br><input type="text"/>                 |
|         | 目前居住地點： <input type="text"/>  |
|         | 目前婚姻狀況：    單身    已婚   |
|         | 一年內每月平均收入：    17999以下    18000~24999    25000~29999<br>30000~39999    40000以上 |
|         | 目前從事行業： <input type="text"/>  |
|         | 目前職位：    公司高層決策主管    中層主管    基層員工    其他                                       |

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## VITA

Hsiu-Ju Yuki Lu

### Education

- Ph.D. Workforce Education, The Pennsylvania State University, University Park, PA, U.S.A.  
M.Ed. Training & Development, The Pennsylvania State University, Capital College, Middletown, PA, U.S.A.  
B.S. Business in Marketing, City University, Seattle, WA, U.S.A.

### Professional Experience

- 2005–2006 Graduate Assistant, Workforce Education, The Pennsylvania State University, University Park, PA, U.S.A.  
2005 Learning Facilitator, Development Dimensions International (DDI), PA, U.S.A.  
2004–2006 Student Leadership Committee, Dept. of Learning and Performance Systems, The Pennsylvania State University, University Park, PA, U.S.A.  
2004 Intern, Employment and Vocational Training Administration Council of Labor Affairs, Taipei, Taiwan.  
2002–2003 Education Research Training, University of Cambridge, Cambridge, U.K.  
2001–2002 Trainer & Instructional Designer of Web-based Training, The Pennsylvania State University, Capital College, Middletown, PA and The U.S. Army War College, Carlisle Barracks, Carlisle, PA, U.S.A.  
1999 Intern, EVA Airways, SEA-TAC International Airport, Seattle, WA, U.S.A.

### Other Employment

- 1995–1996 Staff, Marketing Development Dept., EVA Airways, Taipei, Taiwan.  
1990–1995 Assistant Trainer, Sales & Training Dept., Ya-Chen Computer Co., Inc., Taichung, Taiwan.  
1989–1990 Assistant Trainer, Personnel & Training Dept., Plaza International Hotel, Taichung, Taiwan.

### Memberships

Northeastern Educational Research Association  
American Society for Training and Development