İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

AN EMPIRICAL STUDY OF FACTORS AFFECTING THE INTENTION TO USE A WEB-BASED TRAINING SUPPORT SYSTEM

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WEB-TABANLI EĞİTİM DESTEK SİSTEMİNİN KULLANILMASI HAKKINDAKİ NİYETİ ETKİLEYEN FAKTÖRLER ÜZERİNE AMPİRİK BİR ÇALIŞMA

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FOREWORD

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ABBREVIATIONS

ATB	: Attitude Towards Behaviour
E-Learning	: Electronic Learning
BI	: Behavioural Intention
CFI	: Comparative Fit Index
FDI	: Foreign Direct Investment
GFI	: Goodness of Fit Index
IDC	: International Data Corporation
IS	: Information System
IT	: Information Technology
NFI	: The Normed Fit Index
PEU	: Perceived Ease of Use
PGFI	: Parsimony Goodness-of-Fit Index
PIS	: Perceived Information Support
PMS	: Perceived Management Support
PNFI	: Parsimony Normed Index
PU	: Perceived Usefulness
RMSEA	: Root Means Square Error of Approximation
RMSR	: Root Means Square Residual
RNI	: Relative Noncentrality Index
SEM	: Structural Equation Modelling
SA	: Software Anxiety
SN	: Subjective Norm
SRMSR	: Standardized Root Means Square Residual
TAM	: Technology Acceptance Model
TLI	: Tucker-Lewis Index
TPB	: Theory of Planned Behaviour
TRA	: Theory of Reasoned Action
WWW	**:** World Wide Web

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AN EMPIRICAL STUDY OF FACTORS AFFECTING THE INTENTION TO USE A WEB BASED TRAINING SUPPORT SYSTEM

SUMMARY

Web based learning, also known as e- learning, is a relatively new technology that has spawned as a result of the growth of electronic commerce. To enable competent human performance and to continually update their skills and remain competent in the performance of their jobs, employees must be able to access training on demand. Web based learning is one approach that allows employees to access learning "any time" and "any place". The main question is what are the factors that may influence learners' use of such a system. The dramatically rapid development of modern information technologies and information systems brings both opportunities and challenges to contemporary organizations. While the power of information technology continues to improve dramatically, information technologies and information systems practitioners and managers are still troubled by the long-existing problem that end-users are often unwilling to use available information systems that, if used, would generate significant performance gain (Venkatesh, 2000). While researchers have dealt with a variety of topics in the area of web based learning the acceptance of this technology is a subject that needs further exploration.

This study contributes to the research in web based learning, by putting forward a conceptual model that explains the factors that affect technology acceptance of web based learning and by surveying past works in the technology acceptance literature, and review the seminal theory – The Technology Acceptance Model (TAM). The core concepts and structure of TAM consists of; perceived usefulness which is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context, perceived ease of use refering to the degree to which the prospective user expects the target system to be free of effort and attitude towards the behaviour as an individual's positive or negative feelings about performing the target behavior. TAM postulates that actual technology usage is determined by behavior intention to use, which in turn, is viewed as being jointly determined by the person's attitude toward using the technology and perceived usefulness.

In this study, by incorporating some factors from other theories, an extended technology acceptance model was proposed. A conceptual model was used to assess the technological and value issues and thus obtain an understanding of individuals' actions. In addition to the constructs of the original TAM, the extended model includes constructs and relationships which may prove to be important in the context of web based learning, which are: perceived information support; perceived management support; software anxiety; computer self-efficacy and subjective norm.

To empirically test the model, a web interface for participants to experience web based learning was used, and incorporated with a survey instrument, adapted from previous studies, to assess participants' attitudes and perceptions towards using web based learning. The survey was conducted among the 546 blue collar workers from the automotive industry, aiming to analyze their intention for adoption toward a web based learning system.

Results from structural equation model analyses illustrated that most of the factors in the proposed model have significant influence on the intention to use a web based learning system. Taking the technology acceptence model as the kernel, the extended model proposed in this study decomposes users' intention to use the web based learning system. Motivating by a need to understand the underlying drivers of the intention for the usage of a web based learning system, the empirical results show that both perceived usefulness and perceived ease of use positively influenced learners' attitude to use a web based learning system, whereas, their sofware anxiety had negative impacts on their perceived ease of use. Furthermore, both perceived ease of use and perceived management support positively and significantly influenced perceived usefulness, and perceived information support had significant influence on perceived ease of use. Moreover, findings of this study showed that employees' behavioral intention to use web based learning could be explained by attitude towards use and perceived usefulness in the TAM. Meanwhile, the model identified subjective norm as significant predictor of employees' behavioral intention to use web based learning.

Based on established theory and empirical research, this study proposed and validated a research model between the constructs and provided important information that may assist future decisions. Due to the exploratory nature of the study, five factors deemed the most important in influencing learners' behavioral intentions are included. In particular, for further research some constructs from the innovation adoption literature could also be used to explore learners' behavioral intentions to adopt web based learning technology.

WEB-TABANLI EĞİTİM DESTEK SİSTEMİNİN KULLANILMASI HAKKINDAKİ NİYETİ ETKİLEYEN FAKTÖRLER ÜZERİNE AMPİRİK BİR ÇALIŞMA

ÖZET

Web tabanlı eğitim teknolojleri; genişlemekte olan elektronik ticaretin sonucu olarak ortaya çıkmıştır. Kişisel performanslarını ortaya çıkarmak, yeteneklerini sürekli geliştirmek ve buna bağlı olarak görevlerindeki rekabetçi performanslarını koruyabilmek için çalışanların gereksinimi olan eğitimlere en kolay şekilde ulaşması gereklidir. Son yıllarda bilişim teknolojileri, özellikle kişisel bilgisayarlar ve internet, yaşamımızın tüm alanlarında olduğu gibi, eğitim ve öğretimde de yaygın olarak kullanılmaya başlanmıştır. İnternet tabanlı eğitim, çalışanların eğitime "her yerde" ve "her zaman" ulaşmasını sağlayan bir yöntemdir. Bu noktada ana soru, hangi etmenlerin, kişilerin bu tip bir sistem kullanımını etkileyeceğidir. Çağdaş bilgi teknolojilerindeki dramatik hızlı gelişim, günümüzün organizasyonlarına hem fırsatları hem de aşılması gereken sorunları beraberinde getirmektedir. Bilgi teknolojilerinin kullanım alanı ve buna bağlantılı olarak gücü dramatik olarak artarken, bilgi teknolojilerinin ve bilgi sistemlerinin uygulamacıları ve yöneticileri, son kullanıcıların erişilebilir olması ve kullanılması durumunda performansı görünür şekilde arttıracak bilgi sistemlerini kullanmak istememeleri sorunu ile sıkça karşı karşıya kalmaktadırlar (Venkatesh, 2000). Araştırmacılar web tabanlı eğitim alanında çeşitli konularda uğraş vermişken, bu teknolojinin kabulü, daha ileri araştırmalar gerektiren bir başlıktır.

Bu çalışma, web tabanlı eğitim konusundaki araştırmalara web tabanlı eğitimin teknoloji kabulunu etkileyen etmenleri açıklayan kavramsal bir modeli geliştirerek katkıda bulunmaktadır. Bu model, teknoloji kabulü hakkındaki geçmiş çalışmaları araştırarak ve yeni ufuklar açan Teknoloji Kabul Modelini değerlendirerek geliştirilmiştir. Bu çalışmada, Davis (1989) tarafından güçlü sosyo-psikolojik kuramlara dayanılarak geliştirilen Teknoloji Kabul Modeli'nin (Technology Acceptance Model–TAM) deneysel olarak otomotiv endüstrisinde çalışan mavi yakalı elemanlardan, anket yöntemi ile toplanan veriler ile test edilmesi amaçlanmıştır. Teknoloji kabul modelinin temel elemanları, algılanan yarar ve algılanan kullanım kolaylığıdır. Algılanan yarar, bireylerin bir teknolojiyi kullanarak, yaptıkları işteki performanslarının artması konusunda sahip oldukları eğilim ve düşüncelerini ifade edecek şekilde tanımlanmış iken, algılanan kullanım kolaylığı, belli bir teknolojinin kullanılmasının kolay olmasını ve fazla çaba göstermeden kullanımının öğrenilmesini ifâde etmektedir. Algılanan yarar, bir kullanıcının herhangi bir teknolojiyi kullanmasının belli görevleri yaparken ve sorunları çözerken kendisine sağlayacağı performans artışı ile ilgilidir. Tutum, olumlu ya da olumsuz biçimde tepkide bulunma eğilimidir ve bir teknolojiyi kullanma niyetini belirleyen önemli bir değişkendir. Varolan tutumların, bireylerin belli davranışlarda bulunması için bir ön koşul olduğu bulgulanmıştır. Teknoloji Kabul Modeli kullanıcıların

teknoloji kullanımlarının bu teknolojiyi kabul niyeti etkisi altında şekillendiğini savunmaktadır. Teknolojiyi kabul niyeti ise tutum ve algılanan yararın etkisi altnda şekilllenmektedir.

Bu çalışmada diğer kuramlardan da esinlenerek özgün teknoloji kabul modeli ile bâzı etmenleri birleştirerek geliştirilmiş bir teknoloji kabul modeli önerilmiştir. Teknoloji ve değerle ilgili değişkenleri ve kişilerin davranışlarını araştırmak ve değerlendirmek amacıyla bir kavramsal model kulllanılmıştır. Özgün teknoloji kabul modelinin yapısına ek olarak, geliştirilmiş model web tabanlı eğitim koşulları için önem arzedebilecek yapılar ve ilişkiler içermektedir. Bunlar: algılanan teknik destek, algılanan yönetim desteği, yazılım kullanım endişesi, öz yetkinlik ve öznel (subjektif) norm'dur.

Modeli deneysel olarak test edebilmek amacı ile katılımcıların web tabanlı eğitimi deneyimleyebilecekleri bir web arayüzü ve ilgili literatürde daha önceden yapılmış olan çalışmalardan yola çıkılarak hazırlanan bir anket kullanılmıştır. Bu yöntem ile katılımcıların web tabanlı eğitim hakkındaki davranış ve algıları incelenmiştir. Anket, otomotiv endüstrisinde çalışan 546 mavi yakalı çalışana web tabanlı eğitim sistemini kullanma niyetlerini etkileyen etmenleri analiz etmek amacı ile yapılmıştır. Yapısal eşitlik modellemesi ile yapılan analiz sonuçları, önerilen modelin birçok etmeninin web tabanlı eğitim sisteminin, kullanım niyetlerine anlamlı etkileri olduğunu göstermiştir.

Teknoloji kabul modelini esas alan ve bu çalışmada önerilen geliştirilmiş model, web tabanlı bir eğitim sisteminin kullanım niyetini etkileyen etmenleri başarılı bir şekilde ifâde edebilmiştir. Web tabanlı bir eğitim sisteminin kullanım niyetini etkileyen etmenleri ortaya çıkarabilme amacıyla kurulmuş olan bu model, algılanan kullanım kolaylığı ve algılanan yarar değişkenlerinin, kişinin teknolojiye karşı tutumu üzerinde etkili oldukları ve ayrıca yazılım kullanımı ile ilgili duyulan endişenin algılanan kullanım kolaylığı üzerinde olumsuz yönde bir etkisi olduğu sonucuna ulaştırmıştır. Bunlara ek olarak hem algılanan kullanım kolaylığı hem de algılanan yönetim desteği, algılanan yararı anlamlı bir şekilde etkilemektedirler. Bu çalışmanın bir diğer bulgusu ise, web tabanlı eğitim kullanımı için olan niyetin, teknoloji kabul modelinin özgün hâlindeki tutum ve algılanan yarar değişkenleri tarafından açıklanabileceği olmuştur. Bu arada model öznel normun, çalışanların web tabanlı eğitimin kullanım niyetlerinin anlamlı bir tahmincisi olduğunu göstermiştir.

Kurulan modele ve ampirik araştırmaya göre, bu çalışma, değişkenler arasındaki ilişkileri açıklamayı amaçlayan kavramsal modeli önermiş ve bunu doğrulamıştır. Böylece bu teknoloji ile ilgili alınacak kararlara temel oluşturacak önemli bilgiler de sağlamıştır. Çalışmanın yapısı gereği en önemli olduğu düşünülen beş etmen üzerine yoğunlaşılmıştır. Gelecek çalışmalarda, teknoloji kabulü ile ilgili literatür taranarak kişilerin web tabanlı eğitim konusundaki davranışsal niyetlerini etkileme olasılığı bulunan farklı değişkenler ve ilişkiler de araştırmalara dahil edilebilir.

1. INTRODUCTION

This study will identify and empirically test factors that may influence learners' intention to use of a Web based training support system. The areas of research and theory were drawn from human-computer interaction, information and business management, and adult education.

To enable competent human performance - doing what the job requires, when it is required - and to continually update their skills and remain competent in the performance of their jobs, employees must be able to access training on demand (Wagner and Flannery, 2004). Human resource developers are increasingly being challenged to respond to a changing work environment that is demanding "just-in-time training" for employees. Market demands with rapid changes and constant action require highly competent employees with up-todate knowledge.

Web based learning, also known as e-learning, is defined as an Internet-enabled learning process (Gunasekaran et al., 2002). Web based learning is based on material delivered through a Web browser over the public Internet, private intranet, or extranet and it allows employees to access learning "any time" and "any place". The proliferation of network access and advances in Internet/ Web technology, have stimulated the rapid growth of e-learning. It helps organizations by reducing the cost and increasing availability of the training. Cortona consulting estimated that the web based learning market will reach $50 billion in 2010.

As technologies and labour market demands continue to change in the twenty-first century, workforce education and training will remain a central component of national economic life. Today, highly competent colleagues are worth a fortune and are an organisation's only real asset especially in a competitive market. The educational needs of individuals are now seen to be continuous throughout a working life, as labor markets demand knowledge and skills that require regular updates (O'Neill et al., 2004, p. 315).

Continuing education is an important part of lifelong learning and professional development. In order to maintain competency in rapidly changing environment and meet the challenge of overcoming traditional barriers to continuing education, it is a necessity to access to innovative educational delivery methods to keep pace with updated information. In particular, e-learning has been widely recognized in several countries and has become a valuable and legitimate learning tool.

The Technology Acceptance Model (TAM) is designed to explain computer usage behavioural intention and actual behaviour. Research in this area has resulted in several theoretical models, with roots in information systems, psychology, and sociology, which routinely explain over 40 percent of the variance in individual intention to use technology (e.g., Davis et al. 1989; Taylor and Todd 1995; Venkatesh and Davis 2000). Users' acceptance is the most important determinant of intentions when using any technology. Behavioural intention, which could be used to predict behaviour, is the most important determinant of behaviour.

With this study it is desired to explore individuals' intentions for using web based learning in a voluntary setting. Based on the review of relevant theories that explain the formation of behavioural intention, a theoretical model was developed to identify the factors that influence intention to use web based learning. The theoretical model was used to assess the technological and value issues and thus obtain an understanding of individuals' actions.

1.1 Purpose of the Thesis

Industries, realizes the importance of technology for organizational growth and survival. "There are many organizations that spend a large portion of their budget on information technology to improve performance or overall organizational performance" (Klaus et al., 2003, p. 106). Organizations examine and leverage the opportunities advances in technology (hardware and software), the Internet, and greater digital speeds represent to increase customer contact and profitability. In the era of the knowledge economy, e-learning is expected to play an important part in providing continuing education.

Consequently, imperative researchers continue to examine practices, methodologies, and assumptions surrounding Web based learning.

• The technology that created the Internet has moved distance learning to theforefront of educational innovation in the 21st century (Snell and Penn, 2005, p. 18).

• As demands on time as well as the need to refresh critical skills and knowledge increase, online learning may become the solution to solving "many of the historical problems associated with effectively and efficiently disseminating information to (Munro and Rice-Munro, 2004, p. 28).

There have been few studies to explore behavioural intention toward web based learning, which is still at its preliminary stage. However, regarding web based learning, previous studies have lacked the theory base to explore determinants of behavioural intention.

The main question is what are the factors that may influence learners' use of a web based training support system. However, there is a lack of empirical examination of the adoption of web based learning systems. Explaining user acceptance of new technology is often described as one of the most mature research areas in the contemporary Information Systems (IS) literature (e.g., Hu et al., 1999).

Over the last years, Information Tec,d specially the World Wide Web, has become an essential tool for both fields. The presence of computer and information technologies in today's organizations has expanded dramatically. Web based learning methods are a suitable way of continuing education.

E-learning continues to propagate and evolve at unprecedented speed. Following this web based learning trend, both technology-centered companies (e.g., Cisco, IBM,and Dell) and non-technical companies (e.g., MetLife) have added web based learning contents to solve the employee training puzzle (Bisoux, 2002). Competence, competency, knowledge, ability, skill, human capital, learning organisations are all vogue terms in most public and private organisations. While many organizations began to use the Web for learning, little research has been done to identify the factors affecting learners' acceptance of the web based learning system in the companies,

nor has any research been conducted on attitudes towards web based learning for the blue collar workers.

The study of human-computer interaction posits that the interaction of person and machine is affected by the characteristics of both the computer system and the person using it (Card et al., 1984; Shneiderman, 1980). TAM, introduced by Davis et al. (1989), was based on the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975) and specifically designed for explaining and predicting user acceptance of specific types of technology. TAM was built on collective findings suggesting that the desired technology was greatly dependent on user acceptance of technology. It suggested that perceived usefulness and perceived ease of use were important factors in determining the use of information systems. A number of studies have successfully adopted TAM to examine the acceptance of new technologies such as personal computers (Igbaria et al., 1997), word processors and spreadsheets (Chau, 1996).

The present work advances individual acceptance research by unifying the Technology Acceptance Model theoretical perspectives common in the literature and incorporating other moderators to account for dynamic influences including perceived management support, perceived information support, software anxiety and computer self efficacy and subjective norm.

This paper closes a research gap as the model tested provides insights toward understanding the adoption of web based learning technology, and serves to evaluate an extended version TAM in this context. It is clearly of importance to gain an understanding of the success factors contributing to the acceptance of the web-based learning system by learners. With this as the ultimate aim this paper sets out to investigate factors that were rarely tested in e-learning contexts with the technology acceptance model (TAM). The specific objectives of this study are: (i) to develop an extended TAM for the determinants of the acceptance of web based learning; and (ii) to investigate both the direct and indirect effects of these determinants of intention to use web based learning.

1.2 Web Based Learning

It is increasingly important for organisations to provide employees with a curriculum for learning that is time-efficient. Enterprises have to respond to increased competition by raising efficiency in production by improving the technology.

This fact emphasises the necessity to ensure that employees are up-to-date in terms of knowledge, skills and competencies. One key issue with competence development is the monetary cost, but most important is the cost in human time and effort, which can minimise time away from productive work and maximise skill and knowledge achievements (Hunt and Ivergard, 2004). Employees need time and opportunity to develop their work based competencies, however at the same time, they need to be engaged in their productive work. Time devoted to work tasks means less time for learning, on the other hand time devoted to learning means time away from work tasks.

One solution to this paradox is to have web based learning courses which allow greater flexibility. Web based learning programs provide a highly flexible teaching and learning environment for both instructors and students (Pituch and Lee, 2006). Learners are able to follow paths through the subject content produced by designers or to develop their own routes (Chen and Macredie, 2000). In addition, learners can read course content through a computer network at any time and from different places (Chang et al., 2003).

Web based learning gives a more flexible and focused curriculum. Employees would not have to be away from their desks and could pursue the course between work routines and activities. Web based learning programs change the approaches of delivering instructional materials and open new ways of learning for many people (Altun and Cakan, 2006). One of the differences between web based learning programs and traditional computer-based learning programs is that web based learning programs provide non-linear learning, which allows learners to have freedom of navigation.

1.3 Overview of Information Technology Research Models

Key to research of IT is to assess its value to the organization and understand the factors of that value in an effort to help organizations better deploy, manage, and enhance its effectiveness (Leong, 2003). "Predicting IT adoption and use has been a key area of information systems research since the discipline's inception" (Burton-Jones and Hubona, 2005, p. 58). This section will provide a brief overview of three models found in IT research: theory of reasoned action, technology acceptance model and theory of planned behaviour.

1.3.1 Theory of Reasoned Action and The Technology Acceptance Model

IS research has long studied how and why individuals adopt new information technologies. Within this broad area of inquiry, there have been several streams of research. One stream of research focuses on individual acceptance of technology by using intention or usage as a dependent variable (e.g., Compeau and Higgins 1995; Davis et al. 1989). Other streams have focused on implementation success at the organizational level (Leonard-Barton and Deschamps 1988) and task technology fit (Goodhue 1995; Goodhue and Thompson, 1995), among others.

The Technology Acceptance Model (TAM) was developed by Davis (1985) at a time when user attitudes were discovered as a crucial factor in information system project success (Davis, 1993). The TAM, now a popular and much studied theoretical model, was developed from the general social psychology theory, the Theory of Reasoned Action developed by Fishbein and Ajzen (1975).

User acceptance and adoption problems spurred researchers to search for a model to predict and understand the actions of people. Such behavioral prediction was posited by two social psychologists, Fishbein and Azjen (1975) as the Theory of Reasoned Action (TRA). TRA is described as an actual behavior, Y, influenced by the behavioral intention (BI) being influenced by two rational paths, one personal and one reflecting social influences. The TRA was designed to be a general model allowing adaptation to any conscious behavior (Fishbein and Azjen, 1980, p. 246).

Davis's (1989) TAM offers a promising theoretical base for examining the technology acceptance of learners. TAM was adapted from TRA, and both have been found to predict intentions and usage satisfactorily (Leong, 2003).

TAM, according to Davis (1989), measures an individual's belief, attitude, and behavioural intention relationship which predicts user acceptance of technology that enable, enhance, or expand the learning experience. "Davis asserted that perceived usefulness and perceived ease of use represent the beliefs that lead to such acceptance" (Lederer et al., 1998, p. 195) Perceived usefulness represents the degree to which the student believes that a particular technology will enhance his or her academic performance balanced by a belief that the particular technology would be free of effort to use, or perceived ease of use (Davis, 1989; Lederer et al., 1998). "From a pragmatic point of view, understanding the determinants of IT usage should help ensure effective deployment of IT resources in an [institution]" (Leong, 2003, p. 14). Davis (1989) asserted that perceived usefulness and perceived ease of use represent the attitude toward use and, when combined with behavioural intention, lead to actual use of a system and therefore acceptance.

Davis (1989) posed the question, "What causes people to accept or reject information technology?" (p. 320) Davis explored the prospect that beliefs influence attitudes that indicate intentions and generate behaviours by building upon the work done on TRA relative to technology acceptance. "Davis thus conceived that TAM's belief intention- behaviour predicts user acceptance of IT" (Lederer et al., 1998, p. 195). The perception of the usefulness and ease of use relative to a particular system shapes the attitude toward its use and behavioural intention to make use of that system. The model postulates that usage behaviours of individuals toward technologies are shaped by the experiences with the technology (Agarwal and Karahanna, 2000).

Davis et al. (1989) indicated that perceived usefulness influences attitude toward use. A positive perceived usefulness leans toward a positive attitude about the use of a technology. Davis et al.. (1989), Morris et al. (2000), Mathieson et al. (2001), and Lederer et al. (1998) provided evidence of a consistent perceived usefulness and attitude toward use link.

The perceived ease of use indicates that the system is believed to be free of effort (or easy to use) on the part of the user (Davis, 1989; Lederer, et al., 1998). Perceived ease of use is an individual's assessment that technology interaction will be relatively free of cognitive burden, i.e., ease of use reflects the facility with which the individual is able to interact with a particular software artifact.

The model postulates that usage behaviours of individuals, toward technologies is shaped by the experiences with the technology. (Agarwal and Karahanna, 2000, p. 674). Davis et al. (1989) wrote that perceived ease of use has a significant impact and relationship with attitude toward use through its two mechanisms of self-efficacy and instrumentality. The perceived ease of use and attitude toward use relationship is intended to capture the intrinsically motivating aspects of perceived ease of use (Davis et al., 1989).

The relationship between perceived ease of use and perceived usefulness indicates that technologies that are easy to use contribute to increased performance. "Effort saved due to improved [perceived ease of use] may be redeployed, enabling a person to accomplish more work for the same effort" (Davis et al., 1989, p. 987).

According to TAM, perceived usefulness is also influenced by perceived ease of use. The easier the system is to use, the more useful it is perceived to be (Davis et al., 1989). Many empirical tests of TAM indicate that perceived usefulness is a stronger determinant of behavioural intention, while perceived ease of use is a relatively weak determinant of intention (Venkatesh and Davis, 2000). The original TAM depicts that attitude is a mediating variable between the two determinants and behavioural intention.

Attitude toward system use refers to the end user’s level of desire to employ the technology (Lederer et al., 1998). The attitude toward use and behavioural intention relationship "implies that, all else being equal, people form intentions to perform behaviours toward which they have a positive affect" (Davis et al., 1989, p. 986). Therefore, a positive attitude toward use suggests a strong behavioural intention toward the technology and its future use.

Behavioural intention of use is determined by attitude toward system use and perceived usefulness (Davis, 1989). Similar to the attitude toward use and

behavioural intention, the relationship between behavioural intention and use implies that those individuals with strong behavioural intention toward the technology and its future use will, most likely, use that technology.

Many studies have demonstrated that without the mediating attitude construct, the explanatory power of the model is equally good and the model is more parsimonious (Davis et al., 1989). As a result, it has become a norm to exclude the attitude construct from TAM.

Specifically tailored for modelling user acceptance of information systems, TAM has very good explanatory power, explaining about 40% of the variance in usage intentions and behaviour according to (Venkatesh and Davis, 2000). TAM has been applied to explain various information technologies, such as Spreadsheet (Mathieson, 1991), computer resource center (Taylor and Todd, 1995), electronic mail (Szajan, 1996), and enterprise systems (Amoako-Gyampah and Salam, 2004)

In an extension to TAM (named TAM2), Venkatesh and Davis (2000) add subjective norm as a direct determinant to both intention and perceived usefulness, besides investigating the moderating effects of experience and voluntariness. By modeling social factors such as subjective norm as a direct determinant of behavioral ntention, TAM2 is a step closer to its predecessor, the TRA (Ajzen and Fishbein, 1980)

TAM has become well-established as a robust, powerful, and parsimonious model for predicting user acceptance in IS/IT settings (Venkatesh and Davis, 2000).

1.3.2 Theory of Planned Behaviour

The Theory of Planned Behavior (TPB) extends the TRA by adding perceived behavioral controls to the model, including attitude, subjective norms, behavioral intention, and actual behavior (Madden et al., 1992; Yi et al., 2005). The main reason behind this addition was the recognition that behavior is not always controlled voluntarily. Ajzen (1991) claimed that behavior is deliberative and planned and behavior is a determination of behavioral intention. This theory posits that there are three beliefs that affect behavioral intention. The first one is behavioral beliefs which lead to attitude. Attitude is defined in this theory as positive or negative feelings about that behavior or its outcomes (McCoy, 2002). Second, normative beliefs which

lead to subjective norms consist of the referent's opinion and motivation to comply, motivation to what each referent thinks.

Third, control beliefs that lead to perceived behavioral control refer to people's perceptions of their ability to perform a given behavior. This perception consists of two dimensions, internal and external, which are affected by the individual's knowledge capacity. Internal perceptions refer to past experience and channels where information is received and external perception refers to social influence and resource limitations including technical and managerial support (Veiga et al, 2001).

TPB also hypothesizes that knowledge affects not only attitudes but also perceived behavioral control and that there is a strong correlation between intention and behavior. In this theory, behavioral intention can be defined as the perceived likelihood of performing the behavior (Lin et. al, 2004). In sum, people are more likely to perform the behavior and intention if they have a more favorable attitude and subjective norm in addition to considerable perceived behavioral control to that targeted behavior (Ajzen, 2002).

1.4 Turkish Automotive Industry

The automotive industry is one of the largest and most innovative sectors in Turkey, with heavy foreign investment (Etkin et al., 2000) and exports approaching seven billion U.S. dollars in 2004. Since all firms operate under foreign licenses, the assembly technology compares well with European and American standards.

The vehicles produced in Turkey incorporate the latest technical and engineering advances, and that complexity is one of the reasons that make a technician's ongoing training a necessity. With the increasing complexity of today's vehicles, automotive training is continually evolving and becoming more refined. Figure 1.1 reports about the motor vehicle production in Europe and Figure 1.2 reports about Turkey's motor vehicle export growth in the last decade. On vehicle production Turkey is marching towards top 5 production countries in Europe. (OICA,2008; Automotive Manufacturers' Association of Turkey, 2008)

2003			2005			2007		
Country	Units	Share%	Country	Units	Share%	Country	Units	Share%
1.Germany	5,507	29,4	1.Germany	5,758	31,5	1.Germany	6,195	31,5
2.France	3,620	19,2	2.France	3,549	19,4	2.France	3,019	15,3
3.Spain	3,030	16,1	3.Spain	2,753	15,0	3.Spain	2,890	14,7
4.UK	1,846	9,8	4.UK	1,803	9,9	4.UK	1,750	8,9
5.Italy	1,322	7,0	5.Italy	1,038	5,7	5.Italy	1,284	6,5
6.Belgium	904	4,8	6.Belgium	927	5,1	6.Turkey	1,099	5,6
7.Turkey	534	2,8	7.Turkey	914	4,8	7.Czech R.	939	4,8
8.Czech R.	442	2,4	8.Czech R.	605	3,4	8.Belgium	844	4,3

Figure 1.1 : Motor Vehicle Production in Europe.

Technology adoption habits in different cultures would be a welcome addition to globalization research, which is particularly relevant for emerging economies. In this context the sample group in this study will be selected within the blue collar workers from the automotive sector in Turkey.

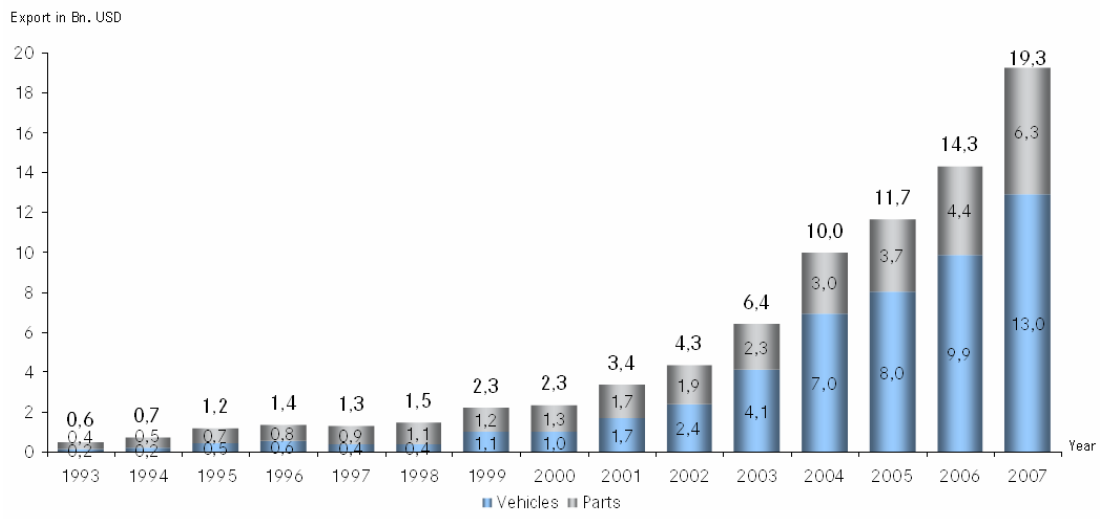

Figure 1.2 : Turkey's motor vehicle export growth in the last decade.

1.4.1 Training Requirements in Organizatons of Automotive Industry

The automotive industry is known for tough competition, fickle customers and short product-to-market cycle. This requires organizations to educate and train anyone, anytime, and from anywhere. For this task, asynchronous web based learning, defined as instructional content or learning experience delivered or enabled by

electronic technologies including the Internet, intranets, and extranets (Govindasamy, 2002; MacGregor and Whittingham, 2001), breaks the limitations of time and space and also creates many benefits, including reduced cost, regulatory compliance, meeting business needs, retraining of employees,low recurring cost, and customer support (Barron, 2000; Gordon, 2003; Harun, 2002).

The training requirements for the labor is valid for the white colar employes as well as the blue collar labor workerswithin the increasing competition in the sector. The impact of web based learning is (seen) real and it has received fairly extensive attention from practitioners and information system (IS) researchers (Ravenscroft and Matheson, 2002).

2. LITERATURE REVIEW

This chapter includes relevant literature pertaining to technology accaptance model and web based learning and will explore the various models from other studies that explain technology acceptance in the context of web based learning.

The strategy used for the literature review is to locate journal articles and books apropriate for this study included examining a mix of online databases, books, print journal articles, and Internet sites. The majority of the journal articles were secured using a variety of online article repositories of Istanbul Technical University's online library databases. Key words and phrases for the various searches included the following: technology acceptance model, TAM, e-learning, web based learning, developing human resources, theory of reasoned action, theory of planned behavior, structural equation modeling etc. Those articles combined with the various books and printed journal articles, provided the depth and diversity needed for this literature review.

2.1 Theory of Reasoned Action and Theory of Planned Behavior

The theory of reasoned action (TRA) and the theory of planned behavior (TPB) are combined in this section due to their relationship to each other and their attempts to measure human behavior. TRA was developed first and TPB was created to address perceived deficiencies in TRA. Davis (1989) adapted TRA to model intentions toward accepting information technology, thus creating TAM. "TRA is a general model that explains and predicts behavioral intentions in many general settings" (Leong, 2003).

TRA posits that human behavior is guided by individuals' behavioral (attitude toward the behavior) and normative (subject norm) beliefs (Ajzen, 2002). Ajzen (2001, 2002) defined attitude toward the behavior as the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question.

Subjective norm refers to the perceived social pressures to perform or not perform the behavior. When combined, attitude toward the behavior and subjective norm predict a person's behavioral intentions. Figure 2.1 shows the graphical representation of Theory of Reasoned Action.

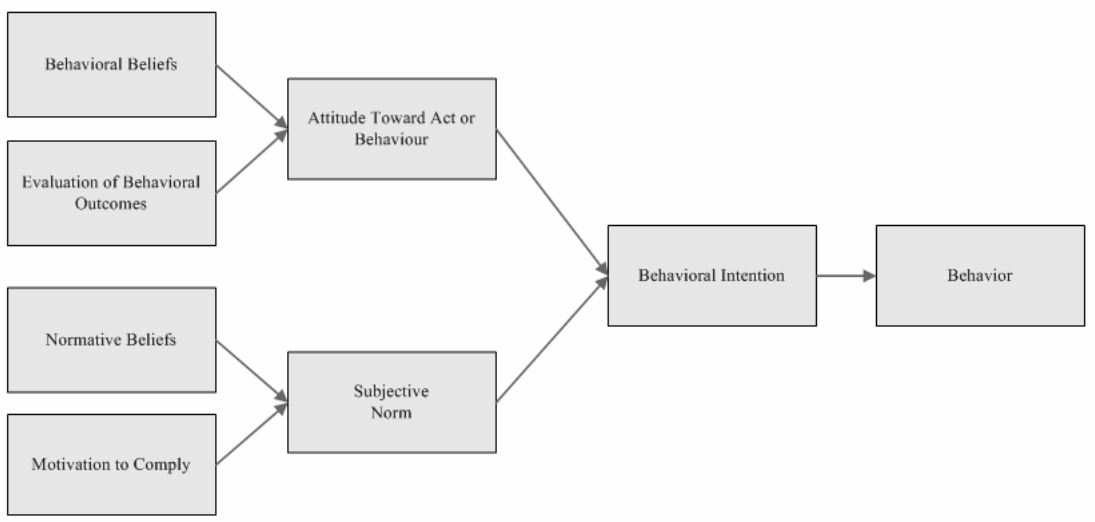

Figure 2.1 : Theory of Reasoned Action.

As discussed another major theory in technology acceptance literature is TPB (Ajzen, 1985). The theory of reasoned action had been developed under the assumption that a person has complete control over a behaviour; however, it became clear that situations exist where individuals lacked complete discretionary control to engage in a behaviour (Ajzen, 1991). Thus, as the theory of reasoned action was extended with an additional construct, namely perceived behavioural control, to account for such situations and the new theoretical model became TPB.

TPB differs from TRA only in that it includes perceived behavioral control as a means to overcome some of the limitations of TRA (Ajzen, 2002; McCormack-Brown, 1999). The addition of perceived behavioral control and the development of TPB is intended to capture an individual's perception of confidence to perform the behavior as well as an individual's perceptions regarding internal and external constraints on the behavior under investigation (Ajzen, 2002; McCormack-Brown, 1991).

As a general rule, the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform

the behavior in question. Intention is thus assumed to be the immediate antecedent of behavior. (Ajzen, 1985, p. 1)

Both TRA and TPB examine ways of predicting various behaviors and the outcomes associated with those behaviors. Both examine attitude toward behavior and subjective norm to predict behavior, and TPB adds perceived behavioral control to (a) predict and understand motivational influences on behavior outside the individuals control, (b) identify how and where to target strategies for changing behavior, and (c) explain virtually any human behavior (McCormack-Brown, 1999). Central to each theory is that individuals are rational, use the information available to them in a systematic way, and consider the implications of their behavior prior to engaging in those behaviors (McCormack-Brown).

The subject of behavioral intention in the workplace has a long history within the field of social/organizational psychology. The TPB (Ajzen, 1985, 1991) is a prime example of a social psychology theory that has found widespread applicability in social sciences, including IS (Mathieson, 1991; Taylor and Todd, 1995). Figure 2.2 shows the graphical representation of Theory of Planned Behavior.

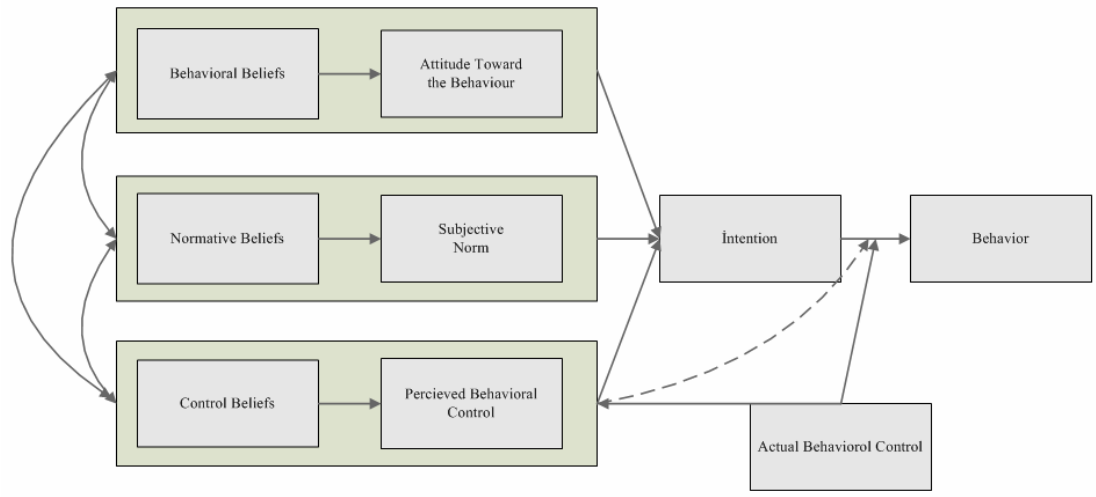

Figure 2.2 : Theory of Planned Behavior.

According to the TPB behavioral intention is directly determined by attitude toward the behavior, subjective norm, and perceived behavior control. Actual performance of the behavior is predicted by behavioral intention and by the degree of actual control one has over performing the behavior. The definition of each construct and brief explanations (Ajzen, 1991) are provided below:

• Attitude toward the behavior is the degree to which performance of the behavior is positively or negatively valued. According to the expectancy-value model, attitude toward a behavior is determined by the total set of accessible behavioral beliefs linking the behavior to various outcomes and other attributes.

• Subjective norm is the perceived social pressure to engage or not to engage in a behavior. Subjective norm is assumed to be determined by the total set of accessible normative beliefs concerning the expectations of important referents.

• Perceived behavioral control refers to one's perceptions of his/her ability to perform a given behavior. It is assumed that Perceived behavioral control is determined by the total set of accessible control beliefs, i.e., beliefs about the presence of factors that may facilitate or impede performance of the behavior.

• Behavioral intention is an indication of one's readiness to perform a given behavior.

• Actual behavior is the manifest, observable response in a given situation with respect to a given target.

Each of the determinants of behavioral intention (i.e., Attitude, Subjective Norm and Perceived behavioral control) is in turn determined by underlying belief structures (Ajzen, 1985, 1991). These are referred to as attitudinal beliefs, normative beliefs, and control beliefs (Taylor and Todd, 1995).

2.2 The Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was first proposed by Davis in 1989 based on the theory of reasonable action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975).

Davis et al. (1989) proposed TAM as a way to explain and predict technology acceptance of an information system by its end users. TAM is an adaptation of Fishbein and Ajzen's (1975) theory of reasoned action (Ajzen and Fishbein, 1980), which had "proven successful in predicting and explaining behaviour across a wide variety of domains" (Davis et al., 1989, p. 983).

TAM proposes six constructs (Davis et al., 1989): actual system use, behavioural intention to use, attitude toward using, perceived usefulness, perceived ease of use and external characteristics. The relationship between attitude toward using, behavioural intention to use and actual system use were derived from the theory of reasoned action (Davis et al., 1989). The other technology acceptance model constructs and their relationships were new ones proposed by Davis et al (1989) for explaining the beliefs that affect the attitude towards using technology and how external characteristics affect these beliefs.

Two constructs, namely external characteristics and actual system use, were introduced to encapsulate observable components of technology adoption. External characteristics refer to all the external features of a system ranging from menus, icons to output produced by the system (Davis et al., 1989). Actual system use refers to the potential adopter's system usage behaviour. TAM explains how the external characteristics of the system affect the potential adopter's attitudes and perceptions leading to actual use of the system. The direct effect of behavioural intention on actual system usage is adapted from the theory of reasoned action. Similarly, the positive direct effect of attitude on behavioural intention is also adapted from the theory of reasoned action.

The two behavioural beliefs introduced by TAM consisting of perceived ease of use and perceived usefulness was a new contribution to research in technology acceptance. Perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). The complexity of the external characteristics of the system has a direct effect on perceived ease of use. Perceived ease of use is considered to have a positive direct effect on attitude; for example, if an individual views that using a system is fairly free of effort, their affect with regards to using the system will increase positively. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). A potential adopter's perceived usefulness is directly affected by the degree to which they perceived that the external characteristics of a system aided them in performing a task or a set of tasks. Equivalently, the ease of use of a system can also contribute to increased performance; thus, ease of use has a direct effect on perceived

usefulness. Perceived usefulness is also considered to have a positive direct effect on behavioural intention; for example, if potential adopters believe that the system delivers useful outcomes, their intention to use is increased. Perceived usefulness is considered to have a positive direct effect on attitude towards using a system. When potential adopters observe that the system delivers positive outcomes this will positively increase their affect with regard to using the system. Figure 2.3 shows the graphical representation of the original formulation of TAM.

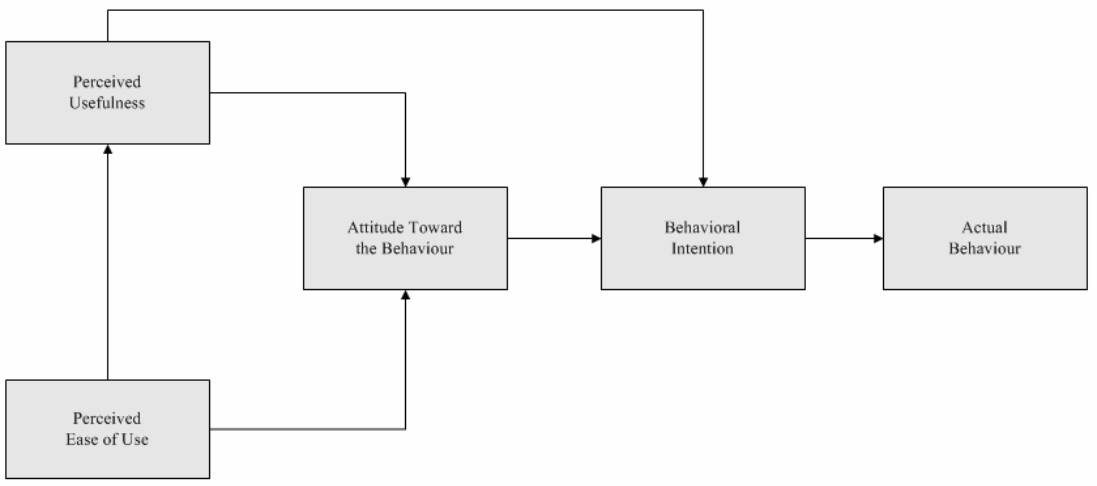

Figure 2.3 : Original formulation of TAM.

Many studies have demonstrated that without the mediating attitude construct, the explanatory power of the model is equally good and the model is more parsimonious (Davis et al., 1989). As a result, it has become a norm to exclude the attitude construct from TAM. Figure 2.4 shows the graphical representation of the parsimonious formulation of TAM.

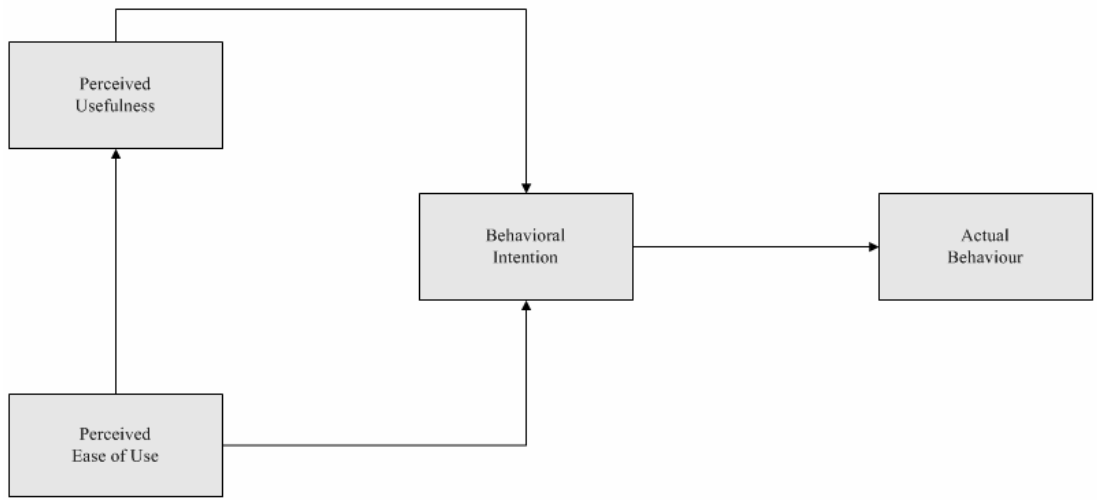

Figure 2.4 : Parsimonious formulation of TAM.

In an extension to TAM - named TAM2, Venkatesh and Davis (2000) add subjective norm as a direct determinant to both intention and perceived usefulness, besides investigating the moderating effects of experience and voluntariness. Figure 2.5 shows the graphical representation of TAM 2.

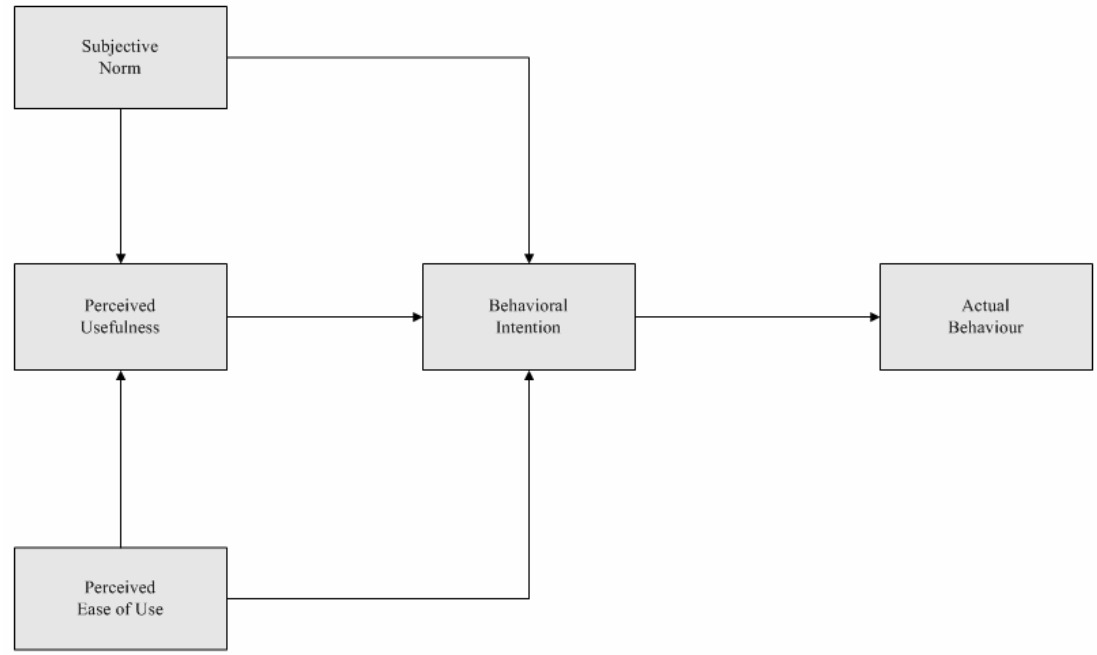

Figure 2.5 : TAM 2.

TAM is intended to provide a conceptual model featuring a theoretic foundation and parsimony, to explain and predict the behavioral intention and practical behaviors of information technology users, based on the acceptance and use of information technology. Based on the suggestions of previous studies, Davis (1989) and Davis et

al. (1989) presented two factors that determine user's acceptance or rejection of information technology, perceived usefulness and perceived ease of use. Users who perceive higher ease of use of a certain system think the system is easier to use, generating a positive attitude towards the adoption of the system. If the perceived ease of use is low, then user attitudes are negative. Moreover, perceived ease of use can strengthen perceived usefulness, while attitude and perceived usefulness have significantly positive effects on behavioral intention. Similar to the TRA, TAM suggests that antecedents that directly affect perceived usefulness and perceived ease of use, such as user's personal attribute, system feature, and environmental variable, can be covered by an external variable. TAM has been used to predict users' intention to accept or adopt a variety of technologies and information systems. Many studies have adopted TAM to explain and predict the adoption of information technology (Adams, et al., 1992; Bruner and Kumar, 2005; Davis, 1989; Davis et al., 1989; Heijden et al., 2003; Igbaria et al., 1997; Liao et al., 2007; Lin and Lu, 2000; Luarn and Lin, 2005; Mathieson, 1991; Moon and Kim, 2001; Taylor and Todd, 1995; Wu and Wang, 2005; Yang, 2005). TAM is a model of behavioral intention developed for information technology adoption behavior, so its focus is definite. Its general applicability across different technologies and user contexts can provide researchers with practical utility.

As the web based learning system promises a new way of delivering education, TAM could be useful in predicting learners' acceptance of an web based learning system. However, very few studies have adopted the TAM as a model for explaining the use of an web based learning system. A number of studies tended to focus on the acceptance of learners by course Websites on quite a small scale. For example, Selim (2003) and Babenko-Mould et al. (2004) tested the two TAM constructs of "perceived usefulness" and "perceived ease-of-use" as predictors of user acceptance of course Websites, with the results indicating a good fit for the TAM.

The basic TAM explains and predicts user intention and usage by only two main constructs, perceived usefulness and perceived ease of use. Given the extensive validations in the literature, these two factors are easy to understand and implement in practice. TAM can be adopted quickly in empirical research to predict user behavior without specifying additional factors for different technologies, and

provides an inexpensive way to gather information about user perceptions of a system. The flexibility of TAM makes it suitable for various diverse technologies (Hong et al. 2006). Hence, TAM is conceived as an extremely appropriate baseline model for this research background and objectives. In TAM, antecedents that directly influence perceived usefulness and perceived ease of use are generalized by only an external variable.

The general ability people feel that they have to perform certain behaviour is referred to as perceived behavioural control (Ajzen, 1985; Ajzen and Madden, 1986). The beliefs that individuals hold with regards to their ability to perform a behaviour, is referred to as control beliefs. These beliefs would include whether an individual believed they possessed the necessary skills, resources or opportunities to perform the behaviour. A number of studies have explored using TPB to explain and predict technology acceptance (Chau and Hu, 2001; Mathieson, 1991) and others have also compared it to TAM (Chau and Hu, 2001; Mathieson, 1991).

Recent studies have extended TAM with new constructs which are important to explain user's intention. For example, subjective norm (Bhattacherjee, 2000; Taylor and Todd, 1995; Venkatesh and Davis, 2000), perceived credibility (Ong et al., 2004), perceived risk (Hsu and Chiu, 2004a) and computing support and training (Venkatesh and Davis, 2000).

Consequently, in this study a model is proposed, based on an extension of the TAM approach; the extended model includes constructs and relationships which may prove to be important in the context of web based learning. These constructs are:

• perceived information support;

• perceived management support;

• software anxiety;

• computer self-efficacy;

• subjective norm

2.2.1 Perceived Ease of Use

Davis (1989), the creator of TAM, defined the variable, Ease of Use, as "the degree to which an individual believes that using a particular system is free of effort" (p.320). This easiness includes mental and physical effort, especially in the-learning phase (Yanga and Yoo, 2004). In this study, this variable can be defined as the learners' perceptions that their usage of the system is effort-free. Consistent with TAM and later TAM2, perceived ease of use has an effect on both intention to use and perceived usefulness, though some studies found that perceived ease of use has no influence on intention to use, since they omitted the attitude factor in their models (Davis, 1989; Vankatesh and Davis, 2000). However, some studies did find that perceived ease of use has significant effect on intention to use through attitude (Lin et al., 2004).

Previous research has shown that perceived ease of use has a significant effect on behavioral intention to use (Davis et al., 1989; Venkatesh and Davis, 1996, 2000). Additionally, a number of studies have found that perceived ease of use has significant effects on perceived usefulness (Davis, 1989; Davis et al., 1989; Mathieson, 1991; Taylor and Todd, 1995a, 1995b; Venkatesh and Davis, 1996, 2000).

2.2.2 Perceived Usefulness

The perceived usefulness of a particular system depends greatly upon the degree to which that system will enhance performance (Davis, 1989; Lederer et al., 1998). Davis (1989) defined perceived usefulness as "a belief that using a new system increases the performance". It is related to effectiveness on the job, to more productivity at work, such as consuming less time or money, and to relative motivation for usage of that particular technology (Yanga and Yoo, 2004).

Usefulness has been tested relative to the system's ability to increase performance, productivity, and effectiveness. Many empirical studies have found that perceived usefulness is an important determinant of intention to use and also of attitude (Venkatesh and Davis, 2000).

2.2.3 Attitude and Behavioural Beliefs

In technology acceptance literature, attitude is defined as a person's positive or negative evaluation of performing a type of behaviour (Chau and Hu, 2001). Hansen et al. (2004) found that attitude had a strong influence on behavioural intention to use online shopping for groceries. Other past studies have also shown that attitude has a significant influence on behavioural intention to use a technology such as word processing software (Davis et al., 1989) or spreadsheet software (Mathieson, 1991). If an individual feels that there are positive consequences from using web based learning then the individual will have more intention to adopt web based learning. Conversely, feelings of negative consequences lower adoption intention. In this study, the hypothesis proposed draws a causal link between attitude and behavioural intention in the context of web based learning.

2.2.4 Perceived Information Support

Perceived Information Support is defined as the degree to which an individual believes that an (organizational and) technical infrastructure exists to support use of the system (Venkatesh et al., 2003). Taylor and Todd (1995) acknowledged the theoretical overlap by modeling Perceived Information Support (facilitating conditions) as a core component of perceived behavioral control in TPB. Several previous studies have shown that there are various external factors that indirectly influence the acceptance of technology through perceived usefulness and perceived ease of use (Davis et al., 1989; Szajan, 1996). In this study, it is expected taht perceived information support (technical support) to be one such external factor affecting the acceptance of web based learning. Ralph (1991) defined technical support as ''knowledge people assisting the users of computer hardware and software products'', which can include help desks, hotlines, online support services, machine-readable support knowledgebases, faxes, automated telephone voice response systems, remote control software and other facilities.

2.2.5 Perceived Management Support

In the work domain, Deci et al. (1989) found that perceived management (autonomy) support is a significant antecedent of trust. Deci et al. (2001) demonstrated that management support in the job was significantly related with work engagement and

well-being in a sample of Bulgarian and US workers. Gagne´ et al. (2000) also found that management support had a direct effect on acceptance of organizational change.

In the IS domain, the influence of management support in the adoption of IT has been found to be positively connected with system usage in prior studies. Karahanna and Straub (1999) proposed an explanation for the psychological origins of usefulness and ease of use. The results indicated that system use is affected through perceived usefulness and perceived ease of use by the degree of social influence exerted by supervisors. Igbaria et al. (1996) indicated that organizational support had significant effects on usage of microcomputers.

2.2.6 Software Anxiety

Compeau and Higgins (1995) found computer anxiety had a significant effect on self-computer use. Computer anxiety has been defined as a fear of computers while using a computer, or fearing the possibility of using a computer (Chua et al., 1999). Computer anxiety refers to fears about the implications of computer-based technology use, such as the loss of important data or the fear of making other possible mistakes. As such, it is the product of a combination of certain psychological variables, including neuroticism and locus of control (Marakas et al., 2000). Researchers have found that computer anxiety has a negative relationship with total hours of Internet use (Joiner et al., 2005). The higher the anxiety about computer use that the subjects have, the less likely they are to use the information system.

2.2.7 Computer Self-efficacy

Self-efficacy refers to people's judgement of their own ability to perform specific tasks (Bandura, 1982, 1997). Compeau and Higgins (1995) and Compeau and Huff (1999) defined computer self-efficacy as individuals' beliefs with regard to their ability to use a computer in the context of IT usage. In end-user computing research this internal perception affects the expectations of individuals using the computer to perform a job, and therefore their use of an information system. Self-efficacy has been studied extensively in teaching-learning settings (e.g., Lent et al., 1984; Compeau and Higgins, 1995; Compeau and Huff, 1999; Madorin and Iwasiw, 1999;

Hasan and Ali, 2004; Hayashi et al., 2004; Yi and Im, 2004), with the results demonstrating that higher self-efficacy lead to better learning performance.

Computer self-efficacy plays a critical role in terms of its effect on perceived ease of use (Madorin and Iwasiw, 1999) and perceived usefulness (Venkatesh and Davis, 1996; Hayashi et al., 2004), because individuals' confidence in their computer-related knowledge and abilities can influence their judgement of the ease or difficulty of carrying out a specific task using a new IT, and how useful that new IT will be. This study examines whether computer self-efficacy is an antecedent of perceived ease of use by modifying the three distinct, but interrelated, dimensions of computer self-efficacy proposed by Compeau and Higgins (1995). The dimensions ("strength" and "generalisability") are explained as follows:

(1) The "strength of computer self-efficacy" is interpreted as reflecting the power of self-judgement by individuals (Compeau and Higgins, 1995). Learners possessing high computer self-efficacy will be confident in their ability to overcome any obstacles, and to achieve-learning, when using the web based learning. Those with a lower strength of computer self-efficacy will have lower confidence in their ability to use the system, and will therefore be more easily deterred by the difficulties encountered.

(2) The "generalisability of computer self-efficacy" refers to the perception by people of their ability to use various computer software and hardware devices (Compeau and Higgins, 1995). Learners with a lower generalisability of computer self-efficacy will tend to use only certain web based learning software (and hardware devices). Conversely, those with a higher generalisability of computer self-efficacy will have greater confidence in their ability to use different web based learning software (and hardware devices).

2.2.8 Subjective Norm and Normative Beliefs

Venkatesh and Davis (2000) found that subjective norm had significant influence on behavioural intention in settings where the degree of voluntariness was perceived to be low; however, subjective norm has no significant influence on behavioural intention in settings with a high degree of voluntariness. Since the use of web based

learning has a associated degree of mandatory requirement, it is considered that subjective norm will have a influence on behavioural intention.

The most significant antecedents of motivation are autonomy and competence although relatedness also plays an important role (Ryan and Deci, 2000). Ryan and Deci (2000) argue that when activities are not inherently interesting or enjoyable, the main reason why the people perform them is because they are valued by relevant others to whom they feel connected (i.e. family, peers or an organization). Although autonomy and competence have a strong influence on motivation, people are likely to endorse their group's goals more when they feel connected to group members.

Thus, when individuals are in an autonomy-supportive context and they have a sense of relatedness their motivation is enhanced (Ryan and Deci, 2000).

Therefore, subjective norm represents a form of social influence, in the IS domain, previous studies have assessed the social influence using subjective norm which is defined as ''one's assessment of whether or not people important to him or her feel the behavior should be performed'' (Ajzen, 1991). The influence of subjective norms has been tested on intention (Bhattacherjee, 2000; Tan and Teo, 2000; Taylor and Todd, 1995), perceived usefulness (Venkatesh and Davis, 2000), attitude (Hsu and Chiu, 2004a) Taylor and Todd (1995a) found that subjective norm was positively related to behavioral intention within the usage of a computing resource center for both experienced and inexperienced users. Bhattacherjee (2000) defined interpersonal influence as the ''influence by friends, family members, colleagues, superiors, and experienced individuals known to the potential adopter'' and external influence as the ''influence by mass media reports, expert opinions, and other non-personal information considered by individuals in performing a behavior''. Bhattacherjee (2000) modeled interpersonal and external influences as subjective norm and found that both were significant predictors of intention to use electronic brokerage services.

Hsu and Chiu (2004a) found that subjective norms had significant effects on attitudes toward e-service usage. Tan and Teo (2000) found that subjective norm was not a significant antecedent of the individual's intention to adopt Internet banking. Hsu and Chiu (2004b) found that interpersonal influence exerts a stronger effect on

satisfaction than external influence. In the present context this means that subjective norm should be positively related to intention.

2.3 Web based Learning

During the 1990s, e-learning was introduced as a new method of delivering distance education. The growth in Web based learning, both course offering and enrollments, has been significant since its inception. The proliferation of network access and advances in Internet/ Web technology, in conjunction with the demand of organizations for flexible training instruments, have stimulated the rapip growth of web based learning. It helps organizations by reducing the cost of and increasing availability of training.

The rapid development of information and communication technologies has led to its increased use in instruction and learning (Cappel and Hayen, 2004; Kim and Ong, 2005). For example, in 2000, investment in the e-learning market in the United States was $2.2 billion according to a report from the International Data Corporation (IDC) IDC states that the revenue from synchronous web based learning exceeded $5 billion by 2006 (Mackay and Stockport, 2006) and IDC estimates that the value of the web based learning market worth will be between $21 billion and $28 billion by 2008 (Brown, 2006). The continuous growth of the web based learning market stimulated discussion regarding effective web based learning methodology.

There are many approaches to Web based learning. Individuals access information resources on the Web to learn and solve daily tasks by themselves. Web based learning systems may better accommodate the needs of learners who are geographically dispersed and have conflicting schedules. Various combinations of text, graphics, audio, video and animations can be integrated into an web based learning system. Given these advantages, it is not surprising that business and educational institutions are making substantial investments in web based learning systems.

2.4 Structural Equation Modeling

Structural Equation Modeling (SEM) also known as, covariance structure analysis, latent variable models or structural modeling, is a multivariate statistical procedure

combining portions of multiple regression, path analysis and factor analysis which allows the researcher to test a hypothetical model based on theory using a series of dependent relationships simultaneously among measured variables and latent constructs as well as between the constructs (Schumacker and Lomax, 2004).

The advantages of using SEM for statistical modeling are: the entire model is tested simultaneously in light of theory; multiple dependent variables are allowed and accommodate latent variables; statistical estimation is improved with SEM which allows measurement error to be taken into account to provide more accurate estimates of the relationships between constructs (Hair, et al., 2006). Tabachnick and Fidell (2007) indicated SEM estimating and removing measurement error allows for accounting the reliability of measurement and difference within and across people across time which can be examined as well as multilevel modeling.

According to Hair, et al. (2006), the six stages of SEM are as follows:

1. Developing individual constructs

2. Developing the overall measurement model

3. Designing a study to produce empirical results

4. Assessing the measurement model validity

5. Specifying the structure model

6. Assessing structural model validity

According to Tabachnick and Fidell (2007), in SEM, when a model is specified, parameters for the model are estimated using sample data and the parameters are used to produce the population covariance matrix. Only identified models can be estimated. A model is identified if there is a unique numerical solution for each of the parameters. So, the first step is to count the numbers of data points and the number of parameters to be estimated. The number of data points is the number of sample variances and covariances. The number of parameters is found by adding together the number of regression coefficients, variances, and covariances that are to

be estimated. If there are more data points than parameters to be estimated, the model is overidentified, which is a necessary condition to proceed.

The next step in model identification requires examination of the measurement portion of the model, which is the part of the model that deals with the relationship between the measured indicators and the factors. It is both necessary to establish the scale of each factor and to assess the identifiability of the measurement model.

To establish the identifiability of the measurement portion of the model, the number of factors, and the number of indicators (variables) loading on each factor are set. The next step in establishing model identifiability is to examine the structural portion of the model by looking only at the relationships among the latent variables (factors).

The structural model and the measurement model are both shown on one overall model. The path diagram shows a complete set of constructs and indicators shown in the measurement model and the structural relationships among constructs. The path analysis process estimates the strength of each relationship portrayed as a straight to curved arrow in a path diagram. With estimates for each path, an interpretation can be made of each relationship represented in the model. When the statistical inference tests are applied, one can assess the probability that the estimates are significant (not equal to zero). These estimates can be used like regression coefficients to make an estimate of the values of any construct in the model.

In specifying the measurement model, one identifies each latent construct to be included in the model. The measured indicator variables are assigned to the latent constructs. The measurement model can be described by a model diagram or by equations.

Specification of the measurement model is usually straightforward, but there are issues to be addressed according to Hair, et al. (2006): 1) Can the research support the validity and unidimensionality of the constructs? Essential points must be engaged in establishing the theoretical basis of the construct and measures. 2) How many indicators should be used for each construct? What is the minimum number of indicators? Is there a maximum? What are the trade-offs for increasing or decreasing the number of indicators? 3) Should the measures be considered as portraying the constructs or seen as explaining the construct ?

Each approach brings with it differing interpretations of what the construct represents. The research must have well developed and established scales. The researcher must still determine validity and unidimensionality in this specific context. In any scale development effort, issues regarding numbers of indicators and type of construct specification must be addressed.

Mulaik and Stanley (1998) state that in SEM, the model hypothesis developed a priori. The hypothesis is tested against data independently from the data used in the formulation of the hypothesis because that is the "way I judge the objective validity of the hypothesis." Mulaik continues in the article "anyone can, through trial and error, fit the data to a model," which necessarily makes the models lack objectivity.

When tested for parsimony, if there is no significant difference, the researcher concludes that the effects dropped from the saturated model were not needed to explain the observed distribution of data in the table. The researcher explores in this manner until the most parsimonious model which still has acceptable fit is found.

2.4.1 Parsimony Fit Indices

Parsimony Goodness-of-Fit Index (PGFI) and the Parsimony Normed Index (PNFI) are the Parsimony Fit Indices measures of overall goodness-of-fit representing the degree of model fit per estimated coefficient. This measure attempts to correct for any overfitting of the model and evaluates the parsimony ratio of the model compared to the goodness-of-fit. These measures complement the other types of goodness-of-fit measures, absolute fit and incremental fit measures. The PGFI and the PNFI can't be used alone, but have to be used as a comparison between two models to be relevant.

The parsimony ratio (PR) of any model forms the basis for the PGFI and the PNFI. The parsimony ratio is the ratio of degrees of Freedom used by a model to the total degrees of freedom available. McDonald and Marsh (1990) note, the the Tucker-Lewis Index (TLI) is an unbiased estimator of a quantity that includes the parsimony ratio.

2.4.2 Incremental Fit Indices

The Normed Fit Index (NFI), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Relative Noncentrality Index (RNI) are all Incremental Fit Indices according to Hair, et et al. (2006). The Incremental Fit indices differ from absolute fit indices in that they asses how well a specified model fits relative to some alternative baseline model or null model which assumes all observed variables are uncorrelated (Hair et al., 2006). Model comparison is very important and nested models may be compared by chi-square difference tests, incremental indices. Incremental indices capitalize on the fact that the null model is always nested within any specified model. The null model simply posits that variables are uncorrelated. Discrepancies between these two models represent how much better the specified model fits than the null model (Sivo, 2006).

In contrast, the Absolute Fit Indices are a direct measure of how well the model specified by the researcher reproduces the data. The Absolute Fit indices are: $\chi 2$ statistic, Goodness of fit (GFI) and Root Means Square Residual (RMSR) and the Standardized Root Means Square Residual (SRMSR) and the Root Means Square Error of Approximation (RMSEA) and the Normed $\chi 2$, Expected Cross-Validation Index, (ECVI), Actual cross validation index (CVI), and Gamma Hat. These indices assess how well a model fits relative to some alternative baseline model.

The NFI or Normed Fit Index is the original fit indices calculated as the ratio of $\chi 2$ value for the fitted model and a null model divided by the $\chi 2$ for the null model with the perfect fit at the value 1. The Value ranges between 0 and 1. The CFI is derived from this index and tried to include model complexity in a fit measure.

The CFI or Comparative Fit Index is an improved version of the NFI which is normed with values also between 0 and 1. Models less than .90 are not considered to usually be fitted well.

TLI or the Tucker Lewis Index is older than the CFI, however the TLI is not normed so its values can range below 0 and above 1. A good model is one that approached 1. Apparently the TLI and the CFI generally provide similar values according to Hair et al. (2006). The TLI is also known as the Bentler and Bonnet's non–normed fit index (NNFI) is often used because Marsh et al. (1988) found that it was the only widely

used index relatively independent of sample size. McDonald et al. (1988) note, the TLI is an unbiased estimator of a quantity that includes the parsimony ratio.

RNI or the Relative Noncentrality Index compares the observed fit from a tested specified model to that of a null model. The high value represents a better fit and like the CFI values below .90 are not usually associated with a good fit.

According to Hair (2006), the TLI and CFI are used most often. Sample size does affect the fit indices according to Sivo, et al. (2006) who studied the subject of "optimal cut off values" for fit indices. Their study found that the recommendation of 0.95 for any class of indexes may be inappropriate, ignoring the issue of sample size. Except for the SRMR when the 0.05 criterion is sufficient across sample size conditions, unlike other fit indexes for which a higher value indicates better model fit. In addition Sivo, et al., (2006) showed that the result from their study suggests that larger sample sizes offer more precision in identifying the correct (i.e., true) model. Also, Fan and Sivo, 2005 found the TLI, BL89, RNI, CFI, Gamma, Mc, or RMSEA indices are not more sensitive to misspecified factor loadings than other indices.

3. METHODOLOGY

In order to explain the technology acceptance of web based learning, it is needed to identify the factors that would influence technology acceptance and develop a model that takes into account the unique context of web based learning. This chapter describes the research design of this study. Research questions and hypotheses, research variables, research instrumentation are all thoroughly discussed in this chapter.

3.1 Research Design

This study will identify and empirically test factors that may influence learners' intention to use of a Web based training support system. Based on the literature on the technology acceptance model and related efforts in technology adoption research, this study utilized an extended model for analyzing web based learning acceptance behavior of learners. To empirically test the model, a survey was conducted regarding the adoption of a web based learning system for the blue collar workers in the automotive industry**.**

3.2 Research Questions and Hypotheses

3.2.1 Dependent Variable -Intention

The dependent variable is "Intention to Use" the web based learning system. This variable is justifiable and empirically supported by previous studies (Venkatesh and Davis, 2000, Wu and Wang, 2005). According to Ajzen and Fishbein (1975), intention has significant effects on behavior. Similarly, TPB postulates that behavior is a result of behavioral intention (Ajzen, 1991).

The role of intention as a predictor of behavior (e.g., usage) is critical and has been well-established in IS and the reference disciplines (Ajzen 1991; Sheppard et al. 1988; Taylor and Todd 1995).

Over the years, strong empirical support has been established in favor of TAM (Adams et al., 1992; Davis et al., 1989; Legris et al., 2003; Venkatesh and Davis, 2000), making it a robust theory since it holds across persons, settings, and times. I used it in this study since TAM results from previous studies indicate the model to be a good basis for analysis in this setting (Ong et al., 2004; Selim, 2003). In general, perceived usefulness and perceived ease of use have constituted a significant influence on an individual's intention to use a technology or system (Ma and Liu, 2004; Schepers and Wetzels, 2006).

3.2.2 Perceived Ease of Use

Perceived ease of use is the degree to which a person believes that using a particular system would be free of effort. It is expected to influence perceived usefulness, and the attitude towards use.

Extensive research over the past decade has provided evidence that perceived ease of use has a significant effect on behavioral intention to use, either directly or indirectly, through its effect on perceived usefulness (Agarwal and Prasad, 1999; Venkatesh, 1999).

Previous research applying the TAM to web based learning technologies produced mixed results. In two studies, (Lee et al., 2005; van Raaij and Schepers, 2008), Perceived Ease of Use was not a good predictor of the intention to use a web based learning system. In another study (Ngai et al., 2007), Perceived Ease of Use was a significant predictor of both attitude and intention to use a web based learning system.

3.2.3 Perceived usefulness

Perceived usefulness is the degree to which a person believes that using a particular system would enhance his or her job performance. This implies that an web based learning system with a high level of perceived usefulness is one for which a user believes that there is a positive user performance relationship. There is also extensive research in the IS community providing evidences of the effect of perceived usefulness on behavioral intention to use (Venkatesh and Morris, 2000) The ultimate

reason that learners exploit web based learning is that they find the system improves their performance.

Perceived usefulness was a significant predictor of both perceived enjoyment and intention to use web based learning technologies (Lee et al., 2005; Liaw, 2008; Ngai et al., 2007; van Raaij and Schepers, 2008).

3.2.4 Attitude Towards Use

In the generic TAM, the belief-attitude-intention-behavior relationship has been demonstrated in various studies. Davis (1989) showed that ease of use had a direct effect on perceived usefulness. Further studies on TAM also demonstrated strong empirical support for a positive relationship between perceived ease of use and perceived usefulness (Adams et al., 1992; Szajan, 1996). The perceived usefulness of the web based learning is defined as the degree to which the user believes that using the web based learning would enhance his/her learning performance (Davis, 1989). The TAM posits that perceived usefulness and perceived ease of use has a direct effect on attitudes towards using a new technology. Attitude is the degree to which the user is interested in specific systems, which has a direct effect on the intention to use those specific systems in the future (Davis et al., 1989).

On the basis of these finding, it is expected that the general causalities found in TAM are also applicable to web based learning context. Therefore, based on the original study by Davis et al. (1989), the following hypotheses were tested:

H1. A learner's attitude toward Web based learning has a positive impact on his/her intention to use Web based learning.

H2. A learner's perceived usefulness has a positive impact on his/her intention to use web based learning.

H4. A learner's perceived usefulness has a positive impact on his/her attitude toward web based learning.

H5. A learner's perceived ease of use has a positive impact on his/her attitude toward web based learning.

H6. A learner's perceived ease of use has a positive impact on his/her perceived usefulness.

3.2.5 Subjective Norm

In many studies, the Subjective Norm has been found to be an important factor for intention to use information technology (Chau and Hu, 2002; Hu et al, 2005; Huang and Chuang, 2007; Yi et al. 2006). It refers to individuals' perceptions affected by important others' opinions about information technology adoption. When considering the organizational culture working in a hierarchical environment, social norms and interpersonal communications between workers and with their supervisors have significant effects on intention behavior.

Moreover, in terms of the national culture, people in Turkey are collectivist in their behaviors and there is a notable power distance between supervisors and employees in work settings. (Yalcinkaya, 2007) This indicates that people in Turkey are affected by the opinions of significant others (Srite et al., 2005). In addition to these factors, the subjective norm has considerable background depicted on TPB (Ajzen, 1991). Yi et al. (2006) asserted that observed behaviors from social groups are an effective instructional tool for people learning technological issues. Furthermore, users may perceive the particular technology to be more useful if their supervisors or peers say so.

Therefore, the following hypothesis is proposed:

H3: Subjective norm has a positive impact on intention to use web based learning.

3.2.6 Perceived Management Support

Ryan and Deci (2000) suggest that social contextual conditions that support one's feelings of competence, autonomy, and relatedness are the basis for increasing intrinsic and extrinsic motivation, which in turn lead to greater performance. The relationship between autonomy and positive outcomes has been shown in a number of studies.

Igbaria aet al. (1997) found that internal management support and external support were significant predictors of perceived usefulness of systems, which in turn

influenced personal computing acceptance in small firms. So based on the previous studies, it is predicted that the contextual factor of management support will increase perceived usefulness (i.e. extrinsic motivation).

Thus the following hypothesis is suggested:

H7. A learner's perceived management support has a positive impact on his/her perceived usefulness.

3.2.7 Software Anxiety

Anxiety is apprehension or discomfort experienced by an individual with technology. It is characterized as an affective response, an emotional fear of potential negative outcomes, such as low performance or exposure to an unknown audience. It has been argued that such negative feelings detract from task performance and have a significant impact on intention to adopt web based learning. Therefore, the following hypothesis was proposed.

H8. A learner's software anxiety has a negative impact on his/her perceived ease of use.

3.2.8 Perceived Information Support

The concept of information support (facilitating conditions) was firstly proposed in a research of PC usage, representing "the objective environmental factors that help users use the technology more conveniently" (Thompson et al., 1991). This concept was later divided into technology facilitating conditions (TFC) and resource facilitating conditions (RFC) (Taylor et al., 1995). Information support is one of the important factors in the acceptance of technology for teaching (Hofmann, 2002; Sumner and Hostetler, 1999; Williams, 2002) and in user satisfaction (Mirani and King, 1994). High levels of organizational support, including management support and information center support, were thought to promote more favorable attitudes about the system among users and information specialists, and lead to greater success for personal computing systems (Igbaria, 1990). Igbaria et al. (1997) argued that internal/external personal computing support/training was affecting the acceptance of personal computing in small firms.

As a result, the following hypotheses is proposed:

H9. A learner's perceived information support has a positive impact on his/her perceived ease of use.

3.2.9 Computer Self-efficacy

In an IS/IT context, computer self-efficacy is defined as ''an individual's perceptions of his or her ability to use computers in the accomplishment of a task rather than reflecting simple component skills'' (Compeau and Higgins, 1995). The relationship between computer self efficacy and perceived ease of use was based on theoretical argument (Mathieson, 1991) and this was empirically examined to see whether there exists a causal link between computer self-efficacy and perceived ease of use (Agarwal et al., 2000; Venkatesh and Davis, 1996). These suggest that computer self-efficacy has a significant positive effect on perceived ease of use of web based learning.

Therefore, it is hypothesized:

H10. A learner's computer self-efficacy will have a positive effect on perceived ease of use of web based learning.

3.3 Research Instrumentation

This study contributes to the research in web based learning, by putting forward a conceptual model that explains the factors that affect technology acceptance of web based learning. By surveying past works in the technology acceptance literature, and by reviewing the seminal theory – The Technology Acceptance Model (TAM). The core concepts and structure of TAM consists of; perceived usefulness which is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context, perceived ease of use refering to the degree to which the prospective user expects the target system to be free of effort and attitude towards the behaviour as an individual's positive or negative feelings about performing the target behavior. TAM postulates that actual technology usage is determined by behavior intention to use, which in turn, is viewed as being jointly determined by the person's attitude toward

using the technology and perceived usefulness. In this study, by incorporating some factors from other theories, an extended technology acceptance model was proposed. A conceptual model was used to assess the technological and value issues and thus obtain an understanding of individuals' actions. In addition to the constructs of the original TAM, the extended model includes constructs and relationships which may prove to be important in the context of web based learning, which are: perceived information support; perceived management support; software anxiety; computer self-efficacy; and subjective norm.

Figure 3.1 depicts the constructs and hypotheses proposed in the conceptual model.

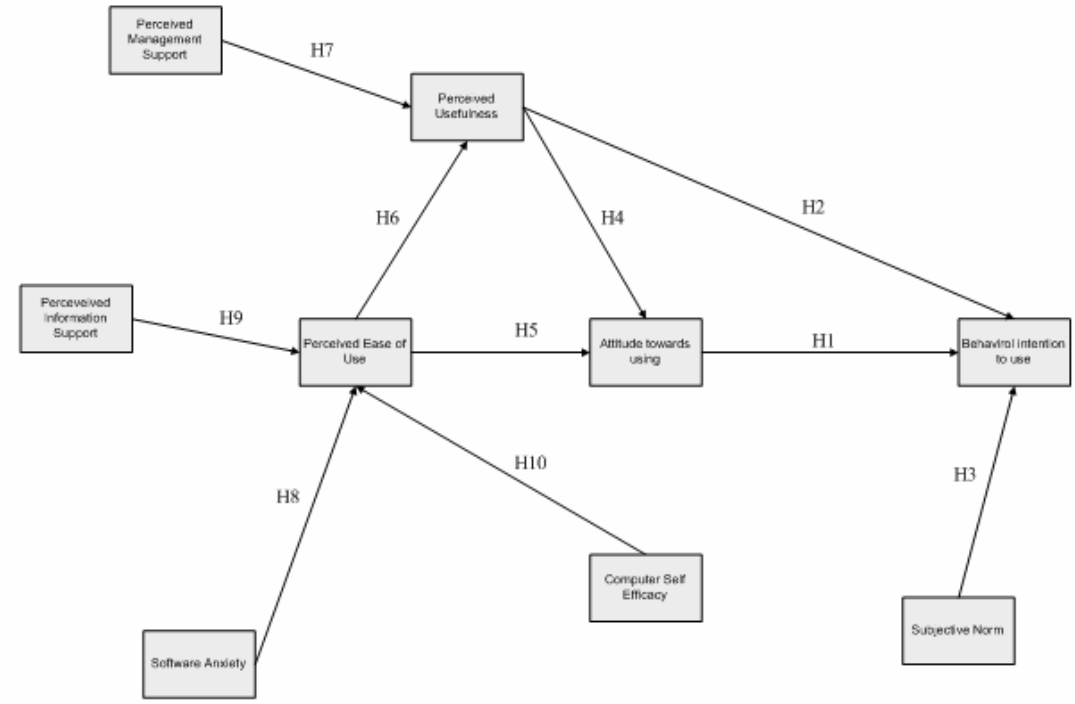

Figure 3.1: The conceptual model.

This study suggests an extended model of TAM for the web based learning technology. This completely new model used in this study extends the understanding of the TAM and provides important and new insights into web based training support system adoption. This model has not been used in any other studies either in the context of web based learning or in the context of any other technology. In addition it is as well very important to extend this enhanced version of theTAM to the newly emerging context of web based learning. So, this research advances theory and contributes to the foundation for future research.

4. THE STUDY

This chapter discusses the methodology selected for this study in more detail. Specifically, it outlines the research procedures, the sample, instrument and materials and data collection and protection of participant rights.

4.1 The Methodology

Survey research is a typical method for testing models in social science studies (Babbie, 1990), including IS (Galliers, 1992; Grover et al., 1993; Pinsonneault and Kraemer, 1993). Like most empirical studies by far, this research is focused on the individual locus of adoption, grounding on the standpoint that individual behavior could be deemed as a basic element of organizational behavior.

The constructs in this study were operationalized through items validated in prior research studies. Data were collected from participants through these previously validated questionnaires to understand the technology acceptance of a web based learning system. The system used in the experiment was designed explicitly for this study. One of the first exercises that need to be undertaken with the design of any system is to consider the major factors that can influence the system's utility to the end-user. In that context, the content and design would play an important role. Therefore, originating from a professional technical web based learning system, a design was created by integrating the training content into a web site.

Figure 4.1 shows the opening page of the web based learning site used in the experiment. The screenshots of the training system used can be found on the appendix section as Figure A.1. This particular design was selected because different professions may show different paths in terms of attitude about and intention of using information technology (Colvin and Goh, 2005). So it was really important to ensure that the design and content of the web based learning system fulfills the requirements of a professional technical web based learning system designed for the blue collar workers.

Figure 4.1 : Web based learning site

4.2 Research Sample

A survey study was conducted to test the research model. Mercedes-Benz Türk A.Ş. (MBT) is one of the major players in automotive industry in Turkey context. Today, 67 % of MBT is owned by Daimler AG and represents one of the largest Foreign Direct Investment (FDI) in Turkey. Mercedes-Benz Türk A.Ş. owns a training center which welcomes annually more than 3.500 blue collar workers from diffferent companies all around Turkey.

The history of Mercedes-Benz Türk A.Ş begins with the foundation of Otomarsan in 1967. Between 1967 and 1990 the company consists of the Davutpaşa Bus factory, and then Aksaray Truck factory and started its exporting activities. In 1990 the company changes its name to Mercedes-Benz Turk A.Ş. From 1990 on, MBT grows with the opening of Hoşdere Bus Factory, extension of Aksaray Truck Factory.

Mercedes-Benz Türk A.Ş. has busses, trucks, vans and passenger vehicles among its products. Vans and passenger vehicles are imported as completely build-up units and sold into the Turkish market by Mercedes-Benz Türk A.Ş. Other products, busses and trucks are produced in MBT factories in Turkey, sold both into the Turkish market and exported outside of Turkey.

Among Daimler AG related companies in the world, Mercedes-Benz Türk A.Ş. includes all the functions such as production, domestic sales, exports, all at the same time. Mercedes-Benz Türk A.Ş. has superior performance in export sales, thus is a global player. 80% of the buses Mercedes-Benz Türk A.Ş. produced have been exported to various countries in three continents. Among them, the west-european markets constitute the biggest portion. Similarly, 40% of the trucks produced have been exported mainly to west-European countries. The company is currently doing very well in terms of its market share and competitive power.

Hoşdere factory is production site in Istanbul for Coaches and City buses, with a capacity of 3600 units annual. Aksaray factory is the MBT production site for Trucks and Military Vehicles which has a capacity of approximately 17.000 units. Bus product range consists of Coaches and City Buses. Truck product range has Light

Duty Trucks, Medium/Heavy Duty Trucks and Truck Tractors. Marketing & Sales and Spare Parts Center and the Head Office building are located in Hadımköy, İstanbul.

Looking at the general organizational structure of the firm, we see that the total personnel number of the MBT units (Hoşdere Factory, Aksaray Factory, Marketing & Sales and Spare Parts Center and Head Office) is over 4600. Dealer network of MBT across Turkey consists of 50 Mercedes Benz locations and approximately 2000 employees.

The sample of this study was selected from the blue collar workers attending to the trainings in the training center of Mercedes-Benz Türk A.Ş., this workers are from various automotive companies all around Turkey.

4.3 The Questionnaire

Based on the hypothesized model developed through a detailed review of the related literature on user acceptance of technology in the context of web based learning a 36-item questionnaire was devised as a measurement scale for the research. The instrument was comprised of items from previous relevant studies having confirmed reliability and validity of the instruments. Excluding the demographic questions which were asked at the end of questionnaire, all of the items were measured by a 5 point Likert-type scale (ranging from 5 indicating strongly agree to 1 indicating strongly disagree).

The application wordings of the questionnaire were slightly rephrased to relate to the research tool, web based learning system. Since the questionnaires from the literature was originally developed in English, the questionnaire then translated into Turkish. The questionnaire was translated into Turkish to obtain accurate responses from the participants, who were non-English speaking. To ensure reliability of the Turkish version of the questionnaire, after the draft was designed, a pretest was performed on 10 workers to modify ambiguous expressions. Based on the respondents' feedback, only minor adjustments were required to improve the instruments' readability and ensure its accuracy and appropriateness. So, it was verified that the translation was

accurate and the meanings of items in the questionnaire were consistence in English and Turkish.

A survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (Creswell, 2003, p. 153). This study employed a quantitative description research design that used a survey constructed from previously used and validated survey instruments. The complete survey instrument is enclosed into the Appendix section Figure A.2. The constructs with their respective reference from the literature and the questions placed in the survey is as follows;

Perceived Usefulness

Reference = Davis, 1989; Davis et al. 1989.

The degree to which a person believes that using a particular system would enhance his or her job performance.

1. Using the system in my job would enable me to accomplish tasks more quickly.
2. Using the system would improve my job performance.
3. Using the system in my job would increase my productivity.
4. Using the system would enhance my effectiveness on the job.
5. Using the system would make it easier to do my job.
6. I would find the system useful in my job.

Perceived Ease of Use

Reference = Davis, 1989.

The degree to which a person believes that using a system would be free of effort.

1. Learning to operate the system would be easy for me.
2. I would find it easy to get the system to do what I want it to do.
3. My interaction with the system would be clear and understandable.
4. I would find the system to be flexible to interact with.
5. It would be easy for me to become skillful at using the system.
6. I would find the system easy to use.

Attitude Toward Behavior

Reference = Davis et al., 1989; Fishbein and Ajzen, 1975; Taylor and Todd 1995; Venkatesh et al., 2003.

An individual's positive or negative feelings about performing the target behavior.

1. Using the system is a bad/good idea.
2. Using the system is a foolish/wise idea.
3. I dislike/like the idea of using the system.
4. Using the system is unpleasant/ pleasant.

Software Anxiety

Reference = Venkatesh et al., 2003.

1. I feel apprehensive about using the system.
2. It scares me to think that I could lose a lot of information using the system by hitting the wrong key.
3. I hesitate to use the system for fear of making mistakes I cannot correct.
4. The system is somewhat intimidating to me.

Perceived Management Support

Reference = Thompson et al., 1991; Venkatesh et al., 2003.

The individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situation.

1. I will use the system because of the proportion of coworkers who use the system.
2. I think the senior management of this business will be helpful in the use of the system.
3. I think my supervisor will be very supportive of the use of the system for my job.
4. In general, the organization will support the use of the system.

Perceived Information Support

Reference = Thompson et al., 1991; Venkatesh et al., 2003.

Objective factors in the environment that observers agree make an act easy to do, including the provision of computer support.

1. Guidance will be available to me in the selection of the system.
2. Specialized instruction concerning the system will be available to me.
3. A specific person (or group) will be available for assistance with system difficulties.

Intention

Reference = Cheong and Park, 2005.

Behavioral intention is an individual's subjective probability of performing a specified behavior.

1. I intend to use Web based learning.
2. I intend to use Web based learning as much as possible.
3. I recommend others to use Web based learning.

Subjective Norm

Reference = Ajzen, 1991; Wu ve Chen, 2005.

The person's perception that most people who are important to him thin he should or should not perform the behaviour in question.

1. People important to me will support my use of the system.
2. People who influenced my behavior will want me to use the system.
3. People whose opinions I valued will prefer that I use the system.

Computer Self-efficacy

Reference = Lee, 2006.

Self-efficacy refers to people's judgement of their own ability to perform specific tasks.

1. I am able to operate the web based learning system with less support and assistance.
2. I am confident that I can overcome any obstacles when using the web based learning system.
3. I believe that I can use different web based learning systems to receive education.

4.4 Pilot Study

To test the general readability and overall flow of the survey, a pretest of the web based learning tool and survey was conducted via a pilot study. The questionnaire was adopted in a pilot test involving 45 workers, who completed the questionnaire. The Cronbach's alpha value for each construct was calculated. Except computer self efficacy and perceived information support, the Cronbach's alpha value for each construct was surpassing the standard threshold value of 0.70 (Nunnally, 1978), thus revealing an indication of good reliability. So no item was eliminated at this stage. Participants in the formal survey, thus could clearly understand each question, and the content validity could be assured.

4.5 Data Collection Procedure

The formal questionnaire comprised two parts. The first part was intended to understand subject's basic data. The second part measured the subject's perception of each construct in the model. The questionnaire adopted a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). shows the constructs and questions included in this questionnaire.

The sample of this study was selected from the blue collar workers attending to the trainings in the training center of Mercedes-Benz Türk A.Ş., this workers are from various automotive companies all around Turkey.

The survey was distributed to the sample with the consent form; the survey instrument, a self administrative form, was then given. Following the demographic information section, participants were asked to indicate the degree to which they agreed with a series of statements. A descriptive note, including the design of questions, how they can respond to the questions was provided prior to the survey questions to decrease any missing data and increase the response rate. Clear survey question statements and appropriate check boxes were attached to each set of the survey.

546 blue collar workers were participated to the survey within a period of 4 months. Participants were not required to complete the survey, rather it was voluntary. In the data gathering process, ethical issues were taken into consideration, such as assuring the confidentiality of subjects and maintaining the privacy of respondents. In the presentation of the results, it will reported aggregate rather than individual data to ensure protection of the participants.

5. RESULTS

In this section, the processes of data analysis and the results of statistical tests are reported. This chapter presents the results of the statistically data analysis and indicates the extent to which the hypotheses were or were not supported.

5.1 Descriptive Statistical Analysis of Participants Demographics

Data were collected through a survey instrument administered to 546 blue collar workers from 52 different firms coming from 22 different cities of Istanbul. during the period September to December of 2008. Of these responding to the gender inquiry, 536 respondents (98%) were male and 10 respondents (2%) were female.

Participants ages ranged from 18 to 49 years, with a mean age of 30.59 years (standard deviation 7.264). Respondents came from 22 cities of Turkey countries and from 52 different firms. The majority of the participants are high school graduates (52%), whereas an important portion (19 %) is graduated from primary school. Job descriptions vary in 8 different group, with the highest percentage mechanician (29%). 53 % of the participants has a working experience in the current company from 0 to 5 years.

The respondents are also classified according to their computer knowledge in years. Table 5.1 reports the ages of the respondents organized into six groups. The most frequent group represented is the 3-5 year computer knowledge who account for 33% of all the respondents. 27% of the respondents had a computer knowledge of 6-10 years, and 22% 0-2 years. The majority (33%) of the respondents reported their weekly computer usage as use 0-5 hours. As the frequency of their computer usage we see that 48% of the respondents use computers in a daily basis.

A summary of the characteristics of the respondents is as follows. (Table 5.1 and Table 5.2)

Table 5.1 : Demographic characteristics of the respondents.

Measure	Items	Frequency	Percentage
Gender	Male	536	98,17%
	Female	10	1,83%
Age	18-20	35	6,41%
	21-25	107	19,60%
	26-30	158	28,94%
	31-35	103	18,86%
	36-40	77	14,10%
	41-45	52	9,52%
	46-49	14	2,56%
Education	Primary School	106	19,41%
	Secondary School	66	12,09%
	High School	282	51,65%
	College	67	12,27%
	University	25	4,58%
Marital Status	Married	392	71,79%
	Single	154	28,21%
Jop Description	Assembling	135	24,73%
	Electronic technician	33	6,04%
	Foreman	32	5,86%
	Mechanician	156	28,57%
	Part production	72	13,19%
	System Tecnician	12	2,20%
	Tech.trouble shooting exp	18	3,30%
	Technical preperation	88	16,12%
Working Years in Current Company	0-2	165	30,22%
	3-5	124	22,71%
	5-10	93	17,03%
	11-15	92	16,85%
	16-20	47	8,61%
	20-30	25	4,58%

20% of the participants use internet 1-2 hours per day. Their internet experience condensate on 2 to 5 years as 31% and 1-2 years as 18%, whereas 16%of the respondents expose their internet experience as none.

Table 5.2 : Computer / Internet usage experience of the respondents.

Measure	Items	Frequency	Percentage
Computer Knowledge in Years	0	57	10,44%
	0-2	118	21,61%
	3-5	178	32,60%
	6-10	150	27,47%
	11-15	33	6,04%
	>15	10	1,83%
Weekly Computer Usage Hours	0	63	11,54%
	0-5	179	32,78%
	6-10	116	21,25%
	11-15	62	11,36%
	16-20	38	6,96%
	21-25	20	3,66%
	26-30	23	4,21%
	31-35	9	1,65%
	36-40	16	2,93%
	41-45	4	0,73%
	46-50	6	1,10%
	>50	10	1,83%
Computer Usage frequency	never	51	9,34%
	once a week or less	83	15,20%
	1-7 days in a week	151	27,66%
	daily	261	47,80%
Internet experience	none	85	15,57%
	less than 6 months	30	5,49%
	6 months- 1 year	73	13,37%
	1-2 years	100	18,32%
	2-5 years	170	31,14%
	more than 5 years	88	16,12%
Internet Usage frequency	never	159	29,12%
	less than 1 hour per day	84	15,38%
	05-1 hours per day	96	17,58%
	1-2 hours per day	110	20,15%
	2-3 hours per day	64	11,72%
	more than 3 hours per day	33	6,04%

Second a descriptive statistics were computed. This descriptive data is presented on Table 5.3 shows the mean and variance of each item in the web based learning assessment instrument.

Table 5.3 : Univariate summary statistics for continuous variables.

Variable	Mean	St. Dev.	T-Value	Skewness	Kurtosis
PIS1	3.947	0.930	99.158	-1.446	2.474
PIS2	3.883	0.895	101.379	-1.155	1.788
PIS3	3.872	0.860	105.206	-0.724	0.742
SA1	2.260	1.047	50.455	0.833	0.127
SA2	2.614	1.184	51.598	0.277	-0.991
SA3	2.480	1.140	50.830	0.445	-0.693
SA4	2.220	1.035	50.123	0.916	0.308
PMS1	3.872	0.862	104.946	-0.733	0.742
PMS2	3.852	0.953	94.438	-0.862	0.701
PMS3	3.914	0.959	95.391	-0.893	0.750
PMS4	4.013	0.821	114.279	-0.804	1.236
PU1	3.612	0.930	90.716	-0.624	0.053
PU2	3.888	0.901	100.867	-0.822	0.754
PU3	3.846	0.951	94.485	-0.895	0.705
PU4	3.962	0.870	106.441	-1.034	1.552
PU5	3.952	0.945	97.723	-1.070	1.151
PU6	3.973	0.825	112.568	-1.033	1.841
PEU1	4.046	0.902	104.755	-1.188	1.778
PEU2	3.908	0.843	108.319	-0.895	1.484
PEU3	3.989	0.850	109.635	-1.040	1.779
PEU4	3.868	0.943	95.862	-0.921	0.942
PEU5	3.813	0.866	102.861	-0.650	0.629
PEU6	3.982	0.898	103.568	-1.077	1.530
ATB1	3.963	0.784	118.076	-1.264	3.086
ATB2	3.929	0.817	112.293	-1.182	2.282
ATB3	3.839	0.917	97.870	-1.010	1.200
ATB4	3.625	0.927	91.393	-0.757	0.534
INT1	4.005	0.866	108.043	-1.013	1.638
INT2	3.886	0.805	112.846	-0.724	1.121
INT3	4.057	0.807	117.412	-1.321	3.183
CSE1	3.689	1.015	84.948	-0.711	0.106
CSE2	4.093	0.933	102.537	-1.112	1.191
CSE3	3.910	0.864	105.783	-0.752	0.773
SN1	3.800	0.959	92.597	-0.970	1.000
SN2	3.769	0.920	95.771	-0.905	0.968
SN3	3.963	0.841	110.148	-0.935	1.537

5.2 Data Analysis

The Statistical Package for the Social Sciences (SPSS Version 10.0) was the primary tool used for the statistical analysis of the data for this study. The Cronbach's Alpha was calculated using SPSS procedures. Cronbach's alpha measures the extent to which item responses obtained at theame time correlate highly with each other. An acceptable reliability coefficient for social science should be 0.70 or higher (Garson; McGill, 2004). Cronbach's alphas for this study were calculated using the SPSS function of reliability analysis. The results are shown in Table 5.4.

Table 5.4 : Internal reliability consistency using Cronbach's Alphas.

Construct	**α**
Intention	0.7941
Attitude towards behaviour	0.8153
Subjective norm	0.7238
Perceived Usefulness	0.8583
Perceived Ease of Use	0.8592
(Perceived) Management Support	0.749
(Perceived) Information Support	0.6759
Software Anxiety	0.8481
Computer Self Efficiacy	0.6343

With a range from 0.63 to 0.86, the variables do fell within the ranges, except perceived management support and computer sef efficiacy. This two variables were under the generally accepted range of 0.70. Thus following the approach taken by Benham and Raymond (1996). At this stage by eliminating one observed variable the perceived information support construct has improved its realiability over 0.70, so the perceived information support construct has been kept within the context, however it has been decided to eliminate the computer self efficiacy items since it is not confirming the reliability with eliminating one or the other observed variable as well. The conceptual model after eliminating the self efficiacy construct is represented on Figure 5.1.

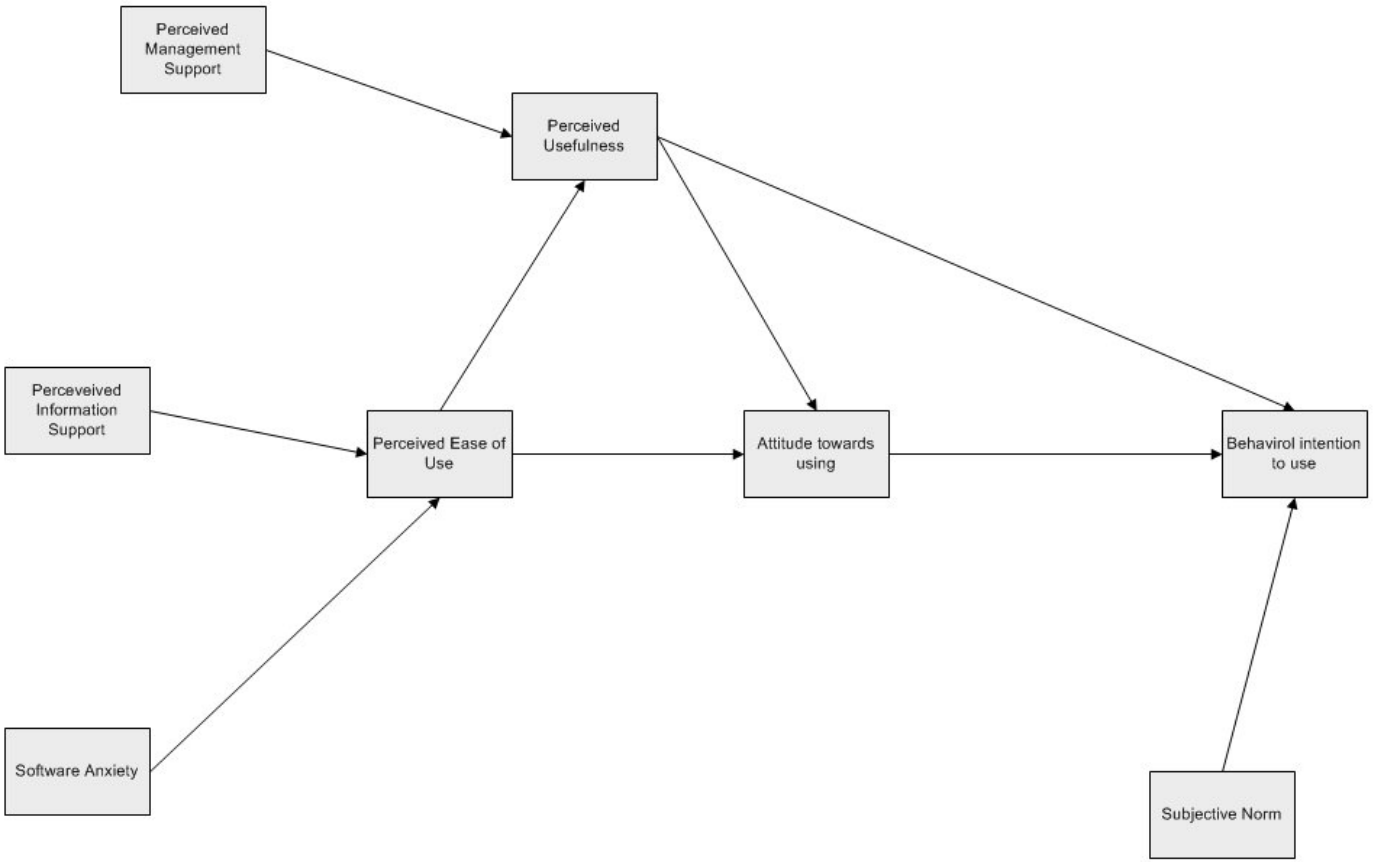

Figure 5.1 : Conceptual model at the final stage.

5.2.1 Structural Equation Modeling Approach

Structural equation modeling (SEM) techniques have been used heavily in measuring user acceptance of information technology (Chau, 1997; Venkatesh et al., 2003). In technology uptake, several published studies have adopted the SEM approach in their studies.

Examples include (Adams, Nelson, and Todd, 1992; Barki and Hartwick, 1994; Chau, 1997; Chwelos et al., 2001; Goodhue et al., 2000; Hartwick and Barki, 1994; Igbaria and Parasuraman, 1989; Koufaris, 2002; Lederer et al., 2000; Moon and Kim, 2001; Rai et al., 2002; Venkatesh and Davis, 2000).

LISREL is a powerful covariance based structural equation modeling technique that has been used extensively in information system research especially in the last decade (e.g. Bhattacherjee, 2001; Gefen, Karahanna, and Straub, 2003). Generally, LISREL consists of two distinct parts: the confirmatory factor model and the structural equation model (Chau, 1997; Segars and Grover, 1993). The confirmatory factor model specifies the relations of the observed factors to their posited underlying constructs. The structural equation model specifies the relationships of the constructs to one another as posited by research models (Chau, 1997). Based on the discussion presented in this section, the following section examines the confirmatory factor models (Measurement Model) of the proposed model.

5.2.2 Confirmatory Factor Model Evaluation

The data analysis followed structural equation modeling procedures. Structural equation modeling (SEM) allows complicated variable relationships to be expressed through hierarchical or nonhierarchical, recursive or non-recursive structural equations (Bullock et al., 1994). SEM has been widely used in behavioral science research for the causal modeling of complex, multivariate data sets in which the research gathers multiple measures of proposed constructs (Hair et al., 1998). Structural equation modeling is also widely used in management information systems research to validate instruments and test linkages between constructs (Chin, 1998; Gefen et al., 2000). This study employs the covariance-based structural equation modeling because there is a sound theoretical foundation of the research model. As suggested by Gefen et al. (2000), covariance-based structural equation

modeling is appropriate for confirmatory research which requires a sound theory base. In addition, the sample size of this study (546) meets the requirement for covariance-based structural equation modeling: at least 100 - 105 cases (Gefen et al., 2000).

As recommended by Segars and Grover (1993), the confirmatory factor (or measurement) model should be assessed first and "fixed" before the structural equation model is examined. The validity of the confirmatory factor model can be assessed by confirmatory factor analysis using LISREL.

LISREL is a powerful covariance based structural equation modeling technique that has been used extensively in information system research especially in the last decade (e.g. Bhattacherjee, 2001; Gefen et al., 2003). Covariance-based structural equation modeling has several strengths that makes it appropriate for this study, including its ability to generate fit indices which makes it possible to compare a set of rival models based on the same variables (Gefen et al., 2000).

LISREL also enables more accurate parameter estimation, a ''more realistic" analysis (Bollen, 1989, p. 19), and finally unidimensionality analysis (Segars, 1997). As mentioned by Chau (1997), there is a number of measures generated by LISREL to evaluate the goodness of fit of the research model. The most popular index is perhaps the chisquare statistic. This statistic tests the proposed model against the general alternative in which all observed variables are correlated (in LISREL terms, unconstrained). With this index, significant values indicate poor model fit while non-significant values indicate good fit. This is why it is also called a "badness-of-fit" measure. Hartwick and Barki (1994) used four other measures of overall model goodness of fit: chisquare / degrees of freedom, Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), and Average Absolute Standardized Residual (AASR). In another study, Segars and Grover (1993) included several other measures of model fit: Goodness-of-fit Index (GFI), Adjusted Goodness-of-fit Index (AGFI), Pit Criterion, and Root Mean Square Residual. Segars and Grover (1993) recommended acceptance range for each measure of model fit, these ranges were readapted by Chau (1997). Poor goodness-of-model-fit indicates possible model misspecifications.

5.2.3 Analysis of validity and reliability

LISREL was used (Version 8.54) to examine the reliability and validity of the measures, and to analyze the proposed model data analysis carried out using a two-stage methodology where ‘‘the measurement model first is developed and evaluated separately from the full structural equation model” (Anderson and Gerbing, 1988, p. 191).

After the data gathering processes, data obtained from the survey was inserted into LISREL 8.54 ® program to conduct the necessary analyses. Various minimum sample sizes for the SEM approach have been recommended. For example, Bollen (1989) suggested a minimum sample size of 100, whereas Anderson and Gerbing (1988) recommended a minimum sample size of 200. Gefen et al. (2000) reported that the average sample size for MIS studies using LISREL was 249 (minimum 41, maximum 451). Therefore, the sample size of 546 in this study was considered more than adequate. This study used maximum likelihood estimation to obtain estimates of model parameters.

Due to the fact that the structural equation model tool, LISREL is sensitive to missing data, missing values were replaced by using the ‘series mean’ method in the SPSS program. This replacement was just made for 6 cases, the reason why very small number of data were missing is that all the surveys were controlled before collecting them back and at that time in case an answer was missing it was requested to make the necessary completion.

According to Tabachnick and Fidell (2007), in SEM, when a model is specified, parameters for the model are estimated using sample data and the parameters are used to produce the population covariance matrix. Only identified models can be estimated. The number of parameters is found by adding together the number of regression coefficients, variances, and covariances that are to be estimated. In this study since there are more data points than parameters to be estimated, the model is overidentified, which is a necessary condition to proceed.

Although the items used as the indicators to measure the constructs in this study were based on the related literature review, the tests of convergent validity, discriminant

validity, and reliability were important for establishing construct validity (Ahire et al., 1996; Tu,et al., 2001).

The maximum likelihood method, used in this study, can be employed for the data with minor deviations from normality (Wisner, 2003), even when the data deviate moderately from a normal distribution if the model has been correctly specified (Chou and Bentler, 1995; West et al., 1995).

The second step was to establish the convergent and discriminant validity of the constructs with a confirmatory factor analysis. The measurement model was revised in the confirmatory factor analysis by dropping items, one at a time, that shared a high degree of residuals variance with other items, according to the standard covariance based structural equation modelling methodology (Gefen et al., 2000).

Anderson and Gerbing's (1988) recommendations were followed first in evaluating and refining the measurement model prior to the simultaneous estimation of the measurement and structural models. Confirmatory factor analysis was used to evaluate the hypothesized measurement model. The results for the initial measurement model, first indicated poor model fit. Examining LISREL output indicated that several items had large standardized residuals. In addition, inspection of the modification indices suggested that some of these items might load on multiple factors. Following established data analysis practices (Anderson and Gerbing, 1988; Byrne, 1998; Segars, 1997), problematic items were deleted one at a time, and reevaluated the measurement model. To assess the influence of item deletion on content validity, the items were examined that remained for each construct. Content validity appeared to be adequate for the following reasons. Even after item deletions, each construct was measured by at least two items. As a result, 16 of the 36 items were removed from the analysis. The list of the items removed from the analysis can be seen at appendix section on Table A.1.

Table 5.5 shows the list of the items used in the final analysis.

Table 5.5 : List of items used in the final analysis.

Latent Variable	Observed Variable	
Intention	INT1	I intend to use E-learning.
	INT2	I intend to use E-learning as much as possible.
Attitude towards behaviour	ATB1	Using the system is a bad/good idea.
	ATB2	Using the system is a foolish/wise idea.
	ATB3	I dislike/like the idea of using the system.
Subjective norm	SN1	People important to me will support my use of the system.
	SN2	People who influenced my behavior will want me to use the system.
Perceived Usefulness	PU3	Using the system in my job would increase my productivity.
	PU4	Using the system would enhance my effectiveness on the job.
	PU6	I would find the system useful in my job.
Perceived Ease of Use	PEU3	My interaction with the system would be clear and understandable.
	PEU4	I would find the system to be flexible to interact with.
	PEU6	I would find the system easy to use.
Perceived Management Support	PMS1	I will use the system because of the proportion of coworkers who use the system.
	PMS4	In general, the organization will support the use of the system.
Perceived Information Support	PIS1	Guidance will be available to me in the selection of the system.
	PIS2	Specialized instruction concerning the system will be available to me.
Software Anxiety	SA1	I feel apprehensive about using the system.
	SA2	It scares me to think that I could lose a lot of information using the system by hitting the wrong key.
	SA3	I hesitate to use the system for fear of making mistakes I cannot correct.

The revised measurement model exhibited a good fit. As shown in Table 5.6, model fit indicators suggested good fit. The common used goodness of fit indices v2/df = 2.76 and the values for CFI, NNFI, GFI, AGFI, NFI and root mean square error of approximation (RMSEA) are considered as a good fit based on the standards suggested by Hu and Bentler (1995, 1999) which can be seen on Table 5.6.

Table 5.6 : Recommended values suggested by Hu and Bentler (1995, 1999)

Model goodness-of-fit indexes	**Recommended value**
$\chi 2/df$ ($\chi 2$, df)	≤ 3
Root mean square error of approximation (RMSEA)	≤ 0.08
Goodness-of-fit index (GFI)	≥ 0.90
Adjusted goodness-of-fit index (AGFI)	≥ 0.80
Comparative fit index (CFI)	≥ 0.95
Normalized fit index (NFI)	≥ 0.90
Non-normalized fit index (NNFI)	≥ 0.90

The results obtained from this study is as follows; 0.933 for GFI, 0.982 for CFI, 0.973 for NFI, 0.901 for AGFI , 0.976 for NNFI, and 0.057 for RMSEA. Appendix A.1 shows the details of the goodness of fit statisticsGiven that the battery of overall goodness-of-fit indices was deemed acceptable and that the model was developed on a theoretical base, no re-specifications of the model were made. This enables to proceed in evaluating the measurement and structural models. Table 5.7 shows the analysis of overall model goodness-of-fit using common fit indexes for the model.

Table 5.7 : Analysis of overall model goodness-of-fit using common fit indexes for the model.

Model goodness-of-fit indexes	Recommended value	Results obtained from this study
$\chi 2/df$ ($\chi 2$, df)	≤ 3	2.76 (392; 142)
Root mean square error of approximation (RMSEA)	≤ 0.08	0.057
Goodness-of-fit index (GFI)	≥ 0.90	0.933
Adjusted goodness-of-fit index (AGFI)	≥ 0.80	0.901
Comparative fit index (CFI)	≥ 0.95	0.982
Normalized fit index (NFI)	≥ 0.90	0.973
Non-normalized fit index (NNFI)	≥ 0.90	0.976

As for the construct validity, it is related to whether a scale measures what it is meant to measure (Garver and Mentzer, 1999). There are several sub-forms of construct validity, some of which are discriminant and convergent validity. In the explanatory factor analysis, the construct validity was assessed by using principal components analysis. Convergent validity addresses the measures of constructs that are theoretically related. The latent variable should correlate the items which are assigned for that particular variable (Garver and Mentzer, 1999). Discriminant validity addresses the measures of constructs that are not theoretically related. The variables should not correlate the items which are not assigned for that particular variable. Factor loading indicates the strength of the relationship between the item and the latent construct and thus, is used to ascertain the convergent and discriminant validity of the scales (Hair et al., 2006). The requirements for discriminant and convergent validity are satisfied when measurement items load high (0.70 or more) on their corresponding constructs and low (0.40 or less) on other constructs (Straub, 1989). In addition, Hair et al. (1998) and Nunnally (1978) posits that the factor loading should be more than 0.50 and ideally be more than 0.70. In this study, all items load more than 0.60 and indşcate reasonable and sufficient loading. Table 5.8 indicates the factor loadings of this study's items. As shown in Table 5.8, all items exhibited providing evidence of acceptable item convergence on the intended constructs.

Table 5.8 : Descriptive statistics of the constructs.

Latent Variable	Observed Variable	Mean	Standard Deviation	Factor Loadings	t-value
Intention (INT)	INT1	4.005	0.866	0.81	21,18
	INT2	3.886	0.805	0.74	18,9
Attitude towards behaviour (ATB)	ATB1	3.963	0.784	0.83	22,43
	ATB2	3.929	0.817	0.84	22,8
	ATB3	3.839	0.917	0.74	19,14
Subjective norm (SN)	SN1	3.800	0.959	0.65	14,81
	SN2	3.769	0.920	0.69	15,71
Perceived Usefulness (PU)	PU3	3.846	0.951	0.72	18,54
	PU4	3.962	0.870	0.81	22,00
	PU6	3.973	0.825	0.83	22,83
Perceived Ease of Use (PEU)	PEU3	3.989	0.850	0.82	21,69
	PEU4	3.868	0.943	0.69	17,17
	PEU6	3.982	0.898	0.83	22,25
Perceived Management Support (PMS)	PMS1	3.872	0.862	0.72	17,86
	PMS4	4.013	0.821	0.83	21,16
Perceived Information Support (PIS)	PIS1	3.947	0.930	0.63	13,7
	PIS2	3.883	0.895	0.70	15,12
Software Anxiety (SA)	SA1	2.260	1.047	0.85	22,37
	SA2	2.614	1.184	0.72	18,29
	SA3	2.480	1.140	0.84	22,32

In Appendix A.2 the factor scores regressions are listed. The quality and adequacy of measurement models assessed by investigating convergent validity and discriminant validity. Discriminant validity verifies whether each construct is unique. Hair et al. (1998) posited that the average variances extracted (AVE) values exceeding 0.50 offers supportive evidence for convergent validity.

The values for the average variance extracted ranges were suggesting that most of the constructs was strongly related to the set of respective indicators, two exceptions were in the perceived information support scale and in the subjective norm scale.

As for the variance extracted, some of the value estimates of the constructs are below 0.5. However, Hatcher (1994) posits that this situation does not cause concern to find an estimate below 0.50, when the construct reliability is acceptable.

Fornell & Larcker (1981) and Tseng et al., (2006) suggested that composite reliability should be great than 0.6. Finally, as can be derived from Table 5.9 all of the composite reliability measures are equal to or above the commonly accepted minimum value of 0.60. This shows a good reliability and that the measures are all consistently representing the same latent construct. Thus, it can be concluded that the measures produce sufficient reliability.

Table 5.9 : Composite reliabilities and average variance extracted.

Construct	**Composite Reliability**	**Average Variance Extracted**
Intention	0.748	0.598
Attitude towards behaviour	0.845	0.654
Subjective norm	0.621	0.454
Perceived Usefulness	0.832	0.623
Perceived Ease of Use	0.822	0.608
Perceived Management Support	0.747	0.598
Perceived Information Support	0.611	0.444
Software Anxiety	0.847	0.649

A series of $\chi 2$ difference tests were performed on the nested models to assess whether the $\chi 2$ values were significantly lower for the unconstrained models where the phi coefficient was constrained to unity (Anderson, 1987). The fact that all critical values related to the $\chi 2$ difference at the 0.005 significance level are less than 3.84 in all possible pairs of constructs gave support to discriminant validity. Table 5.10 shows the $\chi 2$ tests of discriminant validity for the model.

In summary, a battery of tests gave support to the reliability and validity of the studied constructs in the proposed model.

Table 5.10 : $\chi 2$ tests of discriminant validity for the model

Variable constrained	df	$\chi 2$	$\Delta\chi 2$ *
None	142	392.94	-
Intention - Attitude towards behaviour	143	510.05	117.11
Intention - Subjective norm	143	403.89	10.95
Intention - Perceived Usefulness	143	427.1	34.16
Intention - Perceived Ease of Use	143	469.57	76.63
Intention - Perceived Management Support	143	411.63	18.69
Intention - Perceived Information Support	143	422.39	29.45
Intention - Software Anxiety	143	464.41	71.47
Attitude towards behaviour - Subjective norm	143	454.31	61.37
Attitude towards behaviour - Perceived Usefulness	143	834.28	441.34
Attitude towards behaviour - Perceived Ease of Use	143	827.47	434.53
Attitude towards behaviour - Perceived Management Support	143	528.84	135.9
Attitude towards behaviour - Perceived Information Support	143	476.22	83.28
Attitude towards behaviour - Software Anxiety	143	1021.85	628.91
Subjective norm - Perceived Usefulness	143	412.23	19.29
Subjective norm - Perceived Ease of Use	143	432.57	39.63
Subjective norm - Perceived Management Support	143	397.11	4.17
Subjective norm - Perceived Information Support	143	415.16	22.22
Subjective norm - Software Anxiety	143	475.65	82.71
Perceived Usefulness - Perceived Ease of Use	143	619.83	226.89
Perceived Usefulness - Perceived Management Support	143	475.24	82.3
Perceived Usefulness - Perceived Information Support	143	425.76	32.82
Perceived Usefulness - Software Anxiety	143	980.43	587.49
Perceived Ease of Use - Perceived Management Support	143	516.84	123.9
Perceived Ease of Use - Perceived Information Support	143	441.82	48.88
Perceived Management Support - Perceived Information Support	143	445.88	52.94
Perceived Management Support - Software Anxiety	143	580.34	187.4
Perceived Information Support - Software Anxiety	143	590.54	197.6

5.3 Testing the Study's Hypotheses

Table A.1 shows the common model-fit indices, recommended values and results of the test of structural model fitness. A comparison of all fit indices with their corresponding recommended values (Hair et al., 1998), indicate a good model fit. the values for CFI, NNFI, GFI, AGFI, NFI and root mean square error of approximation (RMSEA) are considered acceptable based on the standards suggested by Hu and Bentler (1995, 1999) are shown on Table 5.6.

The results obtained from this study is as follows; 0.977 for CFI, 0.918 for GFI, 0.966 for NFI, 0.889 for AGFI , 0.971 for NNFI, and 0.063 for RMSEA. Table A.2. shows the analysis of overall model goodness-of-fit using common fit indexes for the structural model.

Given the satisfactory fit of the model, the estimated path coefficients of the structural model were then studied to evaluate the hypotheses. Figure 5.2 and Figure 5.3 shows the standardized path coefficients, t values and coefficients of determination (R2) of the latent variables.

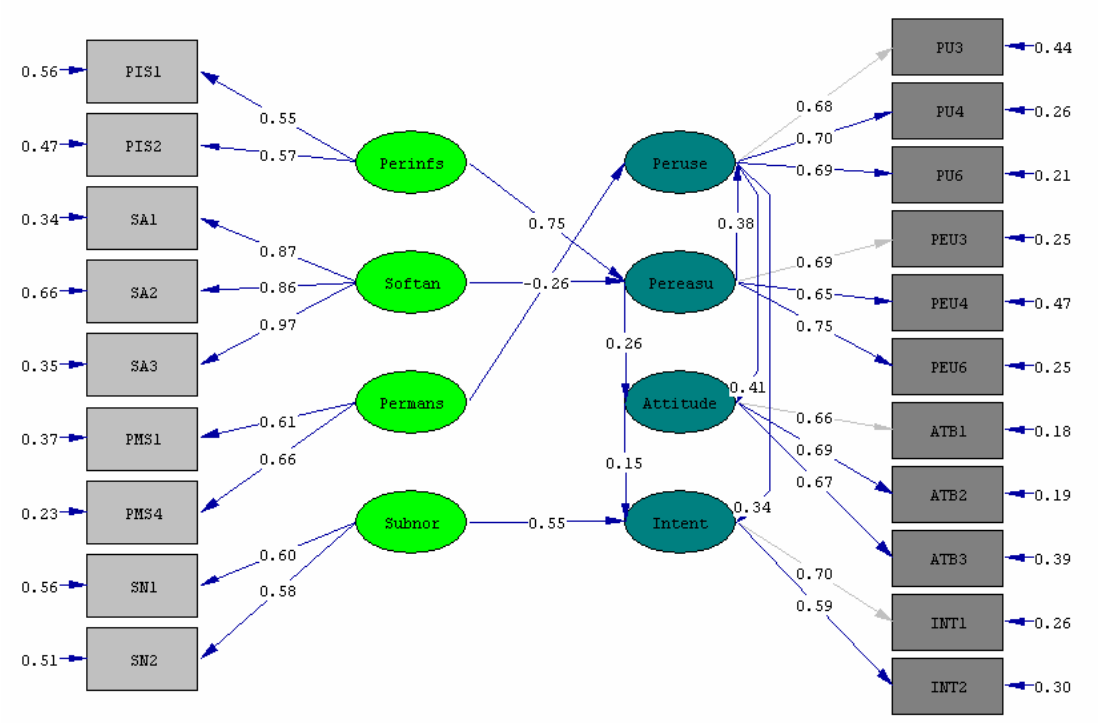

Figure 5.2 : Graphical representation of the results of the structural model.

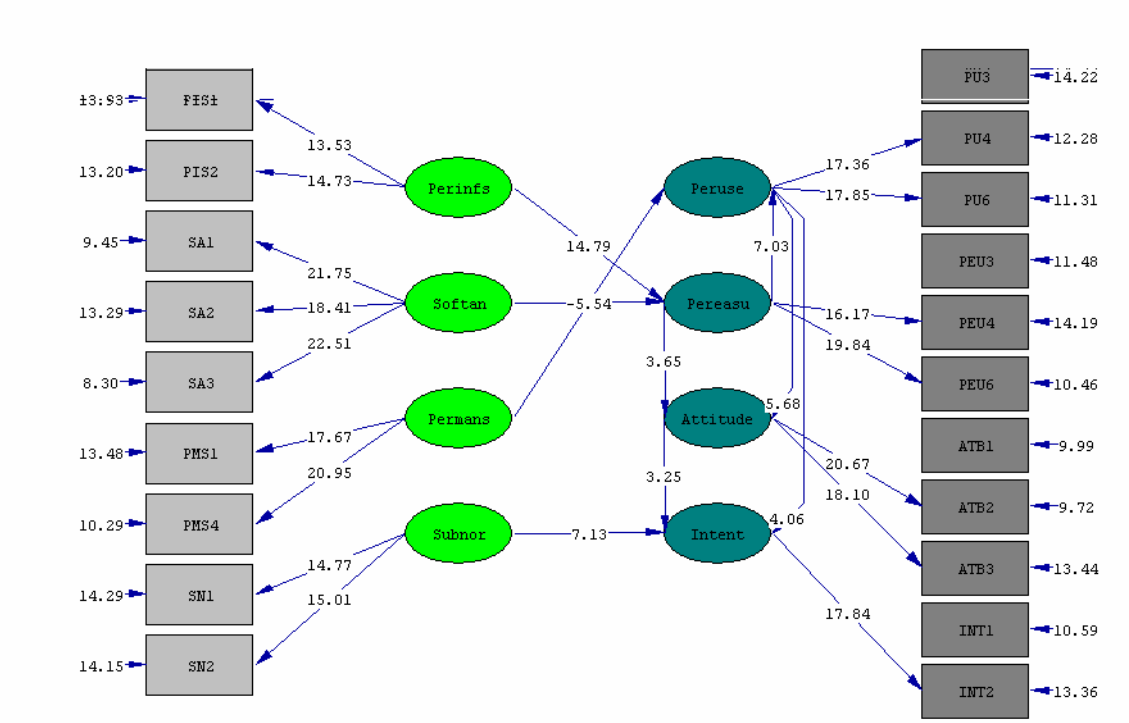

Figure 5.3 : Graphical representation of t coefficients of the structural model.

Figure 5.4 shows the standardized path coefficients for the conceptual model. Eight out of nine paths exhibited a p-value of <0.001, while the remaining one is significant at a p-value of 0.01. Results indicate that software anxiety and perceived information support were a significant determinant of perceived ease of use.

According to the results perceived ease of use and perceived managament support were a significant determinant of perceived usefulness. Perceived ease of use had a significantly positive effect on perceived usefulness. This result is consistent with those of previous studies (Adams et al., 1992; Bruner and Kumar, 2005; Davis et al., 1989; Heijden et al., 2003; Igbaria et al., 1997; Liao et al., 2007; Lin and Lu, 2000; Luarn and Lin, 2005; Moon and Kim, 2001; Taylor and Todd, 1995; Wu and Wang, 2005).

Perceived ease of use and perceived usefulness were significant determinants of attitude towards use, respectively. Perceived usefulness, attitude towards use and subjective norm were, in turn, significant antecedents of employees' behavioral intention to use web based learning. In terms of explanatory power, the model explained 39.3% of the variance in attitude towards use, 88.3% of the variance in behavioral intention to use, 71.7% of the variance in perceived usefulness and

61.7% of the variance in perceived ease of use. And indicating that attitude towards use, subjective norm and perceived usefulness control were significant determinants of employees' behavioral intention to use web based learning, respectively.

Moreover, findings of this study showed that employees' behavioral intention to use web based learning could be explained by attitude towards use and perceived usefulness in the TAM. Meanwhile, the model identified subjective norm as significant predictor of employees' behavioral intention to use web based learning. Table 5.11 shows the summary of the path coefficients.

Table 5.11 : Summary of the path coefficients.

Path	t-value	Hypotheses
Attitude → Intention	3.253**	H1 (supported)
Perceived Usefulness → Intention	4.062***	H2 (supported)
Subjective Norm → Intention	7.132***	H3 (supported)
Perceived Usefulness → Attitude	5.683***	H4 (supported)
Perceived Ease of Use → Attitude	3.653***	H5 (supported)
Perceived Ease of Use → Perceived Usefulness	7.030***	H6 (supported)
Perceived Management Support → Perceived Usefulness	9.832***	H7 (supported)
Software Anxiety → Perceived Ease of Use	-5.542***	H8 (supported)
Perceived Information Support → Perceived Ease of Use	14.794***	H9 (supported)

Appendix A.3 shows the structural equations and Appendix A.4 shows the reduced form equations.

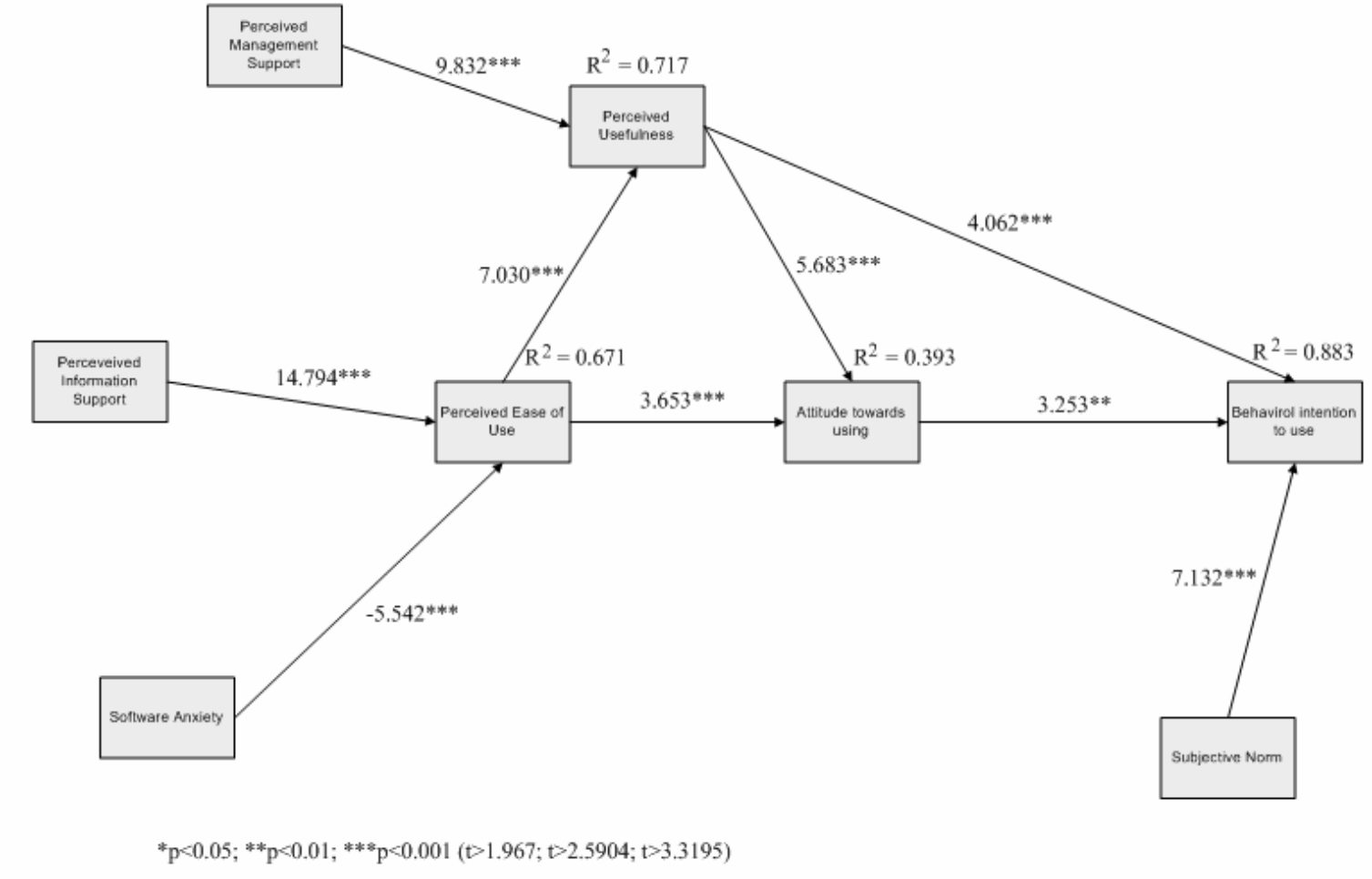

Figure 5.4 : LISREL results of the structural model.

6. DISCUSSION AND CONCLUSION

In this paper, it is proposed an extended information technology initial acceptance model based on TAM and related other studies which have been proved by empirical investigation.

To empirically test the model, a survey instrument was developed to measure constructs primarily by adapting previously validated instruments to fit the web based learning system context. By empirically testing the model with a survey regarding a certain web based learning system, it has been demonstrated that most of the factors in the proposed model have significant influence on the intentions of use of the web based learning system.

This chapter also includes conclusions from the study, recommendations for future research, and implications for practice.

6.1 Summary of Findings

In this study, a contribution was made to the web based learning research area by putting forward a theoretical model that identifies and explains the factors that influence the technology acceptance of web based learning. The majority of hypothesized relationships are supported by the data.

In the theoretical framework, attitude was considered to be an antecedent to behavioural intention. Past research has shown a strong link between attitude and behavioural intention (Chau and Hu, 2001; Davis et al., 1989; Mathieson, 1991). Consistent with Yanga and Yoo (2004), this study found that attitude is strong predictor of behavioral intention to use information technology. Similarly, as Brown et al., (2002) stated, in a mandatory use environment, the factor of attitude is significant on intention. The result of the study indicated that attitude has a positive direct effect on behavioural intention, which is consistent with past studies (Davis et

al., 1989; Hansen et al. 2004; Mathieson, 1991).This study also found that subjective norm as a strong redictor or the behavioral intention.

Although a few studies have found insignificant results for perceived ease use to intention toward attitude (Yi et al, 2006; Venkatesh and Davis, 2000), this study found that easiness of the system is a strong predictor for attitude toward intention to use information technology, which is consistent with other studies that found perceived ease of use to have a significant effect on attitude towards using (Lin et al., 2004).

The results also showed that the software anxiety had negative impacts on perceived ease of use as expected. Perceived information support and software anxiety were found to be significant direct antecedents of perceived ease of use. Second, perceived ease of use and perceived management support were found to be significant mediator of the perceived usefulness.

Perceived usefulness and perceived ease of use have been recognized as the most influential catalysts in a TAM framework. The finding that perceived ease of use has a significant direct and indirect impact (via perceived usefulness) on behavioral intentions is consistent with the TAM findings of Hong et al. (2001-2002) and Thong, Hong, and Tam (2002). Similarly, the significance of the positive relationship between perceived usefulness and behavioral intentions agrees with the findings of Hong et al. (2001-2002) and Thong et al. (2002). This suggests that the greatest web based learning usage outcome would occur when a web based learning system is perceived both useful and easy to use by the learners. Since the results verify the postulates of the original TAM, it could be suggested, contrary to the findings of Straub et al. (1997), but consistent with the findings of Ong et al. (2004) and Pituch and Lee (2006), TAM does hold across cultures.

Table 6.1 : Summary of findings.

	Hypotheses	Supported
H1	A learner's attitude toward Web based learning has a positive impact on his/her intention to use Web based learning.	Yes
H2	A learner's perceived usefulness has a positive impact on his/her intention to use Web based learning.	Yes
H3	Subjective norm has a positive impact on intention to use Web based learning.	Yes
H4	A learner's perceived usefulness has a positive impact on his/her attitude toward Web based learning.	Yes
H5	A learner's perceived ease of use has a positive impact on his/her attitude toward Web based learning.	Yes
H6	A learner's perceived ease of use has a positive impact on his/her perceived usefulness.	Yes
H7	A learner's perceived management support has a positive impact on his/her perceived usefulness.	Yes
H8	A learner's software anxiety has a negative impact on his/her perceived ease of use.	Yes
H9	A learner's perceived information support has a positive impact on his/her perceived ease of use.	Yes

*p<0.05; **p<0.01; ***p<0.001 (t>1.967; t>2.5904; t>3.3195)
Significance of individual paths for the model

6.2 Implications for Practice

Based on the review of the literature and results of the study, several conclusions can be made, the findings of the present study have various implications for research as well as practice.

From the managerial point of view, one of the major implications is that organizations should promote autonomy-supportive conditions to increase the acceptation of the web based learning, because users will show greater interest, greater effort and better performance-learning and using the system, that is, companies should train supervisors to use autonomy-supportive techniques with subordinates. One can, however, make the argument that users in different cultures may behave and act differently. Nevertheless, I believe that the results would apply in similar contexts, and to a limited degree in other contexts and cultures.

Since perceived usefulness is the an important antecedent of intention, managers can increase users' usage intention by improving their beliefs of how the web based learning system can enhance their performance and effectiveness.

6.3 Limitations of the Study

Like in every study, there are a number of limitations attached to this research.

Many studies have implemented a self-reported questionnaire survey. The literature supports use of this type of survey. However, these results may be subjective based upon respondents' moods, feelings, or other internal or external factors at the time the survey was completed. All self-report studies are vulnerable to the inflation of correlations by common method variance. Common method variance is present when correlations between measures are not due to true relationships between the constructs but simply because the same respondent provides the measures for both constructs (Podsakoff and Organ, 1986). The study utilizes a self-reported questionnaire survey and is limited by the accuracy of participants' responses.

One of the limitations of TAM, as mentioned by Mathieson et al. (2001), is that it assumes there are no barriers to prevent an individual from using or choosing to use a particular technology. This general limitation is also valid for this study.

Third, only a limited number of antecedent factors are included in the research model, opportunities exist to expand on the proposed model.

Another limitation that can be identified in this study is that the theoretical model has only been tested on one technology. I also suggest testing this theoretical model on other experimental technologies to give further validation to this model.

6.4 Implications for Further Research

This research study findings suggests a number of opportunities for future research. Some of these relate directly to overcoming the limitations of this study.

Future research may employ inductive and qualitative research approaches to identify other important antecedent factors. It have been investigated a limited number of variables to understand continuance. Other antecedent factors could significantly influence intention to use a web based learning system as well. Future research is needed to fully understand elements of the work climate that improve or undermine users' intention. In particular, some constructs from the innovation adoption literature could also be used to explore learners' behavioral intentions to

adopt new technology. Examples of these could include compatibility and complexity. They are widely discussed in the general innovation adoption literature, but empirical studies about these constructs are only starting to emerge and should also be considered in future research in web based learning technology adoption behavior.

The findings indicate that the theoretical model sufficiently accounts for the variance in behavioural intention to use web based learning. As well, most of the interrelationships and hypotheses hold empirically, thus strengthening the case for the usage or adaptation of the model in future studies of experimental technologies. Testing this theoretical model on other experimental technologies would give further validation to this model. This might take the form of additional theoretically motivated moderating influences, different technologies, different user groups (e.g., individuals in different functional areas), and other organizational contexts (e.g., public or government institutions).

In addition, future research may examine whether demographic variables could potentially confound the observed relationships using a more diversified sample. An important set of variables could be learners' individual differences, such as educational level; learning styles, age, and gender. Differences are important and have been found to be significant, in spite of the lack of studies that have examined the influence these variables have on TAM (Burton-Jones and Hubona, 2005). Much of the literature and studies reviewed fail to investigate whether a relationship exists between age and perceived usefulness or perceived ease of use. As further research, this could be included as an extension of this study to determine whether age has a relationship with perceived usefulness or perceived ease of use and whether it influences either perception. It could be argued that younger more technological learners may have a higher perception of usefulness or perceived ease of use due to their comfort with technology, whereas older learners might have a lower perception due to a lower comfort level with technology.

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APPENDIX A.1 : Goodness of Fit Statistics.

Degrees of Freedom = 142

Minimum Fit Function Chi-Square = 388.728 (P = 0.0)

Normal Theory Weighted Least Squares Chi-Square = 392.943 (P = 0.0)

Estimated Non-centrality Parameter (NCP) = 250.943

90 Percent Confidence Interval for NCP = (195.702 ; 313.839)

Minimum Fit Function Value = 0.713

Population Discrepancy Function Value (F0) = 0.460

90 Percent Confidence Interval for F0 = (0.359 ; 0.576)

Root Mean Square Error of Approximation (RMSEA) = 0.0569

90 Percent Confidence Interval for RMSEA = (0.0503 ; 0.0637)

P-Value for Test of Close Fit (RMSEA < 0.05) = 0.0433

Expected Cross-Validation Index (ECVI) = 0.971

90 Percent Confidence Interval for ECVI = (0.869 ; 1.086)

ECVI for Saturated Model = 0.771

ECVI for Independence Model = 26.152

Chi-Square for Independence Model with 190 Degrees of Freedom = 14213.071

Independence AIC = 14253.071

Model AIC = 528.943

Saturated AIC = 420.000

Independence CAIC = 14359.123

Model CAIC = 889.522

Saturated CAIC = 1533.550

Normed Fit Index (NFI) = 0.973

Non-Normed Fit Index (NNFI) = 0.976

Parsimony Normed Fit Index (PNFI) = 0.727

Comparative Fit Index (CFI) = 0.982

Incremental Fit Index (IFI) = 0.982

Relative Fit Index (RFI) = 0.963

Critical N (CN) = 259.135

Root Mean Square Residual (RMR) = 0.0310

Standardized RMR = 0.0361

Goodness of Fit Index (GFI) = 0.933

Adjusted Goodness of Fit Index (AGFI) = 0.901

Parsimony Goodness of Fit Index (PGFI) = 0.631

Table A.1 : List of items eliminated from the analysis.

Latent Variable	Observed Variable	
Intention	INT3	I recommend others to use E-learning.
Attitude Toward Behavior	ATB4	Using the system is unpleasant/ pleasant.
Subjective Norm	SN3	People whose opinions I valued will prefer that I use the system.
Perceived Usefulness	PU1	Using the system in my job would enable me to accomplish tasks more quickly.
	PU2	Using the system would improve my job performance.
	PU5	Using the system would make it easier to do my job.
Perceived Ease of Use	PEU1	Learning to operate the system would be easy for me.
	PEU2	I would find it easy to get the system to do what I want it to do.
	PEU5	It would be easy for me to become skillful at using the system.
Perceived Management Support	PMS2	I think the senior management of this business will be helpful in the use of the system.
	PMS3	I think my supervisor will be very supportive of the use of the system for my job.
Perceived Information Support	PIS3	A specific person (or group) will be available for assistance with system difficulties.
Software Anxiety	SA4	The system is somewhat intimidating to me.
Computer Self-efficacy	CSE1	I am able to operate the e-learning system with less support and assistance.
	CSE2	I am confident that I can overcome any obstacles when using the e-learning system.
	CSE3	I believe that I can use different e-learning systems to receive education.

Table A.2 : Analysis of overall model goodness-of-fit using common fit indexes for the structural model.

Model goodness-of-fit indexes	**Recommended value**	**Results obtained from this study**
Root mean square error of approximation (RMSEA)	≤0.08	0.063
Goodness-of-fit index (GFI)	≥0.90	0.918
Adjusted goodness-of-fit index (AGFI)	≥0.80	0.889
Comparative fit index (CFI)	≥0.95	0.977
Normalized fit index (NFI)	≥0.90	0.966
Non-normalized fit index (NNFI)	≥0.90	0.971

APPENDIX A.2 : Factor scores regression.

KSI

	PIS1	PIS2	SA1	SA2	SA3	PMS1
Perinfs	0.27	0.38	0.01	0.00	0.01	0.03
Softan	0.00	0.00	0.39	0.17	0.35	0.00
Permans	0.02	0.02	0.00	0.00	0.00	0.25
Peruse	0.04	0.06	0.02	0.01	0.02	0.02
Pereasu	0.03	0.04	-0.03	-0.01	-0.03	0.00
Attitude	0.00	0.00	-0.02	-0.01	-0.02	0.01
Intent	0.03	0.04	-0.02	-0.01	-0.02	0.10
Subnor	0.03	0.05	0.04	0.02	0.03	0.14

KSI

	PMS4	PU3	PU4	PU6	PEU3	PEU4
Perinfs	0.05	0.06	0.10	0.12	0.07	0.04
Softan	0.00	0.01	0.02	0.03	-0.03	-0.01
Permans	0.48	0.02	0.04	0.04	0.00	0.00
Peruse	0.04	0.18	0.31	0.37	0.05	0.02
Pereasu	0.00	0.03	0.05	0.06	0.38	0.18
Attitude	0.02	0.02	0.03	0.03	0.01	0.01
Intent	0.19	0.06	0.10	0.12	0.05	0.03
Subnor	0.26	0.04	0.07	0.08	0.05	0.02

KSI

	PEU6	ATB1	ATB2	ATB3	INT1	INT2
Perinfs	0.08	0.00	0.00	0.00	0.07	0.05
Softan	-0.03	-0.02	-0.03	-0.01	-0.02	-0.02
Permans	0.00	0.02	0.02	0.01	0.16	0.12
Peruse	0.05	0.04	0.04	0.02	0.10	0.07
Pereasu	0.40	0.01	0.01	0.01	0.05	0.04
Attitude	0.01	0.45	0.47	0.23	0.03	0.02
Intent	0.06	0.04	0.04	0.02	0.31	0.23
Subnor	0.05	0.00	0.00	0.00	0.08	0.06

KSI

	SN1	SN2
Perinfs	0.04	0.05
Softan	0.02	0.02
Permans	0.10	0.12
Peruse	0.03	0.03
Pereasu	0.02	0.02
Attitude	0.00	0.00
Intent	0.04	0.04
Subnor	0.23	0.28

APPENDIX A.3 : Structural Equations.

Peruse = 0.383*Pereasu + 0.559*Permans, Errorvar.= 0.283 , R^2 = 0.717
(0.0545) (0.0569) (0.0424)
7.030 9.832 6.671

Pereasu = 0.748*Perinfs - 0.261*Softan, Errorvar.= 0.329 , R^2 = 0.671
(0.0505) (0.0472) (0.0521)
14.794 -5.542 6.314

Attitude = 0.413*Peruse + 0.259*Pereasu, Errorvar.= 0.607 , R^2 = 0.393
(0.0728) (0.0710) (0.0594)
5.683 3.653 10.220

Intent = 0.343*Peruse + 0.149*Attitude + 0.548*Subnor,
(0.0845) (0.0457) (0.0768)
4.062 3.253 7.132
Errorvar.= 0.117 , R^2 = 0.883
(0.0402)
2.906

APPENDIX A.4 : Reduced Form Equations.

Peruse = 0.286*Perinfs - 0.100*Softan + 0.559*Permans + 0.0*Subnor

(0.0428) (0.0223) (0.0569)

6.680 -4.492 9.832

Errorvar.= 0.331, R^2 = 0.669

Pereasu = 0.748*Perinfs - 0.261*Softan + 0.0*Permans + 0.0*Subnor

(0.0505) (0.0472)

14.794 -5.542

Errorvar.= 0.329, R^2 = 0.671

Attitude = 0.312*Perinfs - 0.109*Softan + 0.231*Permans + 0.0*Subnor

(0.0451) (0.0239) (0.0446)

6.920 -4.565 5.190

Errorvar.= 0.713, R^2 = 0.287

Intent = 0.145*Perinfs - 0.0506*Softan + 0.226*Permans + 0.548*Subnor

(0.0294) (0.0133) (0.0466) (0.0768)

4.919 -3.796 4.858 7.132

Errorvar.= 0.189, R^2 = 0.811

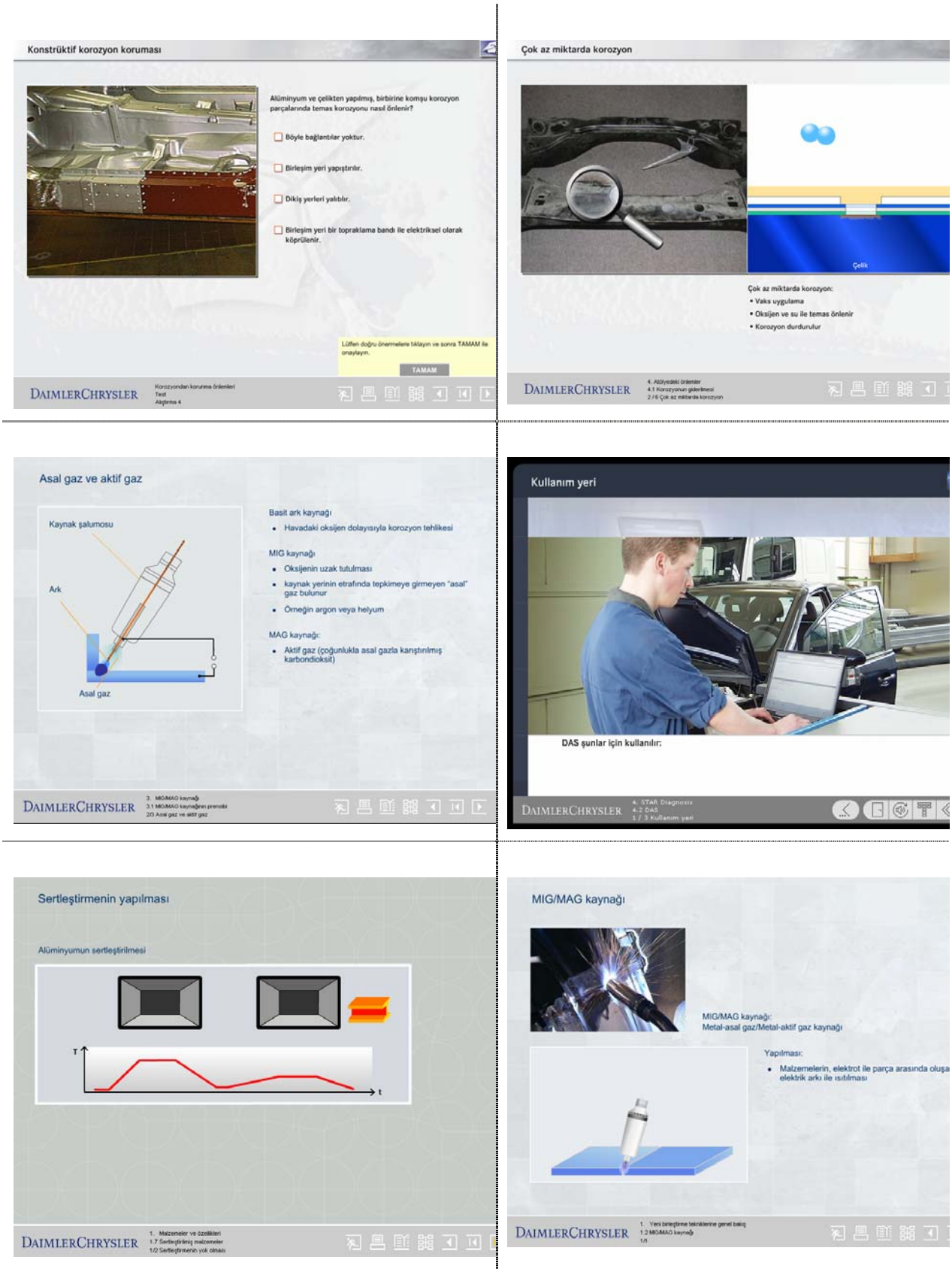

Figure A.1 : Screenshots from web based training support system.

Figure A.1 : Screenshots from web based training support system. (contd.)

Sayın İlgili,

Size sunulan bu anket Web Tabanlı Uzaktan Eğitim sistemlerinin kullanımını hangi faktörlerin etkilediğini ortaya çıkarmak için yaptığımız bilimsel çalışmada kullanacağımız ana veri kaynağımız olacaktır. Bu noktanın anketin doldurulması sırasında tarafınızdan dikkate alınacağına inanmaktayız. Bu anket bilimsel çalışmanın bir parçası olduğundan, üzerindeki tüm bilgiler referans olarak değerlendirilecektir, tüm kişi/kurum isimleri kesinlikle gizli tutulacak ve hiçbir platformda kullanılmayacaktır. Bu bağlamda gerekli tüm bilgileri eksiksiz doldurmanız bizim için büyük önem taşımaktadır.

ITU İşletme Fakültesi Endüstri Mühendisliği Bölümü'nde Mercedes-Benz Türk A.Ş.'nin desteği ile yürütmekte olduğumuz bu çalışmamıza gösterdiğiniz ilgi ve ayırdığınız değerli vaktiniz için çok teşekkür ederiz.

Saygılarımızla,

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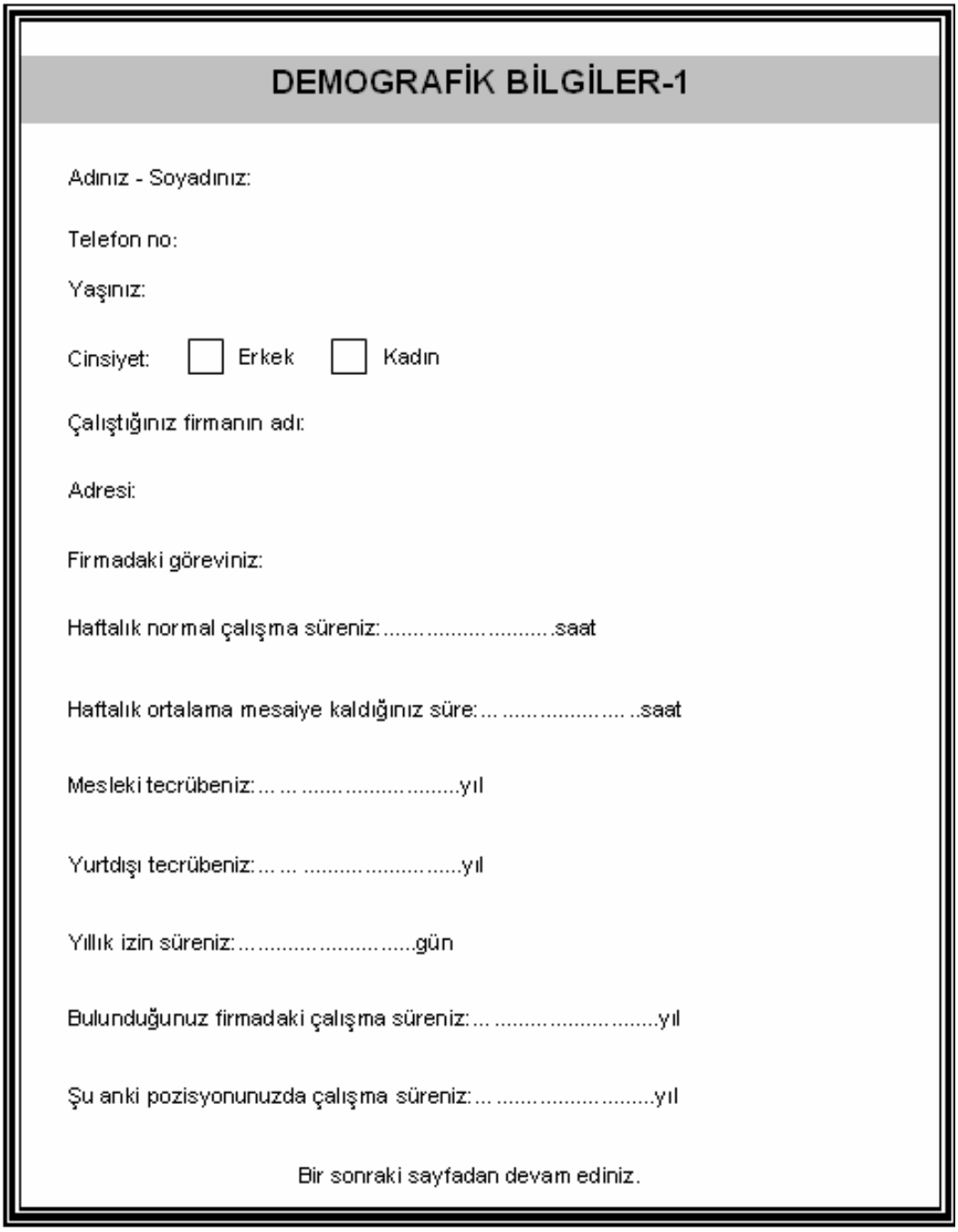
E-mail: demet.karaali@daimler.com

Figure A.2 : Survey Instrument.



DEMOGRAFİK BİLGİLER-1

Adınız - Soyadınız:

Telefon no:

Yaşınız:

Cinsiyet: ☐ Erkek ☐ Kadın

Çalıştığınız firmanın adı:

Adresi:

Firmadaki göreviniz:

Haftalık normal çalışma süreniz:.....saat

Haftalık ortalama mesaiye kaldığınız süre:.....saat

Mesleki tecrübeniz:.....yıl

Yurtdışı tecrübeniz:.....yıl

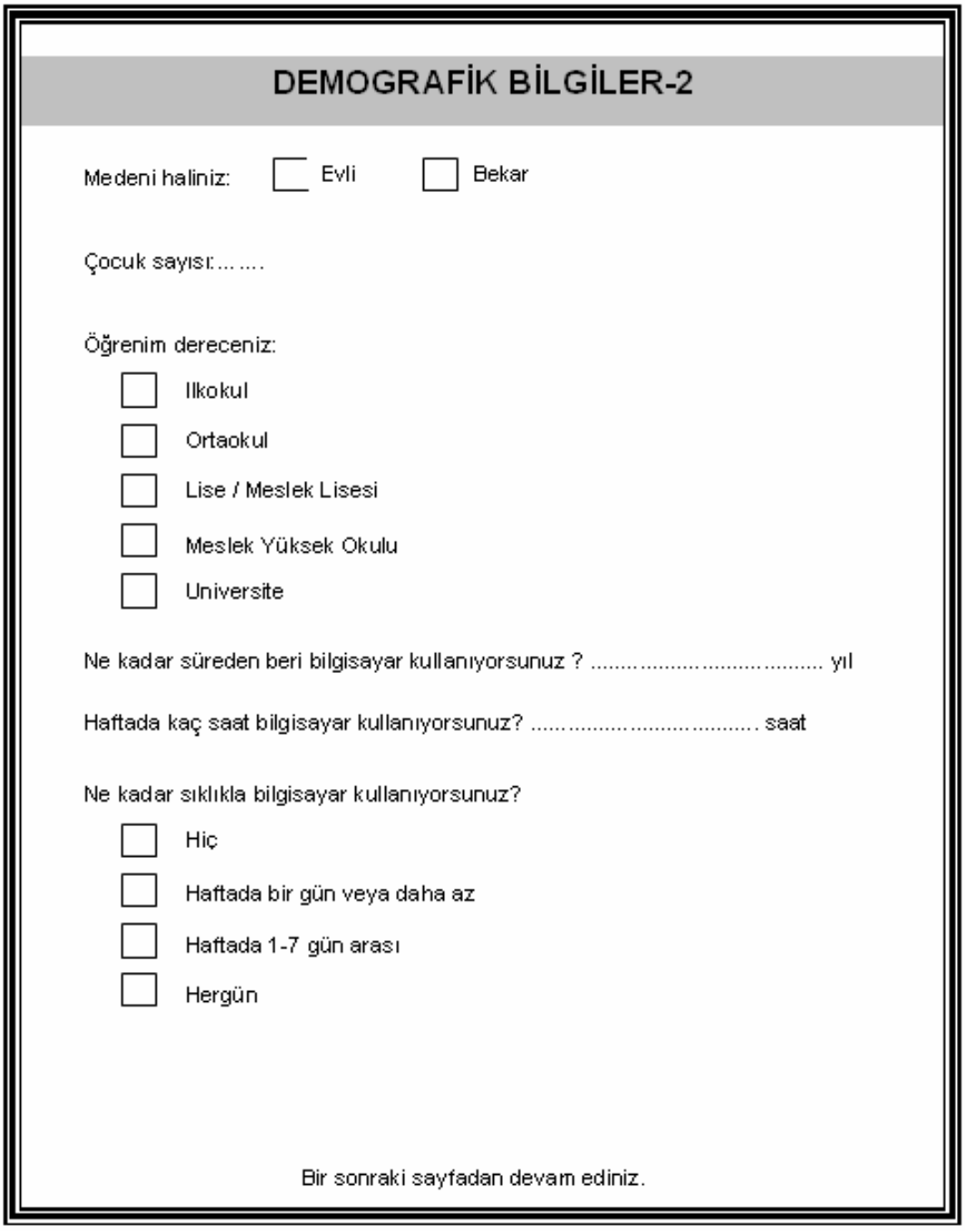
Yıllık izin süreniz:.....gün

Bulunduğunuz firmadaki çalışma süreniz:.....yıl

Şu anki pozisyonunuzda çalışma süreniz:.....yıl

Bir sonraki sayfadan devam ediniz.

Figure A.2 : Survey Instrument. (contd.)



DEMOGRAFİK BİLGİLER-2

Medeni haliniz: ☐ Evli ☐ Bekar

Çocuk sayısı:.....

Öğrenim dereceniz:

- ☐ Ilkokul
- ☐ Ortaokul
- ☐ Lise / Meslek Lisesi
- ☐ Meslek Yüksek Okulu
- ☐ Universite

Ne kadar süreden beri bilgisayar kullanıyorsunuz ? ..... yıl

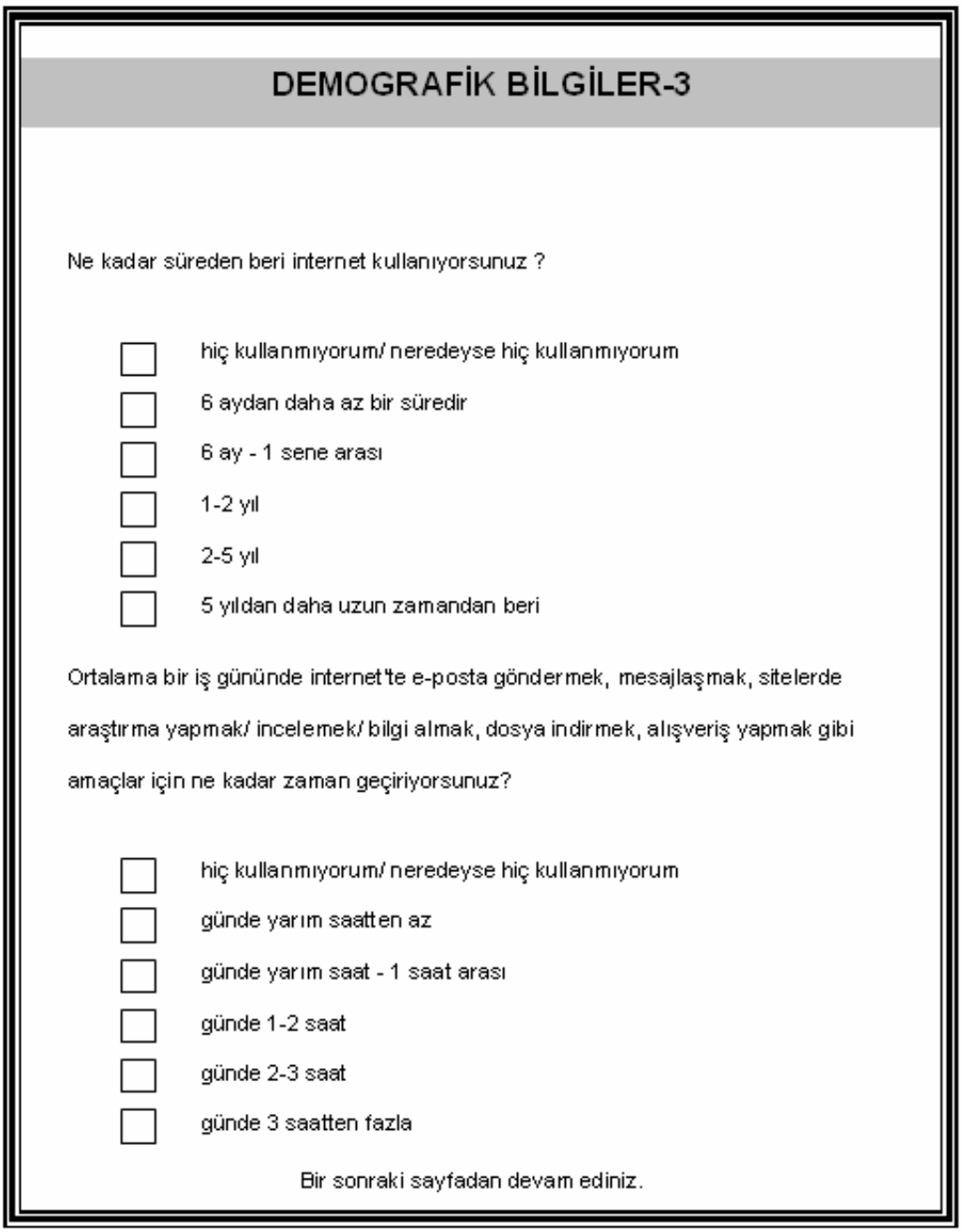
Haftada kaç saat bilgisayar kullanıyorsunuz? ..... saat

Ne kadar sıklıkla bilgisayar kullanıyorsunuz?

- ☐ Hiç
- ☐ Haftada bir gün veya daha az
- ☐ Haftada 1-7 gün arası
- ☐ Hergün

Bir sonraki sayfadan devam ediniz.

Figure A.2 : Survey Instrument. (contd.)



DEMOGRAFİK BİLGİLER-3

Ne kadar süreden beri internet kullanıyorsunuz ?

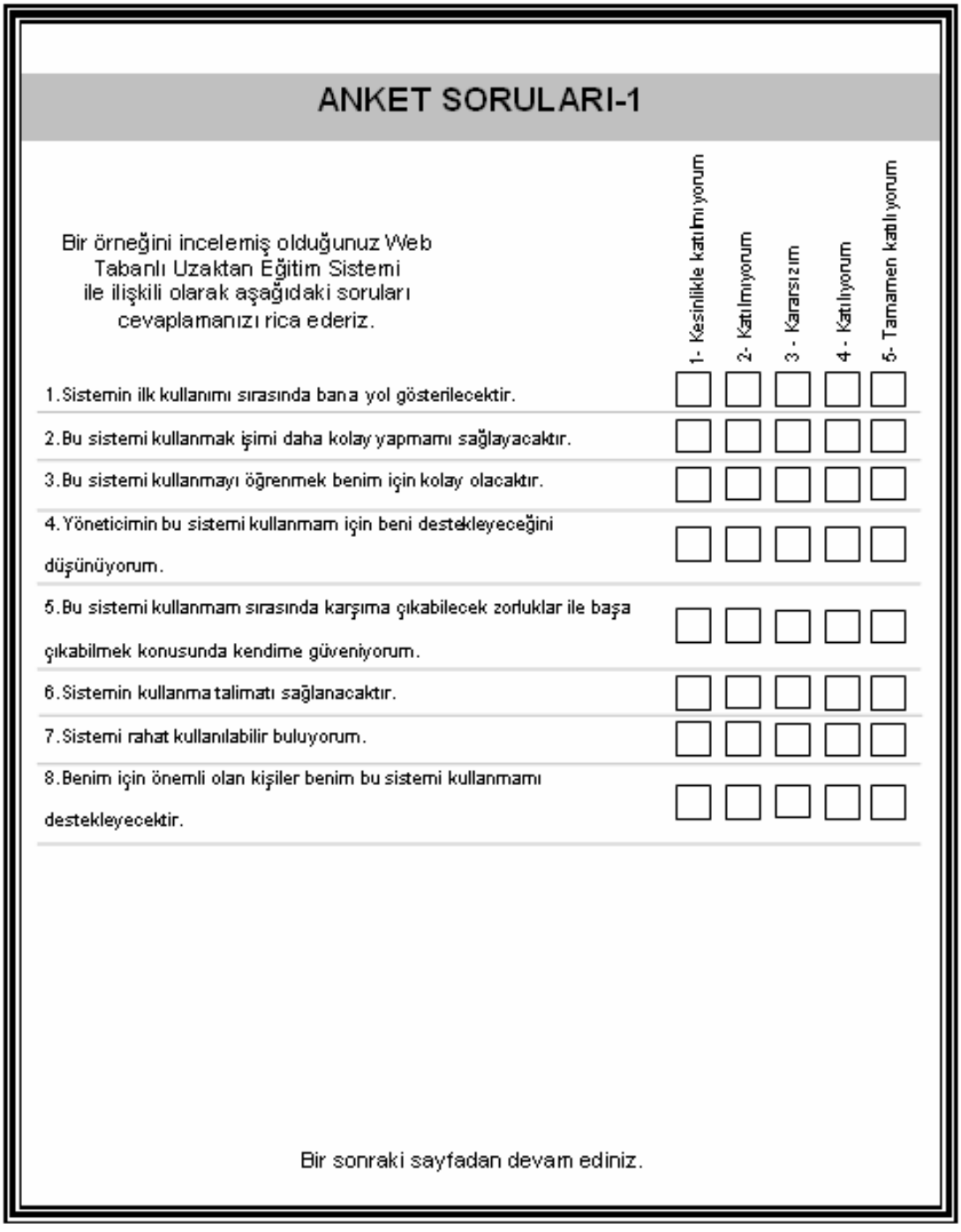
- ☐ hiç kullanmıyorum/ neredeyse hiç kullanmıyorum
- ☐ 6 aydan daha az bir süredir
- ☐ 6 ay - 1 sene arası
- ☐ 1-2 yıl
- ☐ 2-5 yıl
- ☐ 5 yıldan daha uzun zamandan beri

Ortalama bir iş gününde internet'te e-posta göndermek, mesajlaşmak, sitelerde araştırma yapmak/ incelemek/ bilgi almak, dosya indirmek, alışveriş yapmak gibi amaçlar için ne kadar zaman geçiriyorsunuz?

- ☐ hiç kullanmıyorum/ neredeyse hiç kullanmıyorum
- ☐ günde yarım saatten az
- ☐ günde yarım saat - 1 saat arası
- ☐ günde 1-2 saat
- ☐ günde 2-3 saat
- ☐ günde 3 saatten fazla

Bir sonraki sayfadan devam ediniz.

Figure A.2 : Survey Instrument. (contd.)



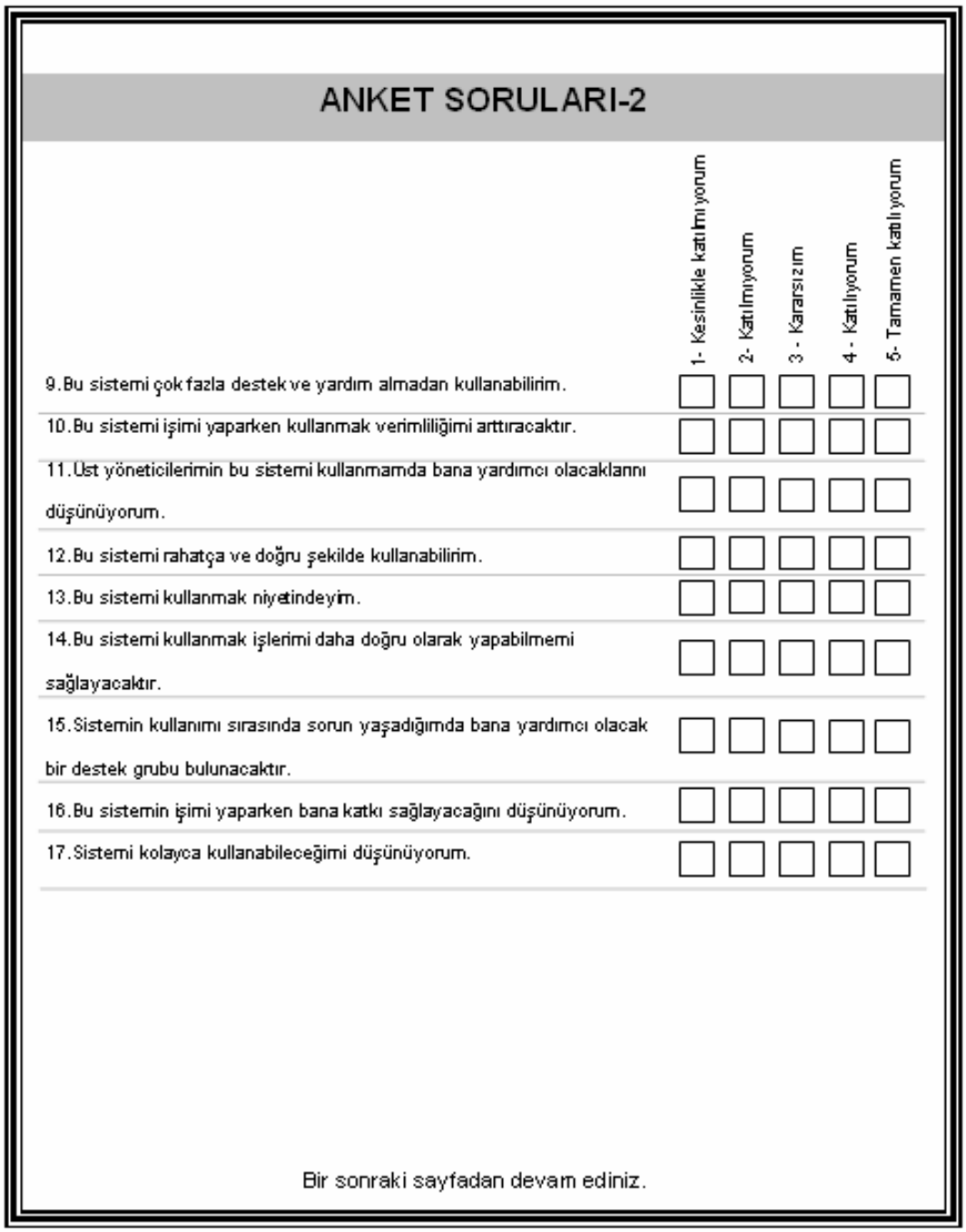
ANKET SORULARI-1

Bir örneğini incelemiş olduğunuz Web Tabanlı Uzaktan Eğitim Sistemi ile ilişkili olarak aşağıdaki soruları cevaplamanızı rica ederiz.

	1- Kesinlikle katılmıyorum	2- Katılmıyorum	3 - Kararsızım	4 - Katılıyorum	5- Tamamen katılıyorum
1. Sistemin ilk kullanımı sırasında bana yol gösterilecektir.	☐	☐	☐	☐	☐
2. Bu sistemi kullanmak işimi daha kolay yapmamı sağlayacaktır.	☐	☐	☐	☐	☐
3. Bu sistemi kullanmayı öğrenmek benim için kolay olacaktır.	☐	☐	☐	☐	☐
4. Yöneticimin bu sistemi kullanmam için beni destekleyeceğini düşünüyorum.	☐	☐	☐	☐	☐
5. Bu sistemi kullanmam sırasında karşıma çıkabilecek zorluklar ile başa çıkabilmek konusunda kendime güveniyorum.	☐	☐	☐	☐	☐
6. Sistemin kullanma talimatı sağlanacaktır.	☐	☐	☐	☐	☐
7. Sistemi rahat kullanılabilir buluyorum.	☐	☐	☐	☐	☐
8. Benim için önemli olan kişiler benim bu sistemi kullanmamı destekleyecektir.	☐	☐	☐	☐	☐

Bir sonraki sayfadan devam ediniz.

Figure A.2 : Survey Instrument. (contd.)

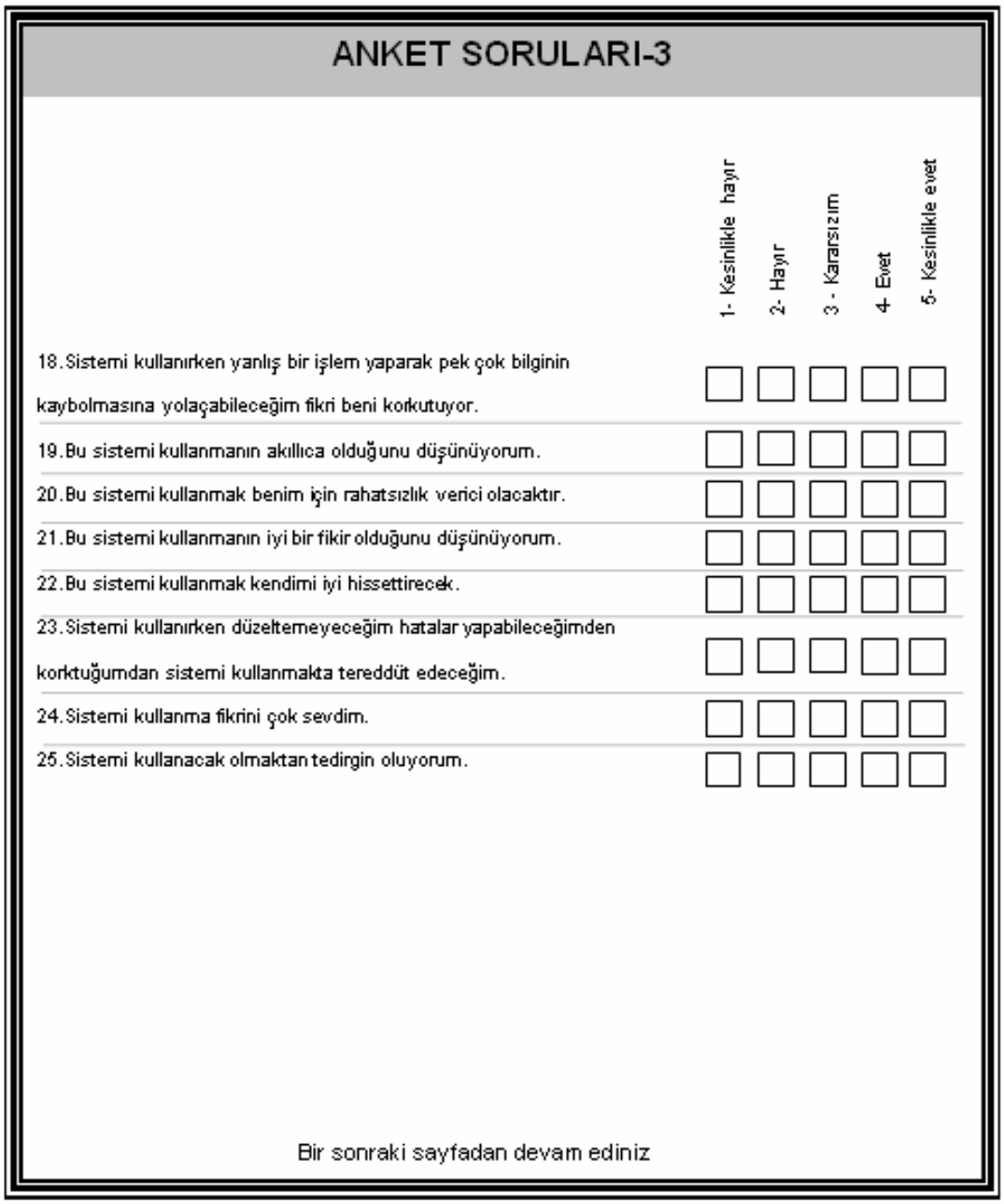


ANKET SORULARI-2

	1- Kesinlikle katılmıyorum	2- Katılmıyorum	3 - Kararsızım	4 - Katılıyorum	5- Tamamen katılıyorum
9. Bu sistemi çok fazla destek ve yardım almadan kullanabilirim.	☐	☐	☐	☐	☐
10. Bu sistemi işimi yaparken kullanmak verimliliğimi arttıracaktır.	☐	☐	☐	☐	☐
11. Üst yöneticilerimin bu sistemi kullanmamda bana yardımcı olacaklarını düşünüyorum.	☐	☐	☐	☐	☐
12. Bu sistemi rahatça ve doğru şekilde kullanabilirim.	☐	☐	☐	☐	☐
13. Bu sistemi kullanmak niyetindeyim.	☐	☐	☐	☐	☐
14. Bu sistemi kullanmak işlerimi daha doğru olarak yapabilmemi sağlayacaktır.	☐	☐	☐	☐	☐
15. Sistemin kullanımı sırasında sorun yaşadığımda bana yardımcı olacak bir destek grubu bulunacaktır.	☐	☐	☐	☐	☐
16. Bu sistemin işimi yaparken bana katkı sağlayacağını düşünüyorum.	☐	☐	☐	☐	☐
17. Sistemi kolayca kullanabileceğimi düşünüyorum.	☐	☐	☐	☐	☐

Bir sonraki sayfadan devam ediniz.

Figure A.2 : Survey Instrument. (contd.)

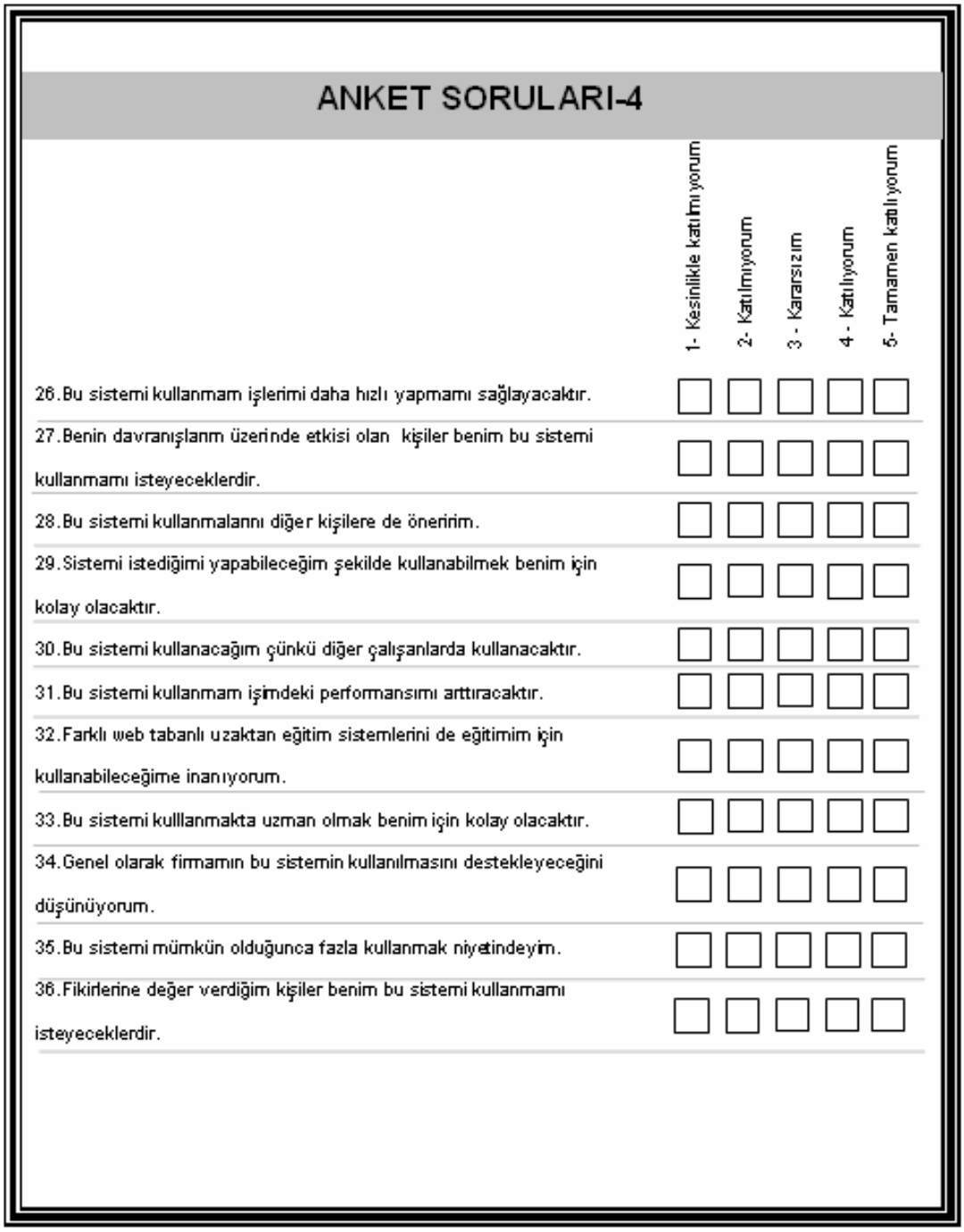


ANKET SORULARI-3

	1- Kesinlikle hayır	2- Hayır	3 - Kararsızım	4- Evet	5- Kesinlikle evet
18. Sistemi kullanırken yanlış bir işlem yaparak pek çok bilginin kaybolmasına yolaçabileceğim fikri beni korkutuyor.	☐	☐	☐	☐	☐
19. Bu sistemi kullanmanın akıllıca olduğunu düşünüyorum.	☐	☐	☐	☐	☐
20. Bu sistemi kullanmak benim için rahatsızlık verici olacaktır.	☐	☐	☐	☐	☐
21. Bu sistemi kullanmanın iyi bir fikir olduğunu düşünüyorum.	☐	☐	☐	☐	☐
22. Bu sistemi kullanmak kendimi iyi hissettirecek.	☐	☐	☐	☐	☐
23. Sistemi kullanırken düzeltemeyeceğim hatalar yapabileceğimden korktuğumdan sistemi kullanmakta tereddüt edeceğim.	☐	☐	☐	☐	☐
24. Sistemi kullanma fikrini çok sevdim.	☐	☐	☐	☐	☐
25. Sistemi kullanacak olmaktan tedirgin oluyorum.	☐	☐	☐	☐	☐

Bir sonraki sayfadan devam ediniz

Figure A.2 : Survey Instrument. (contd.)



ANKET SORULARI-4

	1- Kesinlikle katılmıyorum	2- Katılmıyorum	3 - Kararsızım	4 - Katılıyorum	5- Tamamen katılıyorum
26. Bu sistemi kullanmam işlerimi daha hızlı yapmamı sağlayacaktır.	☐	☐	☐	☐	☐
27. Benim davranışlarım üzerinde etkisi olan kişiler benim bu sistemi kullanmamı isteyeceklerdir.	☐	☐	☐	☐	☐
28. Bu sistemi kullanmalarını diğer kişilere de öneririm.	☐	☐	☐	☐	☐
29. Sistemi istediğimi yapabileceğim şekilde kullanabilmek benim için kolay olacaktır.	☐	☐	☐	☐	☐
30. Bu sistemi kullanacağım çünkü diğer çalışanlarda kullanacaktır.	☐	☐	☐	☐	☐
31. Bu sistemi kullanmam işimdeki performansımı arttıracaktır.	☐	☐	☐	☐	☐
32. Farklı web tabanlı uzaktan eğitim sistemlerini de eğitimim için kullanabileceğime inanıyorum.	☐	☐	☐	☐	☐
33. Bu sistemi kulllanmakta uzman olmak benim için kolay olacaktır.	☐	☐	☐	☐	☐
34. Genel olarak firmamın bu sistemin kullanılmasını destekleyeceğini düşünüyorum.	☐	☐	☐	☐	☐
35. Bu sistemi mümkün olduğunca fazla kullanmak niyetindeyim.	☐	☐	☐	☐	☐
36. Fikirlerine değer verdiğim kişiler benim bu sistemi kullanmamı isteyeceklerdir.	☐	☐	☐	☐	☐

Figure A.2 : Survey Instrument. (contd.)

CURRICULUM VITA

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