

# An empirical study on the e-learning acceptance among the Finnish labor

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Juha Rissa  
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# AN EMPIRICAL STUDY ON THE E-LEARNING ACCEPTANCE AMONG THE FINNISH LABOR

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# Tiivistelmä

## Tausta ja tavoitteet

Verkkokoulutusympäristöjen ja -ohjelmistojen hyödyntäminen yritysmaailmassa on jatkuvassa nousussa. Niin monikansalliset yritykset kuin paikalliset toimijat panostavat yhä enemmän henkilöstön kehittämiseen verkkokoulutusten avulla. Verkkokoulutukset tarjoavat kustannustehokkaan koulutusmahdollisuuden, jonka johdosta työntekijät pystyvät laajentamaan osaamistaan ajasta ja paikasta riippumatta. Alan liiketoiminnan maailmanlaajuisen arvon on ennustettu kasvavan seuraavien vuosien aikana noin kahdeksan prosentin vuosivauhdilla, saavuttaen yli 50 miljardin dollarin (US) arvon. Tämä luo mahdollisuuksia niin tilaajille kuin ohjelmistojen ja koulutussisällön toimittajille. Tutkimuksen motivaatio syntyi tarpeesta tunnistaa ne tekijät, jotka vaikuttavat suomalaisen työvoiman asenteisiin ja hyväksyntään verkkokoulutuksia kohtaan. Tutkimuksen tavoitteena oli luoda aikaisempaan teoriaan pohjautuva malli, jonka avulla pystytään arvioimaan työntekijän taustan ja koulutusympäristön vaikutusta verkkokoulutusten hyväksyntään ja omaksumiseen.

## Tutkimusmenetelmä ja aineisto

Tutkimuksen aineisto kerättiin Webropol kyselytyökalulla, ja kysely lähetettiin sähköpostitse 406:lle vastaajalle. Kysely tuotti yhteensä 115 vastausta, joiden avulla testattiin teorian pohjalta rakennettuja hypoteeseja. Rakenneyhtälömallia käytettiin verkkokoulutusten hyväksyntään vaikuttavien tekijöiden testaamiseen, jonka jälkeen lopullinen malli muodostettiin testattujen konstruktien pohjalta. Aineisto analysointiin SPSS statistics, sekä SPSS Amos (ver. 22) ohjelmistoilla. Aineiston validiteettia ja reliabiliteettia analysoitiin erilaisten, hyvin tunnettujen, tunnuslukujen avulla.

## Tulokset

Tulosten perusteella voidaan todeta, että työntekijän kokema hyöty koulutukseen osallistumisesta on tärkein yksittäinen vaikuttava tekijä, kun tarkastellaan asennetta verkkokoulutuksia kohtaan. Ohjelmiston käytettävyydellä on puolestaan erittäin suuri vaikutus siihen, kuinka hyödylliseksi työntekijä kokee verkkokoulutukset oman työnsä kannalta. Aikaisemmat teoriat osoittavat, että järjestelmän (tässä tapauksessa verkkokoulutuksen) käytön taustat vaikuttavat suuresti koetun hyödyn ja käytettävyyden rooliin. Tutkimuksen rajoitteena oli, että vapaaehtoisuuden vaikutusta ei päästy varsinaisesti testaamaan, sillä suurin osa vastaajista mainitsi osallistumisensa olevan täysin omasta tahdostaan kiinni.

**Avainsanat:** Verkkokoulutus, e-learning, teknologian adaptointi, asenne, itseluottamus, koettu hyöty, käytettävyys, vapaaehtoisuus, rakenneyhtälömallinnus, polkumalli

# **Abstract**

## **Background and objectives**

Utilization of e-learning environments and applications in business context has increased rapidly. International organizations, as well as local companies, allocate more resources to personnel development by using e-learning trainings. e-learning provides cost effective training possibilities and therefore it gives a good opportunity for employees to gain knowledge regardless of place and time. e-learning business is predicted to grow approximately eight percent annually during next few years. In addition, worth of global e-learning business will reach total value of 50 billion US dollars. This creates business possibilities both for the organization with training needs and the system providers. Drive for this research was originated from the need to identify those factors that has an effect towards e-learning attitudes and acceptance of Finnish labor. Aim of this study was to provide structural model, based on the existing theories, which helps to evaluate the impact of employees' background and system environment towards user acceptance.

## **Methodology and data collection**

Research data was collected by using Webropol survey software and survey was sent via email to 406 recipients. Survey yielded overall 115 responses, which were used to test created hypotheses. Hypotheses were based on existing theories but also fitted to the e-learning context. Structural equation modeling (SEM) was used to evaluate measurement model, which was followed by final path model. After constructs, validity, reliability and model fit were evaluated (SPSS Amos 22) final model was tested with suggested thresholds and good fit values. It can be concluded, that validity and reliability meet the suggested satisfactory rate.

## **Results**

The results of this research indicates that perceived usefulness, in terms of e-learning participation, is one of the most important factors when attitudes toward system usage is under evaluation. System usability (perceived ease of use) has also strong influence on the employee feeling of increasing job output. Previous theories suggest that usage background plays an important role in technology acceptance. In addition, role of perceived usefulness and system usability depends on the level of voluntariness. One identified limitation of this study was the lack of voluntariness distribution. Great majority of respondents answered that their e-learning participation was and will be voluntary.

**Keywords:** e-learning, technology acceptance, attitude, self-efficacy, perceived usefulness, perceived ease of use, system usability, voluntariness, structural equation modeling, path analysis

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# **1. INTRODUCTION**

E-learning acceptance, in the context of this study, refers to user acceptance and attitude towards e-learning. Potential user of e-learning technology faces nowadays multiple possibilities to learn via different e-learning channels. Organizations and institutions have become more international during past decades and that has given its own input for empowering learning and training opportunities regardless of time and place. The purpose of this paper is to understand the factors that influence user acceptance of e-learning among Finnish labor. Strong understanding of e-learning acceptance requires review of few key theories. Technology acceptance, consumer attitudes, self-efficacy, and of course e-learning are in the centrum of this research. In this introduction chapter, the background of study, research gap and research problem will be introduced.

## **1.1 Background**

Nowadays, when technology and digital environments has become a part of youngsters' daily lifestyle, are out there still many peoples who refuse to accept technology and especially digital products and services. Technology and especially technology based products and services have increased their condition dramatically during the past decade. We all are somehow met with digital products, online self-services, or even in learning via network. In this paper the term called learning is focusing more on training and real course oriented learning instead of commonly researched learning methods among students in universities and other departments. Even though digital environments and technology has become a part of our lives, instead of extraordinary and special thing that helps only a few, there are still dozens of people who refuse to accept technology and digital goods.

Finnish labor has divided quite radically and 74 % of the whole Finnish labor use computer or other digital devices in their daily work. (*Tilastokeskus, 2012*) Digitalization's speed is so fast that we can assume that during past year this ratio has become even higher. That is the main reason why Finnish labor needs to be highly motivated and enthusiastic to acquire constantly new skills. Manufacturing and industrial environments are moving to cheaper foreign countries, mainly in Asia, and Finnish

environment become more specialized and information technology oriented knowledge society. These are reasons why Finnish labor needs to have high motivation to acquire new skills and maintain their value in labor markets. I can confidently say that almost everybody in Finnish business context needs or uses technology in their daily life but the real question is that how many has really accepted technology with internal and voluntary motives?

The focus of this study is in the current work force in Finland. It is obvious that majority of generation Z uses technology naturally and it doesn't even require any conscious thinking. Younger labor can focus on their core competences and they can specialize for certain areas. They don't have to learn digital methods because they are already familiar with it. Generation Z has a great advantage compared to those who have created careers just before the era of digitalization. So the main idea behind this study is that there are huge group of people who really needs technological skills and digital adaption but who feels themselves simply too uncomfortable without any relevant know-how in this field. Moreover employees are frequently facing the situation where they have to maintain their professional knowledge. Employers want workers whose knowledge and professional skills are updated to correspond to the changing business environment and this maintenance has been traditionally done using trainings.

Term e-learning is rather young and the majority of previous research concerning e-learning, its utilization rate, reason to prefer or refuse it etc. have mainly focused to the e-learning among students. The very first decade when e-learning was dealt was already in 1980 when the new ideas of "Distance learning" become public among the academic research (Bååth, 1982). e-learning has become a huge industry and it gives a wide range of opportunities for e-learning providers and on the other hand organizations that invest lot of capital to e-learning systems.

## **1.1 Research gap**

Technology acceptance and adoption of information technology is widely studied during the past decades. According to Legris et al. (2003) academic literature of technology acceptance has mostly



divided into the following six journals: MIS Quarterly, Decision Sciences, Management Sciences, Journal of Management Information Systems, Information Systems Research and Information and Management (Legris et al 2003). Technology acceptance has focused more to the human psychology and its roots are actually in the social psychology. Theory of Reasoned Action (TRA), which is a famous theory proposed by Martin Fishbein and Icek Ajzen, has given the guidelines to the very first version of Technology acceptance model (TAM). Technology acceptance has been studied in both fields, among consumers and on the other hand in the business context. For example Unified Theory of Acceptance and Use of Technology (UTAUT) focused on the employees acceptance on information technology while the UTAUT 2 was proposed to focus more on the acceptance and adoption among the consumers instead of employees (Venkatesh, Thong & Xu, 2012; Venkatesh, Morris & Davis, 2003).

In addition, e-learning is quite young context in academic environment and its previous research and literature focus mainly on the students' perspective. Effective e-learning experience, as well as successful learning in general, requires high level of motivation. Attitudes towards learning and consequence of increased knowledge are very important factor that gives the basics for adoption. e-learning and technology adoption has been connected in the past research but the recent studies often lack one important measure that is voluntariness. Brown et al. (2002) proposed very interesting and important suggestion, concerning the limitations of technology acceptance model, already in 2002. They focused on the effect of usage background. If the system usage was mandatory for user the perceived ease of use plays more important role than perceived usefulness. According to Davis (1989) and original technology acceptance model the perceived usefulness is more important in cases where system use is not mandatory. In the basic situation the system usability affects positively to perceived usefulness but usefulness has stronger effect towards intention.

E-learning acceptance has been mostly examined among students whose majority learns because of their own will. On the other words technology acceptance of students might differ a lot from the level of employees whose background and attitudes might face mandatory learning experience. Although previous studies have proposed many important viewpoints on the technology acceptance

and e-learning adoption its acceptance is not widely studied in Finnish business context. e-learning acceptance, background of e-learning adopters and characteristics of employees who refuse to adopt e-learning have not been studied during the past years in the Finnish corporate life. This study attempts to fulfill this gap by examining the factors that affects the e-learning acceptance among Finnish employees.

## **1.2 Research problem and objectives**

e-learning could be very cost effective and easy way to train and educate employees especially in organizations whose staff doesn't sit in the same office. Companies, who purchase trainings or e-learning platforms, have to understand how do they and their employees benefit the most of the investments. Even more important it is for service providers whose core business is to train using e-learning environments or produce platforms that really meet the requirements of mainstream customers. Highest benefit is possible to reach only with understanding of user assumption and intention to use. From theoretical perspective, the purpose of this study is to understand the main theories and relations that affects peoples acceptance of e-learning. e-learning acceptance consists of technology acceptance, attitudes, and user learning behavior. This study provides viewpoint for the theories behind e-learning adoption and on the other hand research examining factors that affects on that adoption among Finnish labor. From the practical perspective, the main purpose is to help e-learning software and training developers understand the factors that really affects on the customer adoption. Understanding the factors that has an effect towards user resistance of technology usage would help software developers to focus on right issues. It is really important to understand the both sides of the coin. Those who adopt e-learning might have different kind of background and experience than those whose attitudes are negative towards e-learning or technology in general (Lapointe & Rivard, 2005). Thereby the primary and secondary research questions in my thesis are:

Primary research question is:

***What are the factors that affects e-learning acceptance among Finnish labor?***

Secondary research questions are:

- 1. What are the factors that influence the behavioral intention in e-learning acceptance?*
- 2. What is the role of voluntariness in the e-learning acceptance?*
- 3. What are the main factors that influence negatively on e-learning acceptance?*

### **1.3 Main contents**

E-learning, technology acceptance and discussion around attitudes provide the theoretical framework for my thesis and that is the main reason we go through them shortly before actual literature review.

#### *E-learning*

E-learning is at the central point in this study. The term e-learning means learning via digital devices like computers, tablets or even mobile phones. Most common way to learn in network is still with computer because many of trainings require still high quality visual support. e-learning has two different categories. First definition, which is broadly used, is that e-learning is learning using technical devices and network. Other definition for e-learning has usually been that e-learning is learning with digital devices but it doesn't matter if it has been done using Internet or not (Hung, 2012).

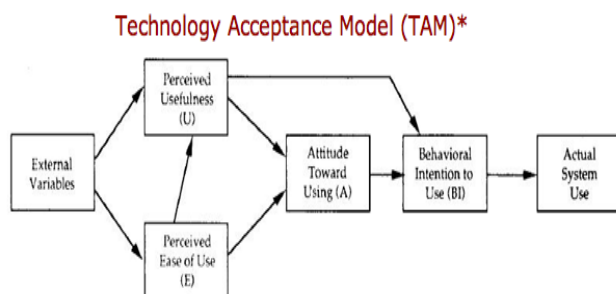
e-learning has been also minded as distance learning, what it also is, but the term e-learning is still more than just distance learning. Nowadays e-learning environments have become even more interactive and in many platforms customers can take a part to the training session for example with questions, experiences or even with their own opinions. Theory of e-learning is mainly discussed in the field of education instead of commercial use. The main difference between distance learning and e-learning terms is that distance learning is wider context where learners, who are in this case employees, learning experiment are not dependable about the actions of the head of the course. In other words distance-learning courses are mainly non-interactive learning methods where the power

of learning is fully controlled by learner himself. Michael Moore discussed long time ago about the autonomy and non- autonomy dimensions in learning process. This autonomy aspect is still valid because of the lack of interactions in many distance-learning platforms (Moore, 1972).

### *Technology acceptance*

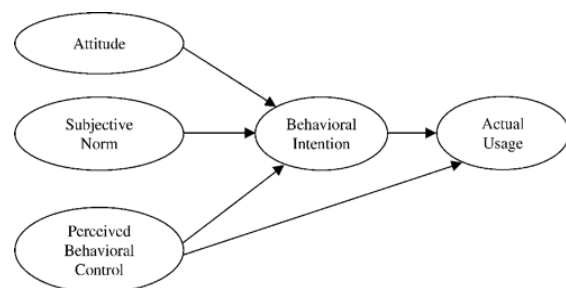
Technology acceptance in contextual level means the consumer adoption of technology and which characteristics have an effect towards accepting it. Technology acceptance has been traditionally consisted of two different parts that have been perceived usefulness and perceived ease of use. These two attributes have created consumer's behavioral intention, which has led to the use behavior. So technology acceptance deals closely with consumer behavior and consumer psychology. Discussion around technology acceptance includes usually information about famous theories that were proposed by Martin Fishbein and Icek Ajzen few decades ago. Theory of reasoned action (TRA) and Theory of Planned behavior (TPB) are proposed the basics for the original technology acceptance model. Theory of Reasoned Action (Fishbein & Ajzen, 1975) has been seen as early version of current technology acceptance discussion. Technology acceptance model that was created by Davis and Bagozzi (1989) is the very first extension of TRA. This is important to understand because TRA and TPB can be counted as key elements of technology acceptance discussion. As you can see in the following images, both models have similar factors affecting to the actual system usage. Figures 1 and 2 present the development of the first actual technology acceptance focused model. Both models will be presented later on this study.

**Figure 1. Technology acceptance model**



Source: vvenkatesh.com/

**Figure 2. Theory of planned behavior**



Source: Icek Ajzen (1981, 1985 & 2002)

Attitude creates the base for successful learning process and that fact can be seen as well in the Figures 1 and 2. Both theoretical models include attitude as an important factor that affects on the behavioral intention. In addition, behavioral intention is an important factor on the effective e-learning experience. Attitudes have been widely explored in the field of human psychology and couple famous researchers on this field are Fishbein and Ajzen who have proposed TRA and TPB. There are three levels of factors that affect learning success and experiment. Those factors are affective factors, cognitive factors and behavioral factors. More about attitudes will be discussed in the next chapter. Literature review goes through the most important theories and literature areas that are relevant for this study.

## **2. LITERATURE REVIEW**

Liaw, Huang and Chen (2006) described effective eLearning experience requirements, and the main idea was that behavioral intention is the most important factor when studying human e-learning experience. This fact emerges from the previous literature of basic learning theories. Furthermore, behavioral intention becomes from the two main factors that are, perceived usefulness and self-efficacy. Perceived usefulness is very common term in technology acceptance model that was created by Davis, Bagozzi and Warshaw in 1989 (Liaw, Huang & Chen, 2007; Bagozzi, Davis & Warshaw, 1989). So the link between these main contents in this study is that e-learning consist of few main parts, which are understanding of user technology acceptance, motivation which leads to self-efficacy and on the other hand individuals motivation, which becomes from the self-efficacy, leads to the higher behavioral intention to use it. According to Liaw's point of view consumer attitudes towards technology and its usage in learning can be separated in three main categories, which are affective factors, cognitive factors and behavioral factors. These main parts create the 'Three tier use model' (3-TUM) (Liaw, 2007), which explains the attitude towards learning methods (Chen & Huang, 2012). Even further, Ajzen and Fishbein (1975) created theory of reasoned action (TRA) that is very well known framework for the consumer behavior. It has very good predictions about consumer intentions and behavior. Consumer attitudes and decision-making process includes parts from original theory of reasoned action. Of course there are dozens of extensions and

modifications from the original theory of reasoned action by Ajzen and Fishbein, but I think it is still simple and relevant way to describe consumer behavior in level of action. The study of Ajzen and Fishbein was based on the previous studies concerning attitudes and they led Fishbein and Ajzen to study attitude and behavior (Ajzen & Fishbein, 1975).

## **2.1 Attitudes & self-efficacy**

This chapter concentrates on the attitudes and the human self-efficacy. Both are very widely studied areas and both relates closely with the main target of this paper. Attitudes and self-efficacy are important factors when discussing about technology adoption and human learning process. Firstly the focus will be in the general level of attitude research and the second goal is to clarify the relation between attitudes and successful learning experience.

### **2.1.1 Attitudes in general**

Human attitudes and attitude formulation are very interesting areas of human psychology. Attitude and its effect on one's behavior is one key component of consumer decision-making process. It is well known fact that without positive attitude learning process is very hard to succeed well. Attitude is one of the key elements here in my thesis as well. Attitude and human behavior takes its place in almost every theory that measures and examines consumer or human behavior (Ajzen & Fishbein, 1980). For example technology acceptance model has also impact from target person's attitude towards technology. Learning is probably one of the most common examples concerning the attitudes on some new actions or perceived new information. In many workplaces the resistance to change and learn new skills is sometimes a big problem. Employee's resistance to adopt new methods or tools can be very hard and it usually leads to, at least in some level, conflicts inside the organization. Management and especially leadership in the situation, where whole organization needs to adopt new processes or even new software or other application to help their core work, are crucial. Good leaders can affect their colleague's attitudes towards change. I will present here some key theories and discussions concerning attitudes and its behavioral effects.

Martin Fishbein, who is known also from the TRA, has also background with attitude research. Studies of Ajzen and Fishbein are focusing to the attitude formulation on the wider context (Ajzen & Fishbein, 2005). Bas Verplanken is also one person who has created many interesting studies that are related quite nearly with attitudes. Verplanken has examined human habits and their relation with behavior. Habits are human actions that can be seen as opponent of planned behavior. Planned behavior is strong behavioral force in behavior but habits can jump over planned actions (Verplanken, van Knippenberg & Moonen, 1998). Academic literature about behavioral intention goes quite far together with other main theories in this research area. Behavioral intention has been studied quite a lot by Paschal Sheeran who concentrates mainly to social psychology and health psychology. Discussion in intention behavior has a strong link with attitudes. Sheeran has been active with including TRA and TPB into his studies. He has focused to review and extend the previous researches based on the original theories. (Sheeran & Orbell, 1999; Sheeran & Taylor, 1999)

### **2.1.2 Attitudes and learning**

Because this study is based on the e-learning acceptance it is reasonable to overlook attitudes from the perspective of learning process. What is then the real relation between attitude and successful learning process? That is a very important factor on this study because technology acceptance can be thought as a learning extension too. Technology acceptance model included the attitude factor, and its effect towards behavioral intention was proved already in the first TAM. Learning success on the technological systems has an effect towards adoption of technology. If organizations want to yield better rates of acceptance among their employees, it is necessary to realize the relationship between learning experience and attitude towards learning. Fishbein and Ajzen (1975) proposed that the intention to perform required or given behavior will be the result of the relationship between behavior, attitudes and subjective norm. Required behavior can be described, in this context, as successful learning where one feels that the actual benefit will be higher than expected. If one participates the learning or training situation, we can assume that the given and required behavior would be the success in the learning process.

### 2.1.3 The self-efficacy model

Self-efficacy plays an important role in terms of technology acceptance, theories of planned behavior and reasoned action but on the other hand it is an important determinant of learning and especially success in the learning environment. The purpose of this part is to clear more about the background of academic literature concerning the efficacy and the basic idea of Banduras famous self-efficacy model.

The self-efficacy is very important factor in learning as well. Self-efficacy was proposed of the Albert Bandura and he is one still one of the most influencing researchers in the field of consumer psychology. Theory of self-efficacy was based on the idea that the psychological and behavioral changes can be developed and measured through the other mean than just the accomplishments of consumer who is under examination (Bandura, 1977). Banduras article was purposed to explain the other issues that has an effect towards human self-efficacy and perceived behavioral intentions. Learning is very good example concerning the self-efficacy in different contexts. Furthermore the basics of self-efficacy model by Bandura (1977) were that the expected consequences of certain actions affect the behavior quite dramatically. Baron et al. (1969) studied the effect of reinforcement towards efficacy formulation (Baron, Kaufman & Stauber, 1969). Albert Bandura, in his study of self-efficacy model, took into consideration the possibility that the sequences are, more likely, affecting even more than the reinforcements towards human behavior development. This argument is based on the notifications of Estes (1972) that the human behavior doesn't increase in the situation where reinforcements has been positively attached towards some certain behavior but the human has believes that the reward is not available if this actions will be recreated in future. In other words human believes about the possible consequences are more powerful towards wanted action than positive reinforcements (Estes, 1972).

According to Bandura (1977), an efficacy expectation is the concept of human belief that one can accomplish the expected behavior, which the expected outcome requires. This is the main idea of consequence based thinking in terms of self-efficacy. The basic difference between the efficacy expectation and outcome expectations is that efficacy expectations are related to the personality and



behavior when the outcome expectations are based on the link of outcome and outcome oriented behavior. Efficacy is very important factor in human learning and that is the one reason why I take this Bandura's famous theory under consideration. There are huge amount of academic discussion around Banduras model, so I will focus on my thesis this basic model and its comparison with other common context, which is controllability. More discussion about comparison between efficacy and controllability will be a bit later on this section.

One important thing to discuss is the Bandura's efficacy expectations (Bandura, 1977). These expectations describe the main information sources that the expectation of one's personal efficacy is usually based. These expectations are, performance accomplishments, vicarious experience, verbal persuasion and emotional arousal. Success, in general, increases these mentioned expectations, which creates the basics for the efficacy formulation.

#### *Performance accomplishments*

Performance accomplishments include the human previous accomplishments, which tend to increase the level of self-efficacy. In terms of my thesis, this is very important factor. My study will concentrate on the e-learning acceptance and personal characteristics. One assumption could be that the previous experience and personal accomplishments towards technology increases the level of acceptance of adapting e-learning and technology in general. One previous example is the study of Bandura et al. in 1975 concerning the personal capabilities to solve certain problems and the level self-efficacy (Bandura, Jeffrey & Gajdos, 1975). Attitude is very important factor towards technology acceptance (e-learning acceptance in this paper) and furthermore self-efficacy is an important thing related to the high motivation towards learning.

#### *Vicarious experience*

Vicarious experience is based on the social comparison between person himself and peoples who belong to the similar reference group. The idea behind this experimental evaluation is, that if other peoples can reach the goal using some level of resources and effort I can reach the same goal with

the same efforts. Social learning has a great input towards this model because peoples tend to observe others actions and performance (Bandura & Barab, 1973).

### *Verbal persuasion*

Verbal persuasion can be easily described by citing Albert Bandura. According to Bandura: *“In attempts to influence human behavior, verbal persuasion is widely used because of its ease and ready availability. People are led, through suggestion, into believing they can cope successfully with what has overwhelmed them in the past. Efficacy expectations included in this manner are also likely to be weaker than those arising from one’s own accomplishments because they do not provide an authentic experiential base for them”* (Bandura, 1977 s. 198).

### *Emotional arousal*

Emotional arousal is the last expectation that was presented by Bandura. Human behavior is also dependent, in some level, about the emotions and arousal in the situations where one needs to accomplish and succeed. Studies have shown that the high arousal level usually indicates the performance and succession. Peoples are more likely to wait the success when their arousal is high compared to the situation where the fear or low level of arousal takes place. Emotional arousal usually exists in the situations where people faces high stress or uncommon situation from where they don’t have any further experiences or expectations. (Bandura, 1977)

Then why these expectations are important for understanding the process of technology acceptance by average user? e-learning includes high amount of technology and in terms of technology acceptance the attitudes and efficacy is really important factor. The intention is to maximize the acceptance level of technology and e-learning environments because digital revolution has come to stay.

## **2.2 Technology acceptance**

Technology acceptance, that is the key concept of this study, provides a huge amount of academic literature. This chapter concentrates on the technology acceptance model 3 (TAM3) and Unified Theory of Acceptance and Use of Technology (UTAUT). Earlier versions of technology acceptance will be also presented but the focus is these extensions. Before we go to the technology acceptance part I will go through the basics of TRA and TPB.

### **2.2.1 TRA & TPB**

Theory of reasoned action (TRA) and theory of planned behavior (TPB) are very well-known human psychology theories. Both concentrate on the human actions and both are presented by Icek Ajzen. Ajzen was behind both concepts but with theory of reasoned action he got help from the famous psychologist Martin Fishbein. Both, Ajzen and Fishbein, are human social psychology pioneers who have also worked among attitudes and many other issues related to human psychologies and behavior. Discussion in this research area is usually concentrating on the extended targets instead of extending theories themselves.

However, it might be the best to explain the importance of these theories towards e-learning acceptance and technology adoption by consumers. Next section will explain more the relation between e-learning, technology acceptance and these two psychological contexts.

*Why TRA & TPB are important for this study?*

Theory of reasoned action (TRA) and theory of planned behavior (TPB) concentrate on the human behavior and TRA has been key model in the evolution of original technology acceptance model. Behavioral intention, which is one of the most important terms in this study, is consequence of subjective norm. Subjective norm is, on the other hand, important and direct determinant in theory of reasoned action and its extension theory of planned behavior. Technology acceptance model 2

has a major input from the TRA and TPB in terms of role of subjective norm. Intention to use which is the step before human usage behavior, is consequence of perceived usefulness that user faces through subjective norm, job relevance, output quality etc. but also under the influence of subjective norm directly. Furthermore the subjective norm is based on the theory of planned behavior and that is the main link between the planned behavior of Ajzen and technology acceptance models by Venkatesh et al. (Venkatesh & Davis, 2000)

Even stronger relation between these models exists in the discussion between the influence of perceived usefulness (TAM) and user intention (TPB). Subjective norm, which is one determinant in TRA and TPB, is one key element of user intention. User intention, on the other hand, leads to the higher level of technology acceptance. So according to these links between technology acceptance model and its various extensions and TRA & TPB we can close this part and confirm the importance of theory of reasoned action and theory of planned behavior in terms of understanding the technology acceptance and its extensions. (Venkatesh, 2000)

### *Development of models*

Martin Fishbein and Icek Ajzen created TRA in 1975 and Ajzen presented the TPB to the public ten years later in 1985. Theory of planned behavior is an extension of theory of reasoned action and it includes the perceived behavioral control in its form (Fishbein & Ajzen, 1975). These theories were developed to predict the intention in terms of consumer adaption. Theory of planned behavior was created mostly because TRA didn't count the perceived behavioral control that was founded very useful aspect in terms of predicting consumer behavior. Perceived behavioral control includes two major determinants, which were efficacy and facilitating conditions. The self-efficacy, which is the other important aspect in the perceived behavioral control, is the one famous theory by Albert Bandura (1977). Bandura examined and created theoretical framework for the human self-efficacy and its effects towards human behavior and success (Bandura, 1977). I don't now concentrate more on this efficacy because next chapter is totally owned for this context. Anyway efficacy is one part, which differs between original TRA and its extension TPB (Taylor & Todd, 1995). The other player in the perceived behavioral control is facilitating conditions, which importance towards perceived

behavioral control was suggested by Harry Triandis (Triandis, 1994). According to the Taylor and Todd both TRA and TPB have noticed that the behavior is a direct function of behavioral intention. Behavioral intention is, like Fishbein and Ajzen has proved, the major determinant of the final behavior. Both models (TRA & TPB) have the same structure in terms of attitudes and subjective norms (Fishbein & Ajzen, 1975; Ajzen, 1985) but the main difference is that the perceived behavioral control was added to the TPB because of the critics towards TRA. Lack of perceived behavioral control (PBC) was noticed by Sheppard et al. (1988) and the main reason why Ajzen reconsidered that attribute was that Ajzen et al. found the positive relation between perceived behavioral control and behavioral intention. It is obvious that the PBC was very important part of TPB because its effect towards behavior and behavioral intention was proved (Ajzen & Madden, 1986). The most important aspect that many studies has proved after theory of planned behavior is that the relationship between perceived behavioral control and intention has been proved many times. This is very important thing in my thesis as well because the intention is one of the key elements in the technology acceptance framework. Behavioral intention leads to the behavior in terms of technology acceptance. (Venkatesh, Thong & Xu, 2012)

### *Content of TRA and TPB*

TRA was firstly meant to predict consumer intentions and behavior and, on the other hand, its capability to explain the changes in the human behavior. Theory of reasoned action is highly appreciated context in the field of social psychology and it has been base for many further theoretical frameworks. Theory of reasoned action consist two major parts that has an effect toward consumer intentions. The core idea is that the intentions have the impact on the behavior. Furthermore the intention of certain consumer is result of two determinants, which are attitudes and subjective norm (Fishbein & Ajzen 1975; Chang, 1998). Both of these attributes are also included into the theory of planned behavior, but I will take TPB under consideration after discussion of TRA. Theory of reasoned action assumes, in generally, that human being is rational and its actions can be predicted by theoretical framework that contains attitudes and subjective norms. The idea behind the rational consumer becomes from the other viewpoint that consumers are making rational decisions because of the systematic processing of available information (Chang, 1998). According to existing literature and theory of reasoned action itself, we can conclude the basics of TRA by

saying that it is based on the assumption that consumers act rationally and use all the available data in terms of behavior and decision-making. According to Madden et al 1992 (Madden, Ellen & Ajzen, 1992). TRA also expect that the behavior of consumer is under full control. There are couple terms that are necessary to open before going to the differences between TRA and TPB. Attitudes and subjective norm are playing an important role in both frameworks. Other component in TRA was subjective norm. Normative believes and motivation to comply is base of subjective norm. (Ajzen & Fishbein, 1980).

Previous section dealt with the difference between these two models, which was perceived behavioral control (PBC). The idea behind the perceived behavioral control in the TPB is that if behavior is not under full volitional control, like TRA assumed, people under examination needs to have requisite resources and opportunities to perform the behavior one really aims to (Chang, 1998). According to Madden, Ellen and Ajzen (1992) TPB is more predictive than TRA.

Harry Triandis studied facilitating conditions and its effect towards consumer behavior in 1979. He found that there is need for specific resources to be available when one would be engaged by certain behavior. Human might need several different kinds of resources like handling the time limits, money and other kinds of resources to find the right behavioral performance. (Triandis, 1979; Taylor & Todd, 1994)

#### *Critics towards TRA & TPB*

It is widely acknowledged that both theories have high validity in the predicting consumer intention in simple situations where full volitional control is expected. Moreover it is well recognized that the theory of planned behavior is consequence from proposed limitations in TRA. Still the main discussion between supporters and critics focus mostly on the linkages between different attributes inside both theories. For example subjective norm has been proved to influence attitudes etc. and that relation has not been taken under consideration in TRA or TPB. Second important aspect, concerning the critics, is the notice that every time when there are effect of ones knowledge, skills or

other personal attributes, the models no longer face the predictability and affectivity (Sheppard, Hartwick & Warshaw, 1988). There are many extensions or suggestions in the academic literature, which has tried to take this kind of relations under consideration. Next part of this chapter will concentrate on one really important part of the TPB and TRA. The self-efficacy of Albert Bandura was one important attribute in perceived behavioral control and that is why I open it a little bit deeper in the next part. If we take a little bit back, the perceived behavioral control was the main and only difference between TRA and TPB so I can trustworthily say that the importance of self-efficacy concerning this study is remarkable.

Next concept presents one of the main contexts in my thesis. Technology acceptance plays an important role in this study because it gives the basic framework and structure concerning the understandability of the e-learning acceptance as well. Technology acceptance has been studied from the many perspectives and e-learning has been also one of the key areas in terms of technology acceptance. There are, at the moment, four major extensions of the original technology acceptance model. I will shortly present all of them in the end of this chapter. Lets start of the background of models.

### **2.2.2 Background of technology acceptance**

Routes of the technology acceptance literature becomes from the human psychology. The discussion of the human acceptance concerning the technology started because of the needs to understand the system usage. The basic idea was to examine and understand the computer and different system user's satisfaction towards particular systems. According to Bailey and Pearson (1983) technology related satisfaction was one part of the wider context of human satisfaction. That was the main reason why human psychologist adopted technology acceptance and started to examine technology usage and user acceptance in the deeper level. This was very important for the academic field, because the content of the satisfaction formulation. Satisfaction was not only consequence of certain attributes but sum of the many different factors, including personal and environmental assets (Bailey & Pearson, 1983). According to the article of Legris, Ingham and Collarette the original list of factors that has an effect towards user satisfaction, included 39 identified attributes (Legris, Ingham

& Collarette, 2003). The list of variables was couple years later divided into the three practical groups by the nature of controllability. Cheney, Mann and Amoroso divided variables in 1986. They studied and identified levels of these factors were uncontrollable variables, partially controllable and fully controllable variables. Furthermore, few years later Davis created the original technology acceptance model. Davis proposed in 1989 the model to explain why peoples accept or do not accept technology (Davis, 1989). It is very important to remember that the technology acceptance model was based on the theory of reasoned action. Fishbein and Ajzen proposed TRA to predict the human behavior. In addition the main target of the original technology acceptance model was, according to Legris et al, *“to provide a basis for tracing the impact of external variables on internal beliefs, attitudes, and intentions. It suggest that perceived ease of use (PEOU), and perceived usefulness (PU) are the two most important factors in explaining system use”* (Legris, Ingham & Collarette, 2003 p. 192). In the time of original TAM (1989) the information technology and system usage in organizations started to develop but there was a lack of understanding the success of implementing and adopting new systems. In 1989 the information technology was mostly in the tool of organizations and its main focus was to increase the productivity of an individuals job outputs.

### **2.2.3 Perceived usefulness & perceived ease of use**

Davis identified that there are two main beliefs that has an effect on the system acceptance. Those beliefs were perceived usefulness and perceived ease of use. Perceived usefulness and perceived ease of use created the structure of model, and the result of both attributes was the level of attitude towards using system. In addition the idea behind the perceived usefulness and perceived ease of use was the prediction of the system characteristics and attitudes toward using. It was necessary to identify the system requirements so the acceptance of user was maximized. The background of this ideology was the large investments to the information systems. The return of investment was poor if the acceptance of employees remains in the basic or low level. Employees needed to be motivated form the internal means and that was the part of user attitudes towards using.



### *Perceived ease of use*

Perceived ease of use has a significant effect on perceived usefulness. It means basically the usability of one particular information system. Davis proposed clear example about ease of use and its effects. If we expect that we have two systems with exactly the same functions the one which is easier to use is much more useful from the perspective of end user. Again, the more useful system is much more effective is the job of an employee. Furthermore, the attitude of the user is related on the perceived usefulness, which has direct input from the system usability (perceived ease of use). In addition the user intention and attitude are the key elements of the user acceptance (Davis, 1989)

### *Perceived usefulness*

Perceived usefulness is defined as the belief of system end user and especially how user see the system help to achieve the highest job output level. Perceived usefulness is, of course, the basic element in the user motivation and attitude formulation. Studies propose that perceived usefulness does not have any impact on the perceived ease of use. On the other hand the high usability level increased the level of perceived usefulness. This is obvious thing, because perceived ease of use relates more the actual system but the perceived usefulness more the input and output of the usage. (Davis, 1989; Davis, 1993)

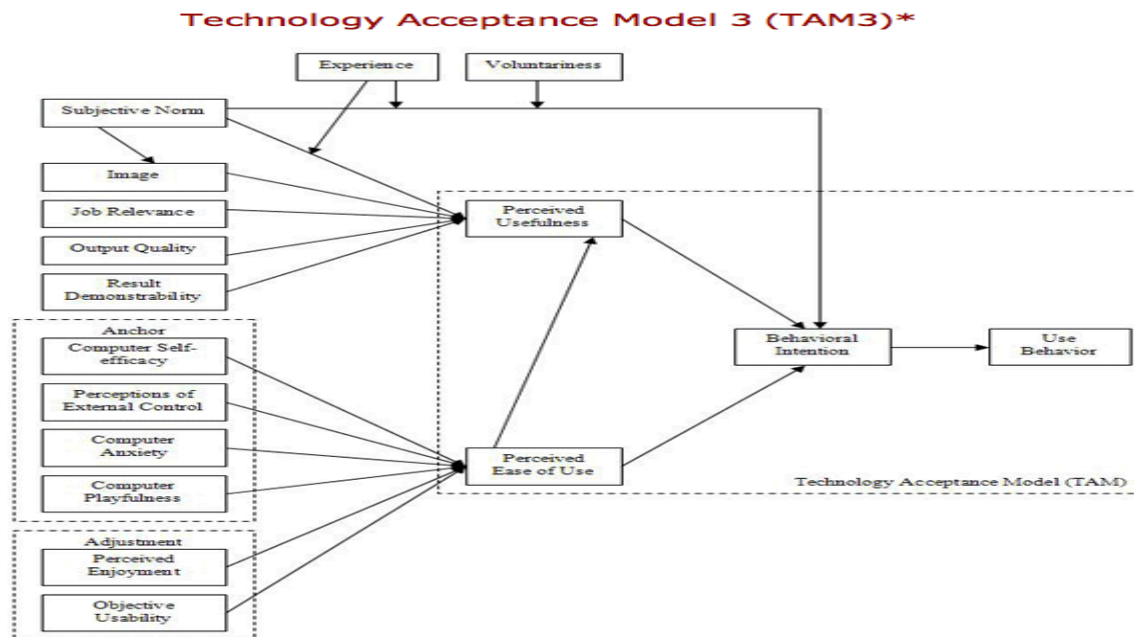
#### **2.2.4 TAM 3 & UTAUT**

Academic discussion and literature concerning the technology acceptance has taken place mainly in the journals of information sciences. Information- and managerial sciences dealing with information technology have been the drivers of discussion and research of this field. According to Legris et al. (2003) the TAM and information technology acceptance discussion have been published mainly in the following six journals: MIS Quarterly, Decision Sciences, Management Sciences, Journal of Management Information Systems, Information Systems Research and Information and Management (Legris et al. 2003). This is actually very interesting issue and also important concerning the structure of the past research field. Decision sciences are highly focusing on the human psychology and behavior while information systems research takes place more technical

perspective. Anyway the academic discussion has focused strongly to the content of acceptance variables. Content of existing models have developed fast and constantly proposed demographic data and on the other hand amount of external conditions has increased very fast.

Original TAM doesn't count any user characteristics into consideration. Original TAM was dominating model from the 1989, when Davis et al proposed it in the first time, until the year 2000 when Davis developed the original TAM with Visvanath Venkatesh, who have been the key person in the field of technology and user acceptance since TAM 2. Technology acceptance model extension, TAM 2, opened effect of perceived usefulness. TAM 2 divided the perceived usefulness into five different factors. Those factors were subjective norm, image, job relevance, output quality and result demonstrability. Martin Fishbein and Icek Ajzen proposed subjective norm already in the 1975 when their famous TRA (theory of reasoned action) was presented. Vehkatesh and Davis moderated the level of perceived usefulness in terms of subjective norm by voluntariness and experience. They noticed that experience and voluntariness has an impact on the subjective norm and its affect towards perceived usefulness.

**Figure 3. Technology acceptance model 3 – TAM 3**



Source: Venkatesh, V. and Bala, H. "TAM 3: Advancing the Technology Acceptance Model with a Focus on Interventions," Manuscript in-preparation. Website: [http://www.vvenkatesh.com/it/organizations/theoretical\\_models.asp](http://www.vvenkatesh.com/it/organizations/theoretical_models.asp)

Visvanath Venkatesh and Bala developed technology acceptance model 3. Their aim was to explain the content of perceived ease of use. High-level usability in the system usage has increasing affect towards perceived usefulness as well, so it is crucial to see behind the layer in this case. (Venkatesh & Bala, 2000)

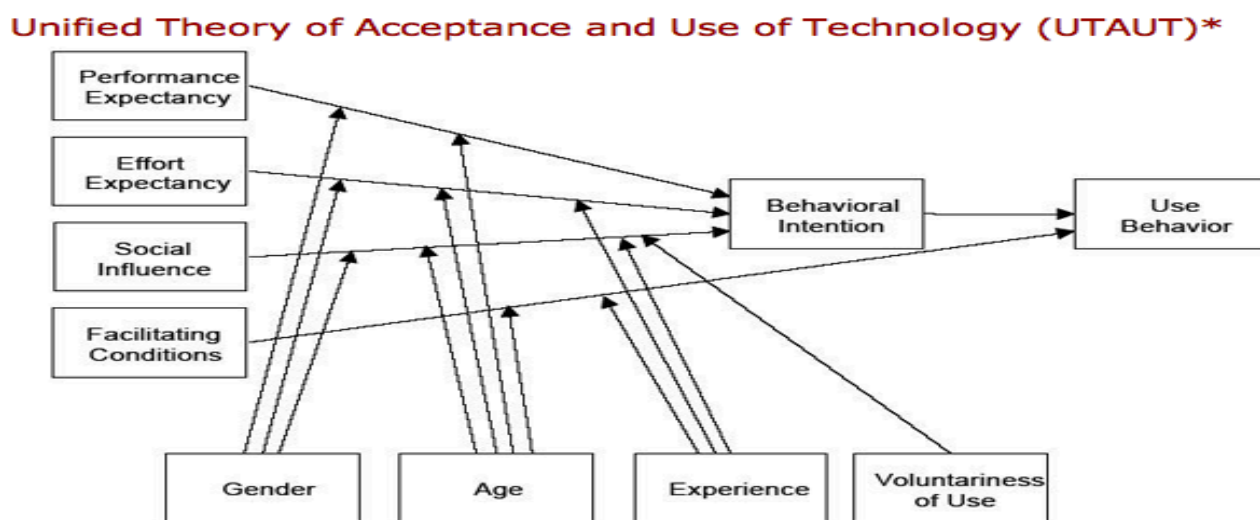
After TAM 2 Venkatesh was interested about the factors affecting perceived ease of use. Venkatesh identified two kinds of variables affecting the perceived ease of use in the system adoption. Venkatesh proposed Anchors and adjustments that have an effect on perceived ease of use. Content of those two groups was, according to the Figure 3, computer self-efficacy, perceptions of external control, computer anxiety and computer playfulness. According to Venkatesh, variables that were identified as anchors, were considered about general ideology and beliefs about information technology and device usage. On the other hand, variables in the adjustment side were identified as beliefs that have been shaped according to direct previous experience with particular system. (Chuttur, 2009)

### *Limitations*

Like every other theories TAM has created discussion about limitations of technology acceptance models. Mohammed Chuttur (2009) reviewed three types of limitations in TAM and extensions. First limitations concern with the methodology that is used when TAM was tested. According to Legris et al. (2003) the main problem in models is that self-reported results and data about system usage is not reliable measurement about the actual system use. Self reported user stories are subjective measures and it is not valid to measure the actual system usage (Legris et al. 2003). Second focus of criticism was on the limitations in the variables and relationships. Yang and Yoo proposed (2003) that user attitude should be taken into consideration when TAM extensions are under development. Their suggestion was that the attitude might have very important input in the system use. Yang and Yoo added two attitude variables, which were affective and cognitive. Affective and Cognitive attitudes got different kind of output towards system use. Yang and Yoo found that Affective attitude doesn't have any significant effect on predicting system use but on the other hand cognitive attitude had high statistical significance (Yang & Yoo, 2003). Brown et al.

proposed other very interesting and important suggestion in 2002. They focused on the effect of usage background. If the system usage was mandatory for user the perceived ease of use plays more important role than perceived usefulness. According to Brown et al. system usability is more important than usefulness. According to Davis (1989) and original technology acceptance model the perceived usefulness is more important in cases where system use is not mandatory. In the basic situation the system usability affects positively to perceived usefulness but usefulness has stronger effect towards intention. (Brown, Massey, Montoya-Weiss & Burkman, 2002) Discussion between mandatory system use and user voluntariness is also very important factor concerning this study. That issue must be considered in the data collection and analysis. There are also other suggestions about the limitations. For example Bagozzi proposed in 2007 that technology acceptance models don't face with realities in many situations. User intention might not be very good indicator in system use and user memory has also its own input in the user acceptance. After TAM 3 Venkatesh et al started to develop their next major extension, that changes the nature of information technology and user acceptance. (Venkatesh, Morris, Davis, & Davis, 2003)

**Figure 4. Unified theory of Acceptance and Use of Technology – UTAUT**



Source: Venkatesh, V., Morris, M.G., Davis, F.D., and Davis, G.B. "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly*, 27, 2003, 425-478. Website: [http://www.vvenkatesh.com/it/organizations/theoretical\\_models.asp](http://www.vvenkatesh.com/it/organizations/theoretical_models.asp)

Focus of technology acceptance models (TAM, TAM 2 & TAM 3) was on the perceived usefulness and perceived ease of use. Unified theory of acceptance and use of technology (UTAUT) was proposed in 2003 and its purpose was to define one unified model according to eight previous models in the field of acceptance, user behavior, motivation etc. UTAUT explains basically the user intentions to use application or information technology system. It has four key constructs. Those constructs are, according to Figure 4, performance expectancy, effort expectancy, social influence and facilitating conditions. UTAUT is basically proposed according to elements of eight previous models. According to article of Venkatesh et al (2003) the core determinants of UTAUT was created by using four determinants of intention and usage and four moderators of relationships. According to Figure 4 moderating relationships were gender, age, experience and voluntariness of use. (Venkatesh, Morris, Davis, & Davis, 2003)

UTAUT has also its own extension that has been proposed in 2012 by Venkatesh, James Thong and Xin Xu. Compared to the original UTAUT, which was proposed by Venkatesh et al. (2003) to focus on employees acceptance of information technology and systems, this extension UTAUT 2 was proposed to focus more on the acceptance among the consumers rather than employees in the professional environments. UTAUT 2 was created to explain the key constructs and relations of basic UTAUT in the consumer context, and the elements have been modified to face the nature of consumer technology usage.

### *Criticism towards UTAUT*

Critics toward UTAUT have been also proposed. Richard Bagozzi, who was other person behind original technology acceptance model, proposed criticism in 2007 concerning the UTAUT and its extensions. Bagozzi stated that it has at least 8 independent variables predicting user behavior and 41 variables predicting user intentions. UTAUT has brought its own spoon in the mess according Bagozzi and the entire study of information technology adoption is going to the way where chaos would be the right term to explain it.

Furthermore, Van Raaji and J. Schepers (2008) have proposed the second viewpoint of criticism toward unified theory. They called the UTAUT as less parsimonious than TAM and TAM2 because in UTAUT the high coefficient of variation was reached only by moderating the key elements with four variables presented in UTAUT. (Van Raaji & Schepers, 2008)

## **2.3 E-learning**

I have now gone through the basic theories and models that might have an effect towards e-learning acceptance from the perspective of Finnish employee. Next and final area is learning and especially e-learning, which has developed dramatically during the past decade. Universities and education institutes around the world have put lot of effort towards distance and e-learning environments. In addition current business environment has extended a lot and traditional geographical regions and boundaries have crashed because of digitalization and development of communication channels. Anyway it is important to understand the basics of learning theories. That is why I will next review some key theories and basics of human learning principles.

### **2.3.1 Overview of learning theories**

Academic field has huge amount of different kinds of theories and models. The most well known paradigms are probably behaviorism, constructivism, cognitivist and humanism. All of these paradigms include multiple theories and models so it is impossible to go them all through in very detailed level in one study. I will now present shortly the paradigms and content of each of them. In addition academic field has multiple other theories instead of the following paradigms. Anyway the first paradigm is behaviorism.

#### *Behaviorist theories*

Behaviorism is one approach to human psychology. The main purpose of behaviorism is to push psychology to concern the real behavior that is observable and measurable instead of some unobservable actions and events that takes place on the human mind (Skinner, 1984). One of the

most famous behaviorist researchers was Ivan Pavlov, who proposed the famous classical conditioning. So in other words classical conditioning as well as operant conditioning is behavioral theory. Pavlov was not actually the spokesman of traditional behaviorism but he still focused and proposed the famous conditioning study. After classical conditioning by Ivan Pavlov, Skinner proposed the idea of operant conditioning after Edward Thorndike's instrumental learning that can be described like Skinner's operant conditioning. Both are very famous models and conditionings have been implemented in consumer behavior, marketing, advertising as well as the dog training (Skinner, 1950). Great examples of conditioning sciences in business world are the organizations' actions to launch some need to customers' mind. Price changes are one of the most common examples. Changes in prices of certain goods causes result like conditioning among consumers. According to Domjan (2009) the elasticity of prices causes the strength of conditioning effect. (Domjan, 2009) So conditioning and operant conditioning are well known behaviorist theories. Behaviorism includes also one well-known social learning theory, which was developed by Albert Bandura in 1977. Social learning theory can be described as an extension of bobo doll experience that was proposed also by Bandura et al. (1961) and it examined the behavior of children and their behavioral adoption through observation and imitation. (Bandura, Ross & Ross, 1961)

### *Cognitivist theories*

Cognitivism, from the perspective of education and learning, propose that human generates knowledge through cognitive abilities. The mental process and cognitive abilities can be identified through recognition, recollection, analysis, reflection, application, creation, understanding and evaluation. These are the common ways to learn according to cognitivist theories. Cognitivism is identified in many contexts as philosophy of learning. That is why this part is very important to this study. Learning theories focus on different learning viewpoints but cognitivism focus straight to the human learning processes. Cognitivism focus to the human learning stages and it focus also on the human memory system. Memory is necessary in human learning process and cognitivism focus on the role of memory in the learning process. One of the most famous cognitivists is Jean Piaget whose cognitive development theory focused on the age and different levels of child who is under control. Piaget proposed the different levels of human characteristics and how do those characteristics affects on the level of human thinking. (Moreno & Mayer, 1999)

### *Constructivist theories*

Constructivism is also known as philosophy of education. Constructivism focus on the real life experiences and its core structure presents that education is based on the experimental learning. Constructivists describe effective learning as problem solving where innovations and challenges creates the structure of human learning process. According to Glaserfeld (1989) constructivism explains how human creates knowledge from the available information generated by his / her previous experiences. That kind of experimental knowledge is called as heuristic knowledge. Heuristic knowledge was developed from the cognitivist theories and it explains the learning as exploring the environment (Glaserfeld, 1989). According to constructivism, the learning environments should be created to support thinking of learner and the role of instructor or teacher is to motivate candidates to think and challenge themselves. There are also many extensions of constructivist theories for example cognitive constructivism and social constructivism. (Savery & Duffy, 1995)

### *Humanism*

Humanist approach towards learning believes that human learning can be seen as a personal act by learner to fulfill his / her own potential. Humanism concentrates mainly to human potential and freedom of individual. One basic assumption according to humanism is that individuals act with intentionality and according to their values. Humanism and behaviorism is two opposite approaches towards learning. One good example is behaviorist conditioning and humanism because operant conditioning believes that learning is consequence of certain action while humanist researchers believe that learning process should be seen as one whole entity with different aspects of human being. Humanist theories consider the human self, motivation, and target goals of individual as a part of learning process and human kind. Effect of high motivation is, on the other words, is proved according to humanist literature. Motivation towards learning is one key component of individual self and learning (Huitt, 2009). One of the most famous humanists is Abraham Maslow whose theory of human basic needs is very well known around the world. According to humanist approach, people can learn by observing what other people, for example colleagues, are doing. This is one good viewpoint that has to be considered in this study as well. If we think that human learn by observing and imitating other persons in the same situation, we need to consider how this need is



fulfilled in the situation where person try to learn through the e-learning channels where interaction and contact with co-learners might be much less than classroom learning environment. Anyway, humanist theories consider that understanding of human learning process requires the overview of the person as a whole. Humanist also concentrates on the interest and needs of human under observation. (De Carvalho, 1991)

### **2.3.2 Definition of e-learning**

e-learning means basically learning through different kinds of technologies and media. The use of electronic media is one key component in the e-learning and nowadays e-learning can be described as learning via various devices like computers, tablets, mobile, virtual environments, etc. There are multiple different ways to learn and at least as much different theories and models that describes learning from the different viewpoints. The current discussion identifies e-learning to include at least the following traditional e-learning methods: multimedia learning, technology- enhanced learning, computer- based instruction, computer- based training, computer assisted or computer – aided instruction, internet based training, web-based training, online education virtual education and digital education. All of these mentioned can be thought as e-learning. In other words, definition of e-learning means, in broader context, that it takes a lot of different kind of learning methods and opportunities under consideration. Many of the mentioned learning types, like computer-based trainings, are not usually interactive learning method where candidate can communicate with instructor. In many cases the interactivity in learning process is important factor for many persons and that must be considered when discussing about e-learning and other learning possibilities with using ICT technology. It is important to understand that e-learning can occur also in the classroom. Usually many persons divide human learning possibilities into two categories, which are distance learning (e-learning) and traditional classroom learning. One important question is, that do we even have other possibilities than e-learning? Even though organizations arrange trainings and education for employees and many of those trainings are still located into organization facilities the tools in the trainings are commonly computer, laptop or even tablet nowadays. The purpose of next couple chapters is to clarify and give more detailed viewpoint for e-learning and its basic principles. (Schweizer, 2004; Welsh, Wanberg, Brown & Simmering, 2003)

### 2.3.3 E-learning development

Heidi Schweizer proposed very good article concerning the relation between e-learning and business. In her article she mentioned about the power of e-learning among students. This is still valid viewpoint concerning the business environment as well because her examples focus mostly to the relation and communication between instructor and learner. Schweizer reviewed article of Garrison and Shale that was published already in 1987 and focused on the advantages and interactions of e-learning (Schweizer, 2004). According to Garrison and Schale (1987) the main criteria's towards distance education were, asynchronous communication between learners, two way communication between learner and teacher and finally the technology mediated communication. e-learning environments have made interactive learning sessions available and teacher and students can communicate real time together. Garrison and Schale provided their main criteria already many decades ago, when the level of information technology was far away from nowadays. Still their requirements towards efficient learning experience were quite close with current possibilities of ICT in training business. (Garrison & Schale, 1987) Current state of e-learning provides multiple opportunities and possibilities to organizations and international companies can arrange staff training across the borders without traveling costs and time consumption.

Academic discussion concerning e-learning has been hot topic during past decades. Information technology related education and distance trainings have been in the centrum of learning research. Meilun Shih, Jui Feng and Chin –Chung Tsai (2007) proposed review of e-learning research trends between years 2001 and 2005. Their study reviews very well the nature of e-learning research and discussion around e-learning methods. They proposed review of journals that have taken part to e-learning development and discussion. My focus will be on their findings concerning e-learning research categories and sub-categories. Shih et al. (2007) identified seven main categories from the academic literature that have mainly been under consideration between the years 2001 and 2005. Those categories gave quite good viewpoint about the content and identified factors in e-learning. Categories according to Shih et al. (2007) were motivation, information processing, instructional approaches, learning environment, prior knowledge metacognition and cognitive psychology characteristics. Highest frequency was in the learning environment and especially interactive learning environments. Attitudes, perception, awareness and collaborative learning had also high

frequencies in e-learning journals and articles. Technology and networks have developed radically after 2005 so the updated list of literature would be appropriate. I will review now the role of motivation Shih et al. founded in their review. Motivation plays an important role in the learning as well as in technology acceptance. (Shih, Feng & Tsai, 2007)

### *Motivation*

Motivation was the first category Shih et al identified. Motivation has been played also an important role in my thesis because it has an important effect towards technology acceptance and consumer behavior. Shih et al. found that academic literature concerning motivation in e-learning concentrates mainly to three sub- categories that were beliefs, attitudes, and behavioral change. Attitude plays an important role in technology acceptance models and in famous behavioral theories TPB and TRA by Fishbein and Ajzen. Motivation and its effect towards e-learning was studied by Tsai, Lin and Tsai in 2001. They focused on high school students in Taiwan and proposed descriptive statistical analysis of motivation in e-learning. (Tsai, Lin & Tsai, 2001) At the same time Shazia Mumtaz (2001) proposed study of motivation as well. Mumtaz focus on children's enjoyment and perceptions towards computer usage (Mumtaz, 2001). Third group of researchers, who focused on the motivation and metacognition in terms of e-learning, included Mezger, Flanagin and Zwarun. They concentrated on perceptions that were part of metacognition category (Mezger, Flanagin & Zwarun, 2003). According to Shih et al. (2007) the articles that have focused on motivation and metacognition explored usually fundamental variables that relates to e-learning user motivation and attitudes. Metacognition, on the other hand, was mainly studied because of the understanding and knowledge towards user metacognition status and it's consequences towards successful e-learning experience. (Shih et al. 2007)

#### **2.3.4 Future prospects & predicted trends**

e-learning environment is rapidly changing and constantly under development. Technology development allows e-learning providers to take new technologies and possibilities to the e-learning field. e-learning becomes more flexible and different devices enables learning experience that is not

fixed only to the computer desktop. This chapter reviews the insight to e-learning trends and future prospects that have been recognized by Pranjalee Thanekar (2013) whose knowledge about the technological possibilities in e-learning environments have been proposed in her blog of e-learning industrial trends. This chapter takes insight for the e-learning trends and the information is based on the e-learning industrial communities. In addition this part takes more practical approach to this subject. I will provide few predicted trends that might have impact also to the e-learning acceptance among Finnish employees.

### *Tablets and mobile environments*

During the last few years the amount of tablet devices has increased rapidly. Tablets are sold not only for consumers but also to the enterprises. Companies and employees are requiring easy and handheld devices that can be move with staff outside the office. Business related activities through tablets and mobile are increasing so the e-learning platforms for tablets and mobile devices will be highly demanded in the near future. Usability and responsiveness in tablet platforms might provide tremendous competitive advantage for e-learning service providers. Among Finnish labor this means also that the technology acceptance should include not only the factors towards e-learning itself but also the acceptance of mobile technology.

### *Learning “just in time”*

According to Thanekar (2013) learning will become more embedded to the daily work and its primary task in organizations will be the instant help for task execution. When learning is embedded with the work tasks it happens through the problem solving and the results might be more effective for both companies and employees. Thanekar proposed that the nature of e-learning would be different than nowadays. Employees will have fast and instant possibility to learn instead of having trainings out of office. (Thanekar, 2013)

### *Gaming as learning experience*

Games and applications as learning method has been hot topic in the discussion of youngsters and children's learning success. This viewpoint explores the factors behind the gaming popularity. Gaming could provide multiple possibilities for e-learning industry in the level of individuals but what is the real potential in the business context? This approach is not presented further in this study but there will be high demand for the future research of playing and games as e-learning method. If gaming would be well implemented, it might provide better outcomes from the e-learning investments. Furthermore the success rate in daily tasks would be higher according to the upgraded personnel satisfaction and professional knowledge.

### *Videos*

Social aspect of e-learning might provide user generated videos in the near future. Users could do their own learning videos and share them for their colleagues and other parties. Of course it must be kept in mind that when we are discussing e-learning from the organizational perspective possibilities for an individual are not the same than consumer in his / her spare time. Videos are very cost effective and after creation the affectivity becomes from the high volumes. According to Thanekar (2013) the power of videos becomes more visible when organization is international. Subtitles and texts can be easily changed to the videos so multi lingual companies can benefit and gain reduced costs because of this possibility. Videos might sound very weird future trend because those has been used in trainings and education in many decades. This insight of Thanekar (2013) proposes that the role of videos might become very dominating and e-learning platforms should take this possibility under consideration.

## **2.4 Conceptual framework**

Conceptual framework of this study was developed during the literature review. The model was adopted mostly from the famous technology acceptance model, where the attitude and behavioral intention played major role. In addition perceived usefulness and perceived ease of use has been identified as important and dominating factors explaining attitude and behavioral intention.

Furthermore, voluntariness and experience has been commonly used moderators with demographic factors like age and gender. These factors developed the conceptual model, which will be presented next.

### *Perceived ease of use (PEOU)*

According to TAM (Davis & Bagozzi, 1989) perceived usefulness and perceived ease of use had an influence towards user attitude. Perceived ease of use has also direct influence on attitude and behavioral intention in technology acceptance model but it was also one factor behind perceived usefulness. High usability of system was proposed to effect positively on perceived usefulness. It is hypothesized in this study that:

**H1: Perceived ease of use is positively related to attitude towards perceived usefulness.**

### *Perceived usefulness (PU)*

Davis and Bagozzi (1989) proposed in their technology acceptance model that perceived usefulness and perceived ease of use was major factors that have an influence towards user attitude. This study focused on the e-learning acceptance among Finnish labor so the perceived job output plays an important role in the acceptance of e-learning systems. Davis proposed perceived usefulness as belief of end user and especially how user sees the possible job output with and without using system. Previous studies propose that perceived usefulness does not have any effect towards perceived ease of use so it is hypothesized in this paper that:

**H2: Perceived usefulness is positively related to attitude toward e-learning systems**

### *Voluntariness (VOL)*

Brown et al. (2002) proposed very interesting suggestion in their study that focused on the usage background. They found correlation between voluntariness and TAM factors that affected on the attitude in model of Davis and Bagozzi (1989). If system usage was mandatory the role of perceived ease of use had more influence towards attitude and behavioral intention than perceived usefulness.

On the other hand if usage was voluntariness and idea of usage came from the user then perceived usefulness played more important role than ease of use. Thus, it is hypothesized that:

**H3: Voluntariness is positively related to user attitude**

User experience (EXP)

According to Bandura (1977) user experience affects positively towards self-efficacy. Bandura proposed different factors that have an effect toward one's self-confidence. Bandura proposed efficacy expectation and outcome expectations and relations of those factors. According to Bandura, it is obvious that experience of successful actions with technology affects positively on user's self efficacy. Thus, it is hypothesized in this construct that:

**H4: Experience of information technology is positively related to user's self-efficacy**

Self-efficacy (SE)

According to Liaw, Huang and Chen (2006) Self- efficacy is one of the most important factors affecting human e-learning acceptance. Self-efficacy (Bandura, 1977) plays an important role in e-learning acceptance, technology acceptance model (Davis & Bagozzi, 1989), theory of reasoned action (Ajzen & Fishbein, 1980) and theory of planned behavior (Ajzen, 1985). According to Bandura (1977), an efficacy expectation is the concept of human belief that one can accomplish the expected behavior, which the expected outcome requires. In addition, Self-efficacy has an effect toward human attitude of coming action. Thus, it is hypothesized here that:

**H5: User's self-efficacy is positively related to behavioral intention to use e-learning system**

*Attitude (AT)*

Original TAM, which was proposed by Davis and Bagozzi, provided model where attitude was the dominating factor towards behavioral intention. In addition the role of attitude was already noticed

in TPB and TRA (Fishbein & Ajzen, 1980; Ajzen, 1985) According to TRA, TPB and TAM it is hypothesized that:

**H6: Attitude is positively related to behavioral intention to use e-learning systems**

### *Behavioral intention (BI)*

Theory of reasoned action (TRA), its extensions Theory of planned behavior (TPB) and Technology acceptance model (TAM) proposed all that behavioral intention is the main factor explaining the actual usage of system user. In addition Liaw, Huang and Chen (2006) described effective eLearning experience requirements, and the main idea was that behavioral intention is the most important factor when studying human e-learning experience. This fact emerges from the previous literature of basic learning theories. Furthermore, behavioral intention becomes from the two main factors that are, perceived usefulness and self-efficacy. Perceived usefulness is very common term in technology acceptance model that was created by Davis, Bagozzi and Warshaw in 1989. According to Liaw et al. (2006) it is highly argued that Behavioral intention and Self-efficacy (Bandura, 1977) belongs to this research.

**H7: Behavioral intention is positively related to e-learning acceptance**

## **3. METHODOLOGY**

The main focus of this research was to test the proposed conceptual model empirically. Among the previous academic literature, there has been lot of papers that have widely studied the technology acceptance and user adoption of new technologies. In addition past e-learning research has mainly focused on the factors that have an influence towards user acceptance and learning outcomes. High amount of e-learning acceptance studies have provided during past decade but majority of those papers have focused on the e-learning among the students. Proposed conceptual model is based on the well-known studies like TRA (Ajzen & Fishbein, 1980), The Self- Efficacy model (Bandura, 1977), TPB (Ajzen, 1985), TAM (Davis & Bagozzi, 1989), TAM3 (Venkatesh & Bala, 2003),



UTAUT (Venkatesh et al. 2003). That is why the quantitative approach was chosen to examine the proposed relations that have been earlier identified in the field of academic research.

### **3.1 Data collection**

Research data was collected through web-based survey and the questions were mostly based on the previous studies that have focused on the technology adoption. Data was collected via Webropol surveys, which are web-based survey and reporting software. The survey was firstly sent to a sample of 406 individual respondents who has participated e-learning training during the past 12 months. All of the respondents belong to the Finnish labor and that was double checked by asking job position in the survey. 5.22 % of the respondents didn't identify their job position. In addition the sample itself was created from the list of people who have participated to Webropol e-learning trainings. Furthermore the Webropol trainings are for the business customers so it is well explained why the sample represents the labor. Sample included respondents from the whole age scale. Age scale was from the 19 to 65 year old respondents. Sample contains neither under 18 years nor over 65-year-old respondents.

The survey yielded 115 completed responses between 29.4.2014 and 10.5.2014 that represents the response rate of 28.3 %. According to Baruch and Holtom (2008) the average response rate for the individual surveys is 52.7 % that is a bit higher than this study yielded. In addition organizational surveys yielded on average 35.7 % of response ratio, which is quite close with this study (28.3%). (Baruch & Holtom, 2008) Sample size of 115 represents medium sized sample in SEM. According to Kline (2005) the sample size between 100 and 200 respondents allows analysis with structural equation modeling. Less than 100 respondents represent the small sample and it is recommended that sample exceed at least 100 respondents. (Kline, 2005) In addition Bagozzi and Youjae (2012) propose that researcher should prefer sample size over 200 but sample over 100 respondents is meaningful to exceed.

### *Demographic characteristics*

Respondents were identified by demographic characteristics according to gender, age and job position. Gender distribution was very poor in this study because of the small amount of male respondents (Male 22.1 %; Female 77.9 %). Two values were missing in gender data but that does not explain the poor distribution. Gender distribution was poor but age groups were represented well. Two biggest age groups among respondent were 42 – 49 year olds (26.9 %) and 50 – 57 year olds (25.2%). Respondents between 18 and 41 represents 43.5 % of the whole sample. Sample included only Finnish respondents. Third demographic factor was job position that yielded expected distribution. Approximately 10 percent represented top management (not included entrepreneurs) and one entrepreneur participated survey (0.9%). Biggest groups were employees (31%) and managerial employees (36%). Also 6 respondents out of 114 (5.2%) identified their position as “other”.

**Table 1. Demographic characteristics**

Demographic characteristic	Number of respondents	%
<b>Gender (n=113)</b>		
Male	25	22.1
Female	88	77.8
<b>Age (n=115)</b>		
0-18	0	0
19-25	15	13.0
26-33	20	17.4
34-41	15	13.0
42-49	31	26.9
50-57	29	25.2
58-65	5	4.3
+ 65	0	0
<b>Job description (n=114)</b>		
Top management	11	9.6
Officer (upper level)	41	35.9
Officer	35	30.7
Office clerk	20	17.5
Entrepreneur	1	0.9
Other	6	5.3

Each construct with the means and standard deviations are presented in Table 3. 7-point Likert scale was used to measure constructs in which 7 represents strongly agree and 1 strongly disagrees. Attitude and behavioral intention was generally very positive constructs among respondents with means of 5.51 (attitude) and 5.53 (behavioral intention). Experience of computers and applications was also positive with mean of 5.96. Voluntariness and perceived usefulness had also high means like was expected. According to Brown et al. (2002) high level of voluntariness affects positively to perceived usefulness where in turn low voluntariness decreases perceived usefulness but increases the importance of perceived ease of use.

**Table 2. Means & Standard deviations**

<b>Construct</b>	<b>Mean</b>	<b>Std. dev</b>
Behavioral intention	5.53	0.97
Attitude	5.51	1.03
Self-Efficacy	5.26	0.93
Perceived usefulness	5.42	1.02
Experience	5.97	0.92
Voluntariness	5.83	1.08
Perceived ease of use	5.09	0.99

### **3.2 Survey content**

Since the e-learning is still quite young term, and most peoples are not very experienced with e-learning applications, actual use of systems was difficult to examine widely. Expectation was that the respondents have, at least, a little experience about the e-learning application because of the nature of sample characteristics. All respondents were firstly informed about the content of survey and basic principles of e-learning applications were presented in invitation. Survey content was based on the existing theories, which have mostly predefined and common constructs. Theories used in this study created the base for the survey development. Conceptual framework defined the constructs and according to theories behind framework the questionnaires were made. Perceived

usefulness and perceived ease of use were adopted from technology acceptance model (Davis, 1989). Self-efficacy, that has also played an important role in technology acceptance as well as theory of planned behavior (Ajzen, 1985), was adopted from the well know research by Albert Bandura (1977). Attitude, behavioral intention and actual use have also general indicators, which have been widely used in previous studies. (Venkatesh, 2003) Core constructs were hypothetical and measured through indicators that were observed in questionnaires. Kline (2005) suggested that multiple indicators are needed to measure each core construct. Multiple indicators ensures the reliable scores and minimum of 3 indicators are commonly suggested (Bagozzi & Youjae 2012; Kline, 2005). Constructs were measured though 4 indicators except in voluntariness (5) and actual use (2). Some indicators were measured through reversed scale to ensure high quality data. Indicators, in which reversed scale was used, were changed afterwards to meet the common scale. Some indicators that have been adopted from existing studies were modified to fit the e-learning context.

## **4. ANALYSIS AND RESULTS**

This chapter evaluates the approach and methods used in data analysis. Structural equation modeling (SEM) was done with SPSS Amos 22.0 software and SPSS Statistics application was used to calculate means and standard deviations. Measurement model will be presented first with constructs and indicators. In addition the structural model evaluation and final model presentation will be presented after measurement model.

### **4.1 Measurement model evaluation**

Measurement evaluation was made by using approach suggested by Anderson and Gerbing (1988). First step was to measure the quality of indicators and constructs with item loadings. The purpose of this step was to measure convergent validity of model. Second phase was to calculate composite reliability (CR) and average variance extracted (AVE) from the output of factor analysis. Cronbach's alphas were evaluated before factor analysis to measure the internal consistency. Table 3 presents Cronbach's alphas of constructs used in measurement model.

**Table 3. Cronbach's Alphas**

<b>Construct</b>	<b>Cronbach's Alpha</b>	<b>Number of items</b>
PU	0.922	4
PEOU	0.840	4
SE	0.715	4
VOL	0.818	5
AT	0.898	4
BI	0.693	4
AU	0.364	2
EXP	0.735	4

Cronbach's alphas are mainly in range 0.7 – 0.9 that is good and provides information about high internal reliability in these constructs. Perceived usefulness reached alpha over 0.9, which was excellent value. Behavioral intention (0.693) reached acceptable level but actual use had low internal reliability, which was not acceptable. Actual use contains only two indicators, which might affect negatively to the Cronbach's value. (Bagozzi & Youjae, 2012; Cortina, 1993; Cronbach, 1951) After evaluating Cronbach's alphas, confirmatory factor analysis (CFA) was made with SPSS Amos. The main goal of analysis was to measure relation between observed variables (indicators) and latent variables (factors) in this model. CFA measures how well indicators, which were examined in questionnaire, represent the core constructs. According to Kline (2005) satisfactory level for factor loadings is greater than 0.6, which was not loaded in 7 indicators. Four indicators, out of those 7 (under 0.6) loaded between 0.5 and 0.6 but were not rejected because of the small gap to the satisfactory level. Three indicators loaded between 0.3 and 0.4 (SE3, SE4 & BI3) but were not rejected because of the small effect on the model quality. However majority of the loadings placed between 0.7 and 0.95 that is acceptable result in confirmatory factor analysis (Kline, 2005). In addition Bagozzi and Youjae (2012) suggest that even though standardized loadings of 0.7 or greater is ideal in CFA models, standardized loadings as low as 0.5 still could yield satisfactory level of model fit. (Bagozzi & Youjae, 2012)

**Table 4. Constructs, indicators, Composite reliability & Std. factor loadings**

<b>Construct, indicators &amp; Composite reliability</b>	<b>Std. factor loadings</b>	<b>Based on *</b>
<b>F1: Behavioral intention (Composite reliability = 0.789)</b>		
[BI1] Assuming I had possibility to participate eLearning training, I intend to participate	<b>0.906</b>	Venkatesh et al. 2003 *
[BI2] I plan to participate eLearning training during next few months	<b>0.653</b>	Venkatesh et al. 2003 *
[BI3] If I must participate training and my alternatives are basic classroom training and eLearning session, I intend to choose eLearning session	<b>0.334</b>	Venkatesh et al. 2003 *
[BI4] Given that I had possibility to participate eLearning training, I predict that I would participate	<b>0.821</b>	Venkatesh et al. 2003 *
<b>F2: Attitude (Composite reliability = 0.908)</b>		
[AT1] I have fun using the eLearning system	<b>0.740</b>	Davis et al. 1992
[AT2] Using the system is wise idea	<b>0.767</b>	Fishbein & Ajzen 1975
[AT3] I like the idea of using the eLearning system	<b>0.925</b>	Fishbein & Ajzen 1975
[AT4] Using the eLearning systems is pleasant	<b>0.929</b>	Davis et al. 1989
<b>F3: Self-Efficacy (Composite reliability = 0.725)</b>		
I could complete the job using a new software package...		
[SE1] ... if there was no one around to tell me what to do as I go	<b>0.836</b>	Venkatesh et al. 2003
[SE2] ... if I had just the built-in help facility for assistance	<b>0.955</b>	Venkatesh et al. 2003
[SE3] ... if someone showed me how to do it first	<b>0.307</b>	Venkatesh et al. 2003
[SE4] ... if I had used similar packages before this one to do the same job	<b>0.309</b>	Venkatesh et al. 2003
<b>F4: Perceived usefulness (Composite reliability = 0.922)</b>		
[PU1] eLearning trainings improves my performance in my job	<b>0.925</b>	Davis 1989
[PU2] eLearning trainings in my job increases my learning outcome	<b>0.861</b>	Davis et al. 1989 *
[PU3] eLearning trainings enhances my effectiveness in my job	<b>0.825</b>	Davis et al. 1989
[PU4] I find the eLearning trainings to be useful in my job	<b>0.845</b>	Davis et al. 1989
<b>F5: Experience (Composite reliability = 0.756)</b>		
[EXP1] I have experience on computers, tablets, smartphones etc. devices	<b>0.707</b>	Researcher
[EXP2] I have experience on eLearning applications	<b>0.580</b>	Researcher
[EXP3] I have experience on different kinds of softwares	<b>0.798</b>	Researcher
[EXP4] I have experience on social media	<b>0.546</b>	Researcher

**F6: Voluntariness (Composite reliability = 0.818)**

[VOL1] My participation in eLearning trainings is voluntary	<b>0.751</b>	Researcher
[VOL2] If i had possibility to participate eLearning training that is not compulsory i still participate very gladly	<b>0.763</b>	Researcher
[VOL3] My participation to eLearning trainings is voluntary	<b>0.815</b>	Researcher
[VOL4] My supervisor does not require me to participate eLearning trainings	<b>0.588</b>	Researcher
[VOL5] Although it might be helpful in my job, participation to eLearning training is not mandatory for me	<b>0.496</b>	Researcher

**F7: Perceived ease of use (Composite reliability = 0.856)**

[PEOU1] My interaction with eLearning system(s) is clear and understandable	<b>0.678</b>	Moore & Benbasat 1991
[PEOU2] Using eLearning systems does not require a lot of my mental effort	<b>0.690</b>	Moore & Benbasat 1991
[PEOU3] I find eLearning system(s) to be easy to use	<b>0.943</b>	Davis 1989
[PEOU4] I find it easy to get the system to do what I want it to do	<b>0.766</b>	Davis 1989

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\* Modified to fit e-learning context

After evaluating model with confirmatory factor analysis, where loadings and reliability was evaluated, Fornell and Larcker (1981) proposed that next actions would be evaluation of convergent validity, discriminant validity and average variance extracted (AVE) to investigate the reliability and validity of each measure. (Fornell & Larcker, 1981)

*Convergent & Discriminant validity*

Convergent validity and discriminant validity were evaluated with thresholds of composite reliability, average variance extracted (AVE) and maximum shared squared variance (MSV). According to Hair et al. (2010) average variance extracted should be greater than 0.5 and MSV. In addition composite reliability (CR) should be greater than AVE to reach satisfied rate of convergent validity. Kline (2005) suggest that threshold for CR, to reach satisfied reliability, is 0.7. CR range in this study falls between 0.725-0.922, which means, according to Kline (2005), that the reliability placed to the satisfactory range. Few concerns were founded in convergent and discriminant validity. AVE for voluntariness (0.480), self-efficacy (0.450) and experience (0.443) were below

threshold of 0.5. Discriminant validity concerns were also identified. AVE of behavioral intention and voluntariness were less than MSV that claims low convergent validity (Hair et al. 2010). Correlation matrix also show that square root of AVE was less than correlation with other value in case of behavioral intention, and voluntariness. Table 5 presents correlation matrix with AVE and AVE square roots. Table 6 presents values of maximum-shared squared variance (MSV).

**Table 5. Correlation matrix, Average variance extracted & AVE square root**

<b>Construct</b>	<b>AVE</b>	<b>BI</b>	<b>PEOU</b>	<b>VOL</b>	<b>SE</b>	<b>AT</b>	<b>EXP</b>	<b>PU</b>
<b>Behavioral Intention</b>	0,508	<b>0,713</b>						
<b>Perceived ease of use</b>	0,603	0,396	<b>0,776</b>					
<b>Voluntariness</b>	<b>0,480</b>	0,747	0,399	<b>0,693</b>				
<b>Self-Efficacy</b>	<b>0,450</b>	0,314	0,553	0,396	<b>0,671</b>			
<b>Attitude</b>	0,714	0,662	0,647	0,654	0,442	<b>0,845</b>		
<b>Experience</b>	<b>0,443</b>	0,225	0,256	0,238	0,528	0,323	<b>0,665</b>	
<b>Perceived usefulness</b>	0,748	0,597	0,478	0,485	0,233	0,697	0,255	<b>0,865</b>

**Table 6. MSV**

<b>Construct</b>	<b>MSV</b>
<b>Behavioral Intention</b>	0,558
<b>Perceived ease of use</b>	0,419
<b>Voluntariness</b>	0,558
<b>Self-Efficacy</b>	0,306
<b>Attitude</b>	0,486
<b>Experience</b>	0,279
<b>Perceived usefulness</b>	0,486



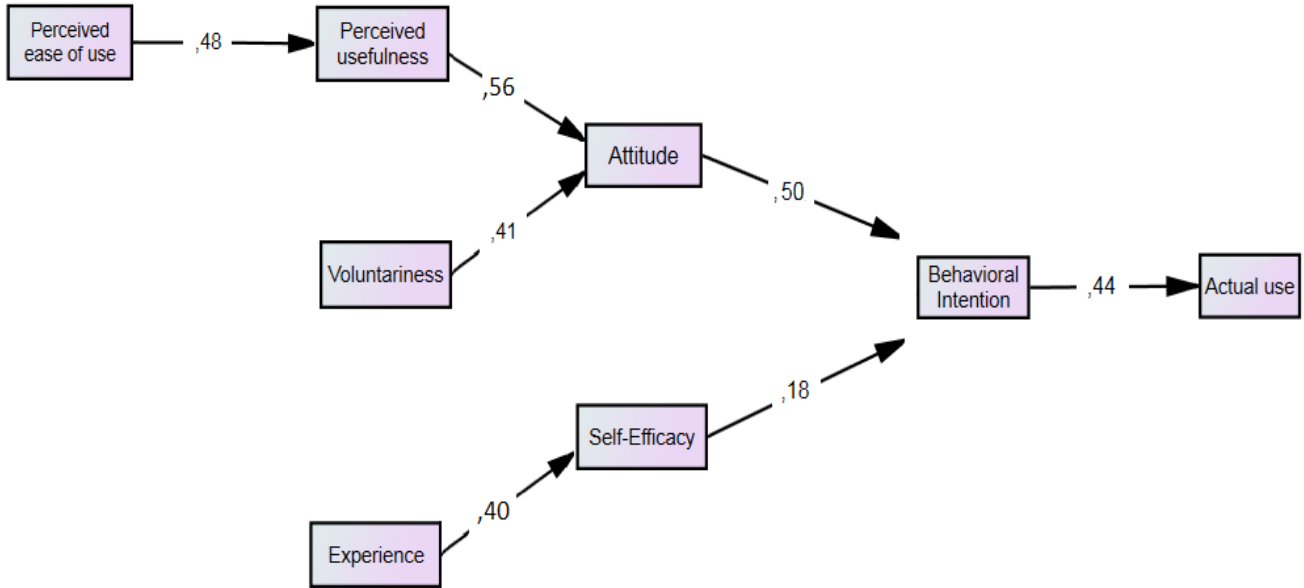
### *Model fit*

Kline (2005) suggested several model fit measures that were evaluated after validity. Comparative fit index (0.84) and normed fit index (0.723) didn't reach the suggested value of 0.9 (Kline, 2005). Reasonable error of approximation (RMSEA) for measurement model was 0.089, which is greater than satisfactory range 0.05 -0.08. RMSEA value, in this study, explains model fit that does not reach the target level suggested by Kline (2005). Chi-square / Df was 1.9, which stayed below the maximum value of 3. (Chi-square = 677.402 Degree of freedom = 356). Measurement model reached suggested level of reliability and validity except few described concerns of convergent and discriminant validity. Model fit could have been better with higher RMSEA value. Next part provides structural model and hypothesis evaluation. Structural model was defined after confirmatory factor analysis and SPSS Amos was used to calculate standardized estimates and p-values.

## **4.2 Testing the structural model**

SEM was used to evaluate hypothesis and proposed conceptual framework. SPSS Amos was used to measure factors and regression weights in proposed conceptual model. Purpose of SEM was to create understanding of the most important factors that has an effect towards e-learning acceptance. Hypotheses were evaluated with p-values (significant < 0.01) and influences in path analysis were evaluated with standardized regression weights. Both values are presented in Table 7. Same measurements (Kline, 2005) were used to evaluate validity and reliability in path analysis. Comparative fit index (CFI) and normed fit index (NFI) does not reached suggested value of 0.9 proposed by Kline with values of 0.705 (CFI) and 0.673 (NFI). Kline (2005). RMSEA with 90 % confidence 0.155 was really poor with structural model when appropriate level of RMSEA should remain between 0.05 and 0.08. (Kline, 2005). Final model was created after several evaluations with different paths. Conceptual framework and theory (Davis & Bagozzi, 1989) proposed that perceived ease of use would be one construct with direct effect towards attitude. Perceived ease of use has an effect on attitude but with higher estimate towards perceived usefulness. That is the main reason why PEOU affects directly on PU in final model but not directly on attitude. More discussion about findings will be proposed on the next chapter.

**Figure 5. Final model**



**Table 7. Testing structural model & Hypothesis**

Path	Standardized estimates	p-value	Hypothesis
PEOU → PU	0.48	< 0.01	H1: Supported
PU → AT	0.56	< 0.01	H2: Supported
VOL → AT	0.41	< 0.01	H3: Supported
EXP → SE	0.40	< 0.01	H4: Supported
SE → BI	0.18	< 0.05	H5: Supported
AT → BI	0.50	< 0.01	H6: Supported
BI → AU	0.44	< 0.01	H7: Supported

### 4.3 Results

Findings prove that previous literature and research, like technology acceptance models and theory of planned behavior, supports e-learning acceptance and adoption in business context. Attitude and self-efficacy had major effect towards behavioral intention, which on its behalf had direct effect towards actual use of technology. (Davis & Bagozzi, 1989; Ajzen, 1985) Hypotheses 5 and 6 were supported with significance of  $< 0.01$  and  $< 0.05$  (self- efficacy) attitude with strong loading (0.50) when standardized estimate of self-efficacy remains in 0.18. Original technology acceptance model by Davis and Bagozzi (1989) proposed that attitude toward using and perceived usefulness had both direct effect on behavioral intention to use system. Final model did not support original TAM with role of perceived usefulness. Perceived usefulness did not have significant direct effect on behavioral intention in this study. On the other hand H2 was supported while perceived usefulness had the strongest loading towards attitude with loading of 0.56.

Brown et al. (2002) proposed that voluntariness plays an important role when one is evaluating role of perceived usefulness and perceived ease of use in technology acceptance models. They suggested that voluntariness must be taken into consideration in technology adoption. Brown et al. (2002) proposed that high level of voluntariness raise the role of perceived usefulness and low level of voluntariness increase the role of perceived ease of use. In the situation where system usage is voluntary, perceived usefulness had highest impact on attitude. On the other hand mandatory system usage decreases the role of PU but increased direct effect of PEOU towards attitude. In this sample amount of respondents, whose e-learning system usage was mandatory, was low compared to the voluntary users so comparison between mandatory and voluntary use was not meaningful. On the other hand model proved that perceived usefulness had very strong effect towards attitude when perceived ease of use has stronger loading towards perceived usefulness than attitude. In addition level of voluntariness among sample was very high. This model supports the ideology of Brown et al. (2002) where voluntariness had an important role. Thus, H3 was supported with loading of 0.41.

In hypothesis 1, perceived usefulness and perceived ease of use was proposed to affect user attitude. Thus, H1 was supported partially because perceived ease of use didn't have strong direct effect towards attitude. Other part, which states that perceived ease of use has direct effect towards perceived usefulness, was still supported with strong loading (0.48) and  $p < 0.01$ . Existing literature proposed stronger direct relation between perceived ease of use and attitude but level of voluntariness might be one reason for result.

Experience and self-efficacy was one interesting issue. Presumption was, of course, that higher level of experience affects positively on self-efficacy. According to Bandura et al. (1975) performance accomplishments were one key factor explaining the self-efficacy. They suggested that experience of solving problems would have an indirect effect towards attitude because of the strong positive value towards self-efficacy. Another key factor in self-efficacy research is vicarious experience suggested by Bandura and Barab (1973). Vicarious experience was not directly measured in this study but it could have been very interesting issue in this research. Social influence was not measured either in this paper and it is also proposed that it has strong effect towards attitude of system adoption. Venkatesh et al. (2003) proposed the strong role of social influence towards behavioral intention. On the other hand they suggested that personal experience correlates strongly with social influence. In this study experience was firstly proposed to load with behavioral intention and attitude but because of the low rate of standardized loadings compared to the self-efficacy the final model was proposed as it was proposed in structural model. Anyway H4 was also supported with strong standardized loading of 0.40.

Actual use of system got poor factor loadings in measurement model. One reason might be small amount of indicators measuring actual use of system. Actual e-learning system use was measured through two indicators, which is less than suggested minimum of three (Bagozzi & Youjae 2012; Kline, 2005). In addition employees in many organization might not be able to join e-learning trainings even though they would be very eager about taking part. Sample contained many respondents whose behavioral intention towards e-learning system usage was highly positive while actual system use reached only moderate or low values. This could be very interesting future research possibility.

To wrap results chapter, moderate level of empirical evidence was found for the hypothesis proposed in conceptual model. Existing literature of technology acceptance and e-learning platforms suggested most of evaluated hypothesis. Actual system usage was one factor that didn't faced with recommended level of internal reliability. Future research possibility could be studying relations between e-learning acceptance and respondent's age and gender. Results of this study suggest that perceived usefulness and perceived ease of use are critical constructs when discussions focus on e-learning system acceptance. Davis and Bagozzi suggest both constructs already in 1989 and both are still two of the most important constructs among Finnish employees. Results also prove the fact that attitude plays an important role in e-learning acceptance. Attitudes are very widely studied during the past decades and Fishbein and Ajzen suggested already in 1975 that the person's intention to perform well is the result of behavior, attitudes and subjective norm. Finally, citing Yang and Yoo can summarize results part: "*It's all about attitude*" (Yang & Yoo, 2004 p. 19).

## **5. CONCLUSIONS**

### **5.1 Discussion**

The purpose of this study was to study e-learning acceptance in Finnish business environment and find out reasons and consequences of certain factors. Main interest was to provide conceptual model that can be used to evaluate organizations and e-learning platform provider's possibilities and threats. e-learning acceptance and intention to adopt e-learning technology is very widely studied around the world but great majority of papers have focused to e-learning among students. e-learning platforms have been an important part of higher-level education but e-learning acceptance in business context has been without any additional focus in academic field. In addition, study was meant to propose answers to research questions defined in the introduction chapter.

In TAM 3 Venkatesh and Bala proposed that Self-efficacy was one factor that explained perceived ease of use. This view differs from the theory of planned behavior that was proposed by Ajzen (1985). Ajzen suggested that self-efficacy affects directly to perceived behavioral control, which on

the other hand, influence directly to behavioral intention. In addition, Liaw et al. (2006) proposed that self-efficacy is the most important factor that explains the eLearning acceptance. The results of this study show that the role of self-efficacy in e-learning context is not very strong compared to the previous literature. Figure 5 show that the loading between self-efficacy and behavioral intention was the weakest of the factors in the final model (0.18). In addition loading between self-efficacy and user attitude was not even significance. This result was a bit surprising. The presumption, according to the existing literature, was that the self-efficacy would have been the most explaining factor in terms of technology acceptance.

The most interesting issues in the final model were the roles of perceived usefulness and perceived ease of use. Focus of e-learning literature has changed to learning environments, which had highest frequency in study proposed by Shih et al. (2007). They identified main categories that have been under research between 2001 and 2005 and e-learning environments was the most studied category. This study proved that perceived ease of use, which is major factor in terms of system quality, has positive effect towards perceived usefulness. According to TAM, TAM 3 and UTAUT, perceived ease of use explain directly users attitude and indirectly perceived usefulness. Final model propose that the role of perceived ease of use is to explain perceived usefulness. This can be explained with the high rate of voluntariness among the respondents. Brown et al. (2002) suggest that background of system use has higher role than is earlier expected. When the system use is voluntary, then the role of perceived ease of use decrease and correlation with perceived usefulness increase. On the other hand, when system use is mandatory, perceived ease of use affects directly to user attitude towards adoption. In this study the rate of voluntariness was high so it can be concluded that theory of Brown et al. (2002) is still valid. Final model differs from the previous theories because perceived ease of use was not proposed to affect directly to user attitude. Academic literature suggests that negative attitude towards system use and low level of voluntariness goes together. (Brown et al, 2002; Venkatesh et al, 2003) This study did not fully proved this theory but it propose that perceived usefulness affects positively on attitude which, on its behalf, has an effect towards behavioral intention.

Shih et al. (2007) proposed that motivation in e-learning literature concentrates mainly on three categories, one of them being attitudes. Attitude had very strong loading (0.50) towards behavioral intention in structural model. User attitude and behavioral intention were evaluated according to original technology acceptance model and theory of planned behavior. Final model suggest that attitude toward using system affects strongly to the behavioral intention. In addition behavioral intention explain strongly the actual use of system. These results confirm that the technology acceptance model fit to the e-learning environment in terms of user attitude and behavioral intention.

Berge (2002) proposed reasons why distance trainings might not be fully accepted in corporate organizations. He proposed that the role of organization played an important role in individual level. If the capability of distance trainings was not at high-level employees usually recognized different kinds of barriers in trainings. Internal motivation, which rises up from the organization itself, seems to be very important factor nowadays as well. Employee attitude can be depending on the organizational actions and motivation like Berge proposed in 2002. This study suggested that attitude is the most important individual factor towards behavioral intention. That is why organizations must consider carefully their actions to motivate staff to e-learning trainings. Voluntariness was one key element according to Brown et al. (2002) in technology acceptance. This study partially proved their suggestion that high voluntariness increases the affectivity of perceived usefulness. In this study majority of respondents answered that the e-learning participation and system usage was voluntary. Only few told that participation is mandatory. According to Venkatesh et al. (2003) voluntariness moderates the social influence. In this study, voluntariness was evaluated as one of the key factors key factors. Direct relation between voluntariness and user attitude was proved with high loading (0.41). This doesn't count of the possible relation between voluntariness and other factors but those were not investigated in this study.

Technology acceptance model 3 had the highest influence towards this study. Most of the identified factors were adopted from the TAM 3. Furthermore, questionnaire was meant to follow TAM 3 as far as possible. Technology acceptance model 3 and UTAUT suggest that user experience and voluntariness moderate the subjective norm. In this study, voluntariness is proposed to affect

directly on the user attitude and experience affects to user self-efficacy. Both are important in final model and it is suggested that previous literature is valid in e-learning environments.

To summarize this study, introduced research had multiple different theoretical constructs that were studied firstly in theoretical point of view. Then measurement model and structural model were created according to previous studies. Two-step approach was used to evaluate constructs and measurement approach, suggested by Anderson and Gerbing (1988), was used to evaluate confirmatory factor analysis and structural model. In addition, all of the final hypotheses were supported. Thus, final model was accepted. Final model is an adaption of technology acceptance model fitted in to the Finnish business environment. This study highlighted importance of usability as one key construct in one's attitude toward system use. If system providers want to have competitive advantage now and future they should really concentrate on the user-friendly application interface.

## **5.2 Managerial implications**

Managerial implications are presented here from two different perspectives. Firstly, couple suggestions will be aimed to organizations with distance training possibilities. Secondly, implications will be proposed to e-learning system providers. The results indicate that voluntariness is one of the main factors with perceived usefulness, which on the other hand, affects positively to user attitude. Organizations should focus to the right content of trainings. If employees feel that participation will not increase their job output the attitude and voluntariness to participate is not good enough to reach satisfactory rate of organizational knowledge development. When organizations are investing to e-learning courses and platforms, they should really consider the system quality from usability point of view. Perceived ease of use was one of the key constructs when structural model were measured. If system usability is not good enough user's perceived usefulness can be harmed. System usability means, usually, higher satisfactory level among end users and in addition higher revenues to the system provider. Perceived ease of use is obviously important factor for both sides and software designers should constantly test system usability with real end users.



Thanekar (2013) proposed that the main trends would be tablets and mobile environment, learning just in time and gaming as learning experience. If we compare these trends and this study we can find relations between measured factors and future trends proposed by Thanekar. Perceived ease of use and perceived usefulness creates basics to mobile applications and platforms. Usability point of view system providers must carefully consider technological issues like responsiveness, WCAG standards (Web content accessibility guidelines) and basic usability of application. This study highlighted importance of usability as one key construct in one's attitude toward system use. If system providers want to have competitive advantage now and future they should really concentrate on the user-friendly application interface. Learning just in time, as future e-learning trend, has a strong relation with perceived usefulness as well.

### **5.3 Limitations and recommended future research**

Limitations of this research must be taken into account during the research quality evaluation. Some validity concerns must be taken into consideration. Sample was gathered from the participants of one company's customer list so users experience of e-learning platforms might focus on that particular application. Other concern is the demographic distribution of respondents. Females cover almost full sample with 77.8 percent gender distribution. Thus, gender distribution is really poor and didn't enable any kind of gender comparison. Structural model did not take into account any kinds of demographic characteristics. Thus, valuable future research possibility would be to evaluate e-learning acceptance from the perspective of personal characteristics. In addition model fit can be questioned. Some key values, like RMSEA, remains too high. According to Kline (2005) and Bagozzi and Yi (2012) good level for RMSEA in confirmatory factor analysis is 0.06 and 0.08 is satisfactory. In this study the RMSEA value was 0.089, which was above suggested satisfactory level. Some limitations, which have already been identified by Legris et al. (2003) exists in this study as well. They proposed that that the self-reported results about system usage are subjective measures and are not valid to measure the model. Data in this study was gathered via email survey and respondents answered questionnaire by themselves. This study proved few well-known theories constructs to fit in Finnish business context. Anyway, future research should concentrate on the demographic characteristics of e-learning technology adopters and e-learning objectors.

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## APPENDIXES

### Appendix 1. Measurement model

