



## The roles of intrinsic motivators and extrinsic motivators in promoting e-learning in the workplace: A case from South Korea

Sun Joo Yoo<sup>\*</sup>, Seung-hyun Han, Wenhao Huang

Human Resource Development, Department of Education Policy, Organization, and Leadership, University of Illinois at Urbana Champaign, USA

### ARTICLE INFO

#### Article history:

Available online 26 January 2012

#### Keywords:

Unified Theory of Acceptance and Use of Technology (UTAUT)  
Extrinsic motivation  
Intrinsic motivation  
E-learning  
Acceptance

### ABSTRACT

Acceptance of e-learning by employees is critical to the successful implementation of e-learning in the workplace. To explain why employees might accept the e-learning technology, motivational factors must be considered. Although the Unified Theory of Acceptance and Use of Technology (UTAUT) has identified many variables to understand employees' motivation to use e-learning, current literature cannot conclude the roles of extrinsic and intrinsic motivators in the technology adoption process. Consequently, organizations often overestimate the effects of extrinsic motivators in promoting e-learning while ignoring employees' intrinsic motivation. To examine the effect difference between the two motivational factors, this study surveyed 261 employees in a food service company in South Korea with the UTAUT instrument. Upon analyzing 226 valid cases with LISREL, the findings revealed that intrinsic motivators (effort expectancy, attitudes, and anxiety) affected employees' intention to use e-learning in the workplace more strongly than did the extrinsic motivators (performance expectancy, social influence, and facilitating conditions). Furthermore, the effects of intrinsic motivators mediated the effect of extrinsic motivators. Implications of this study are important for both researchers and practitioners.

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### 1. Introduction

Technology is a viable tool to make it possible to create, save, and share information for future use in the workplace. Nowadays, organizations cannot survive and grow without significant support from technology (Rosenberg, 2006). According to the American Society of Training and Development (ASTD), the portion of technology-based training in the workplace approached 36.5% of employee training in 2009, which is the largest volume since the ASTD began to collect data in 1996 and the upward trajectory is strong (ASTD, 2010). The collective use of technology-based training across organizations has been identified as "e-learning", which can be designed, developed, and delivered via computer- and Internet-based applications (Clark & Mayer, 2008; Horton, 2006).

The continuous development of information and communication technology has enabled e-learning to become a new form of employee's training in the workplace (Rosenberg, 2006). E-learning provides employees with a different opportunity to learn regardless of where they are and when they are available. In e-learning employees are able to participate in self-paced and interactive

learning that is otherwise impossible. The learner-centered approach further makes e-learning a powerful training tool for employees as well as one that influences them to change their learning behaviors within their work environments (Bandura, 2002). Such changes in the training contexts of organizations have highlighted the need for understanding and incorporating employee's acceptance on e-learning in order to facilitate the e-learning implementation processes.

Researchers began to identify factors that influence individuals' acceptance on information technology since the beginning of the personal computer era (e.g., Davis, 1989). The consensus is that intrinsic and extrinsic motivations are two critical factors to encourage employees to adopt information technology (Davis, Bagozzi, & Warshaw, 1992; Venkatesh, 1999). Intrinsic motivation reflects the natural human propensity to learn and assimilate. Extrinsic motivation, on the other hand, varies considerably in its characteristics and thus can either reflect external control or influence self-regulation (Bandura, 2002). Considering the complexity involved in understanding how employees might adopt new information technology, Venkatesh, Morris, Davis, and Davis (2003) proposed the Unified Theory of Acceptance and Use of Technology (UTAUT) to expand the explanation on technology acceptance with multiple social, psychological, and technical constructs.

The UTAUT presents a robust conceptual framework to explain the relationship between the aforementioned constructs and user's intention to adopt information technology (Pynoo et al., 2011;

<sup>\*</sup> Corresponding author. Address: Human Resource Development, Department of Education Policy, Organization, and Leadership, University of Illinois at Urbana Champaign, 351 Education Building, 1310 S. 6th Street, Champaign, IL 61820, USA. Tel.: +1 217 333 0807; fax: +1 217 244 5631.

E-mail addresses: [yoo23@illinois.edu](mailto:yoo23@illinois.edu) (S.J. Yoo), [han84@illinois.edu](mailto:han84@illinois.edu) (S.-h. Han), [wduhuang@illinois.edu](mailto:wduhuang@illinois.edu) (W. Huang).

Shin, Shin, Choo, & Beom, 2011; Venkatesh et al., 2003). Current research, however, is lacking in three areas. First, little research using UTAUT were conducted on e-learning implementations in the workplace. Most studies were conducted among students or instructors in academic settings (Featherman & Pavlou, 2003; Pynoo et al., 2011; Shin et al., 2011; Szajna, 1996). Second, it is unclear whether or not intrinsic motivators and extrinsic motivators might influence employees' e-learning acceptance levels differently. Although a few studies have attempted to investigate their effect difference in promoting technology acceptance, the results remain inconclusive (Atkinson & Kidd, 1997; Venkatesh, Speier, & Morris, 2002). Third, a recent study in users' acceptance towards technology revealed that the predictability of UTAUT might vary when applied in different cultural settings (King & He, 2006). Although UTAUT's validity and theoretical robustness have acquired strong empirical support, most studies have mainly been carried out in the US context. The applicability of UTAUT in different cultural settings needs further investigation. To address these deficiencies, the present study examined two separate categories of motivators—intrinsic and extrinsic—and their effects on employees' intentions in adopting e-learning in the workplace. Furthermore, the study was situated in the South Korean context, to investigate UTAUT's feasibility in a different cultural context. The research questions are the following:

Research Question 1: To what extent does intrinsic motivation influence employees' intention to use e-learning in the workplace of South Korea?

Research Question 2: To what extent does extrinsic motivation have a direct and independent impact on behavioral intention to use e-learning in the workplace of South Korea?

Research Question 3: To what extent does the effect of extrinsic motivation differ from the effect of intrinsic motivation in influencing the use e-learning in the workplace of South Korea?

## 2. Literature review

### 2.1. E-Learning the workplace of South Korea

E-learning has been defined in various ways by many researchers. Kelly and Bauer (2004) view e-learning as a web-based learning tool that utilizes web-based communication, collaboration, knowledge transfer and training to benefit the individuals and organizations. Other scholars (Engelbrecht, 2005; Khan, 2001) see e-learning as the delivery of teaching materials via electronic media, such as Internet, intranets, extranets, satellite broadcasting, audio/video tape, interactive TV, and CD-ROM. Rosenberg (2001) defined e-learning as “the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance” (p. 28). Rosenberg (2001) also expanded the scope of e-learning from specific course to learning architecture that included knowledge management, which supports organizational performance, not just learning. Many practitioners have recognized e-learning as online courseware or e-training that has replaced the traditional classroom training (Rosenberg, 2006).

With regard to the application of e-learning in organizations, nearly 85 % of Fortune 500 companies utilize e-learning for developing their employees' knowledge and skills (Barron, 2003). Organizations invested over 250 billion dollars for training, of which 16 billion dollars were spent on e-learning training (Johnson, Hornik, & Salas, 2008). Additionally, the e-learning portion of employee training shows drastic growth from 15.4% in 2002, and 36.5 % in 2009 (ASTD, 2010). While the rapid growth of e-learning has been demonstrated in the US, South Korea has also been following the e-learning growth trend.

E-learning in South Korea is defined as a stand-alone course, with a self-directed learning format, in which instructors do not exist, and the learning process is controlled by learners (Byun & Lee, 2007; Lee, Yoon, & Lee, 2009). The development of e-learning in South Korea is strongly related to the rapid growth of its information and communications technology industry (Misko, Choi, Hong, & Lee, 2005). High quality e-learning services have been developed because of the nation-wide telecommunications infrastructure and high speed Internet (i.e., South Korea has the fastest average Internet connection speed and the highest rate of broadband connectivity in the world) (Akamai Technologies, 2008; Communications Workers of America, 2009). The rapid growth of e-learning in South Korea began in 1999 due to the support from the South Korean Ministry of Labor (Lee et al., 2009; Lim, 2007). The numbers of companies and employees who have participated in e-learning courses in the workplace have rapidly increased since the end of 20th century. In 1999, the number of employees who participated in e-learning was only 19,653, but the total number of participants in 2005 was more than one million, a 54% increase in 6 years. Moreover, e-learning training comprised over 45% of total training in 2005 (Byun & Lee, 2007; Lee, Byun, Kwon, & Kwak, 2008), which has clearly become a universal training method for the workplace in South Korea (Lee et al., 2008). While this top-down approach might boast the adoption of e-learning in South Korean workplaces, the understanding on how employees have accepted e-learning in their training routines remains illusive. The next section discusses UTAUT as a viable measure to gauge employees' technology acceptance levels.

### 2.2. The Unified Theory of Acceptance and Use of Technology (UTAUT)

In order to better explain the relationships between employees' technology acceptance level toward information technology and their intention to use the information technology, Venkatesh et al. (2003) proposed the Unified Theory for the Acceptance and Use of Technology (UTAUT) by synthesizing the Theory of Reasoned Actions (TRA) (Fishbein & Ajzen, 1975), the Technology Acceptance Model (TAM) (Davis, 1989), TAM 2 (Venkatesh & Davis, 2000), the Motivational Model (MM) (Davis et al., 1992), the Theory of Planned Behavior (TPB) (Ajzen, 1991), the Combined Model of TAM and TPB (C-TAM-TPB), the Model of PC Utilization (MPCU) (Thompson, Higgins, & Howell, 1991), the Social Cognitive Theory (SCT) (Compeau & Higgins, 1995), and finally the Innovation Diffusion Theory (IDT) (Moore & Benbasat, 1991).

The TRA first explains the drive of human actions with two constructs: attitudes toward target behaviors and attitudes toward subjective norm. The causal relationship between attitudes and actions suggested by TRA is rather strong. The TAM expanded the factor pool of technology acceptance by adding the perceived usefulness of the technology and perceived ease of use to the discussion. TAM2 addresses the technology acceptance in mandatory settings by refocusing on the effects of subjective norms (or social influences). The Motivational Model distinguishes effects of extrinsic and intrinsic motivation in influencing the level of technology acceptance. The TPB, based on the viewpoint of TRA, includes the perceived behavioral control to explain the relationship between attitudes and behaviors. While the C-TAM-TPB model combines constructs of TAM and TPB, the MPCU focuses on external factors that might influence the acceptance level such as job fit and resources available for using the technology. Finally, the SCT integrates factors such as self-efficacy and anxiety into the model to understand the barriers and enablers of technology acceptance.

As a result, UTAUT identifies performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) as four core constructs to predict users' behavioral intentions (BI) and actual user behaviors (UB) in adopting information

technology for work-related purposes. PE measures how users perceive the usefulness of the technology for their work performance; EE indicates the users' perceived ease of utilizing the technology; SI gauges the social pressure of adopting technologies perceived by users; and FC reports users' perceived support from the organization in order to adopt the technology successfully for work. Attitude towards using technology (ATUT), self-efficacy (SE), and anxiety (ANX) are also included with certain conditions. UTAUT proposes that the effect of ATUT can only be observed with the absence of PE or EE measures (Venkatesh et al., 2003, p. 455); and the effects of SE and ANX must be mediated by the EE construct (Venkatesh et al., 2003, p. 455). Furthermore, UTAUT considers users' age, gender, prior experiences with technologies, and the voluntariness of use as moderating variables that constantly influence the relationships between the aforementioned independent variables (PE, EE, SI, FC, ATUT, ANX) and dependent variables (BI, UB).

Inevitably, UTAUT poses both advantages and limitations for its applications in research. In terms of UTAUT's advantages, first is the holistic approach in explaining the underlying relationships among many psychological and social factors that might impact information technology adoption. Second is the consistent validity and reliability of the data collected by the UTAUT instrument (e.g., Lin & Bhattacharjee, 2008; Wang, Wu, & Wang, 2009). For its limitations, van Raaij and Schepers (2008) argued that UTAUT is not parsimonious enough as it requires many variables to achieve a substantial level of variance; and the social influence (SI) and facilitating condition (FC) constructs might not be properly measured due to their complexity (p. 841). Finally, considering the number of variables involved in UTAUT, it is not economical for organizations to address all of them in order to promote the acceptance of e-learning among employees. Current literature, however, fails to discern the effect difference among UTAUT variables in an efficient and meaningful manner with less constructs involved. Lee, Cheung, and Chen (2005) suggested that the investigation of technology acceptance should be grounded in employees' extrinsic and intrinsic motivations, which in turn, can inform organizations on devising efficient strategies to promote e-learning in the workplace. The following section discusses some classic distinctions between intrinsic and extrinsic motivation.

### 2.3. Motivation

Motives drive human activities and the motive must be of a certain kind (Kant, Wood, & Schneewind, 2002). Motivation theorists often classify motivation into two different classes: extrinsic and intrinsic motivation as the different causes that lead to action (Calder & Staw, 1975; Deci, 1972; Porac & Meindl, 1982; Scott, Farh, & Podsakoff, 1988). First, intrinsic motivation, which refers to the motivation to do something due to inherent satisfaction (Berlyne, 1966; Decharms, 1972; Deci, 1972; Ryan & Deci, 2000), has been known as one critical factor that influence (s) the learning process (Ryan & Stiller, 1991). Thus, intrinsic motivation is an important motivator that affects learning, adaptation, and competencies and is necessary for human development (Deci & Ryan, 1985). Intrinsic motivation would be a powerful source of behavioral drive when a person has opportunities to decide his or her behaviors autonomously (Deci & Ryan, 1985). In contrast to intrinsic motivation, extrinsic motivation refers to doing something because it leads to a valued outcome such as improved job performance, pay, and promotions (Deci, 1972; Lawler & Porter, 1967). Extrinsic motivators include anything related to work, such as promised rewards, praise, and deadlines (Amabile, 1993).

Much research has examined the role of intrinsic or extrinsic motivation to explain users' technology usage and adoption (Atkinson & Kidd, 1997; Heijden, 2004; Igbaria, Parasuraman, & Baroudi, 1996; Venkatesh & Davis, 2000; Venkatesh et al., 2002).

Lee and colleagues (2005) considered intrinsic motivation as a collection of factors that affect users' behavior for its own sake such as interesting, enjoyable, or engaging. They also described extrinsic motivation as factors that affect a person's behavior such as a desire for rewards or recognition or to obey the order of supervisors. Venkatesh and colleagues (2002) showed that external motivation affected the behavioral intention of knowledge workers while internal motivation did not. In an academic setting, however, intrinsic motivation affected undergraduate and graduate students' technology use significantly (Atkinson & Kidd, 1997). Clearly both intrinsic and extrinsic motivators are influential on the acceptance of technology. But it remains inconclusive as to which kind of motivators might affect users' behaviors more than the other.

### 2.4. The relationship between intrinsic and extrinsic motivations

Motivation is important for learning. Ryan and Deci (2000) suggested that "people have not only different amounts, but also different kinds of motivation (p. 54)." That is, different people have different orientations of motivation—intrinsic or extrinsic—as well as different levels of motivation. More importantly, the relationship between extrinsic and intrinsic motivators is interconnected (Ryan & Deci, 2000).

Social and environmental factors can facilitate or undermine intrinsic motivation when individuals meet specific conditions that are enforced to express their feelings (Ryan & Deci, 2000). For instance, perceived intrinsic motivation could be gradually developed by satisfying the needs for relatedness, competency, and control (Roca & Gagné, 2008; Ryan & Deci, 2000). Moreover, people can feel competent and experience an increase in their intrinsic motivation when they function in autonomous settings (Ryan & Deci, 2000). The qualities of self-determination such as creativity, self-regulation, and flexibility are associated with employee's attitudes and the quality of their work in the workplace (Deci & Ryan, 1985). Therefore, enabling all employees to working toward maximal intrinsic motivation should be an essential principle in the workplace. However, intrinsic motivation can be weakened by consistent environmental or socially sanctioned forces and expected tangible rewards made contingent upon task performance (Deci & Ryan, 1985).

Recent review suggests that extrinsic motivation is equally important to influence behaviors as intrinsic motivation (Deci, Koestner, & Ryan, 1999). In other words, being motivated to do something in order to achieve a utilitarian outcome is as important as feeling enjoyable by completing the task although early literature defined extrinsic motivation as an impoverished form of motivation (Decharms, 1972). External motivation such as rewards and communication of interpersonal influence is an important factor that determines an individual's behaviors in the learning process (Deci & Ryan, 1985). Deci, Connell, and Ryan (1989) investigated the relationship between employees' intrinsic motives and external motivation and indicated that organizations should provide opportunities to allow employees to decide their behaviors that would affect their attainment of extrinsic rewards such as job satisfaction, pay, and benefits. In addition, employees' intrinsic motivations as well as internal emotions could also be affected by the perceived supervisor support (Kobasa & Puccetti, 1983). In the context of technology-mediated environments, Newby and Alter (1989) concluded that the presence of extrinsic motivators (e.g., monetary reward) might prevent users from participating computer-based tasks that are intrinsically challenging and enjoyable. Their study further suggested that people might choose to complete a less intrinsically enjoyable task in order to receive extrinsic rewards. Clearly the intrinsic motivators might interact with extrinsic motivators in influencing the selection of technology-based tasks.

Based on current literature investigating user's acceptance levels toward e-learning, however, the relationship between effects of intrinsic and extrinsic motivators remains inconclusive, which inevitably presents challenges for organizations to efficiently devise and implement motivational strategies to promote the use of e-learning among employees. The following section discusses prior technology acceptance studies that examined UTAUT variables' effects in the categories of intrinsic motivation and extrinsic motivation.

### 2.5. Situating UTAUT in intrinsic and extrinsic motivation categories

Some studies have focused on the extrinsic motivation of technology acceptance (Igbaria et al., 1996) while other researchers emphasized the importance of intrinsic motivation (Sánchez & Hueros, 2010; Teo, Lim, & Lai, 1999; Venkatesh, 1999). In the context of UTAUT, effort expectancy reflects the intrinsic motivational aspect of a specific type of system usage (Davis et al., 1992). Researchers also identified enjoyment and playfulness as intrinsic motivators (Fagan, Neill, & Wooldridge, 2008; Lee et al., 2005; Venkatesh & Davis, 2000). Heijden (2004) concluded that the attitudes and effort expectancy are intrinsic motivational dimensions for determining behavioral intentions on technology usage. According to Sundaravej (2010), anxiety is intrinsic motivation because of emotion factor. On the other hand, performance expectancy, social influence, and facilitating conditions were identified as extrinsic motivators in previous studies (Lee et al., 2005; Venkatesh et al., 2003). Although Amabile (1993) argued that there might be some interactions between intrinsic and extrinsic motivators, technology acceptance research that focuses on similar interactional effects between intrinsic and extrinsic motivation in the framework of UTAUT is lacking.

Without understanding the relationship between intrinsic and extrinsic motivation in influencing technology acceptance levels among employees, efficient management of resources to implement organization-wide e-learning becomes an unrealistic expectation. Therefore, in our study of employee's attitudes towards e-learning, effort expectancy, and anxiety are postulated as the intrinsic motivators while performance expectancy, social influence, and facilitating conditions are postulated as the extrinsic motivators for using e-learning. See Fig. 1 below for the research model.

The findings of this study could add to theoretical understanding of why employees use e-learning and what the relationship

between intrinsic motivation and extrinsic motivation might be in influencing e-learning acceptance levels. We argue that understanding the role of each motivator, and what fosters each of them, is an important issue for human resource development (HRD) professionals to cultivate employees' behavioral intention to use e-learning. Additionally, this understanding of the intrinsic role could have practical implications for the development of e-learning (Fagan et al., 2008).

## 3. Methods

### 3.1. Research site and sampling

The data for this study was collected from a mid-size (1500 employees) food service company in South Korea via an online survey. The company constantly conducts training for its employees due to a high turnover rates among young employees, the company's emphasis on services, and its role in shifting the socioeconomic trends on food service consumptions. The company has been utilizing e-learning as a training tool since the year 2000 because it needs to train employees who are sent to work in franchise stores. E-learning is used for delivering training as it allows employees to be flexible on learning time and pace.

In 2010, a total of 200 e-learning courses were provided monthly to the employees. The courses were developed by external e-learning course developers and internal human resource development (HRD) staff. To increase the participation of the e-learning, several company-wide policies are in place. First, each employee needs to complete at least 100 h of training per year in the company. Second, based on the position held, at least two e-learning courses are required for general employees, and at least four e-learning courses for managers are required in order to be qualified for promotions. If an employee does not fulfill the training requirement, his or her performance evaluation will also be adversely affected.

### 3.2. Instrumentation

The present survey targeted employees' acceptance levels of e-learning in the workplace of South Korea. The research team created surveys based on selected items from the UTAUT (Venkatesh et al., 2003) by using a 7-point Likert Scale from 1 (strongly disagree) to 7 (strongly agree). The instrument consists of following categories: performance expectancy, effort expectancy, attitude, social influence, facilitating condition, anxiety and the intention to use e-learning. All items have shown acceptable levels of reliability and validity in previous research (Pynoo et al., 2011; Wang et al., 2009). See Appendix A for survey items. According to the research model in Fig. 1, factors in UTAUT were classified into two groups. Performance expectancy, social influence, and facilitating conditions belong to extrinsic motivation, whereas effort expectancy, anxiety and attitude towards using e-learning are subject to intrinsic motivation. Since the UTAUT instrument was previously developed and used in English, the survey was also translated into Korean using translation-back translation procedures considering the meaning of the original items (Brislin, Lonner, & Thorndisk, 1973; Chapman & Carter, 1979). Several human resource development professionals were asked to comment on the appropriateness of the Korean wording in the translation. One of them has a Masters degree in educational technology and has been working in the food company. The other holds a Ph.D. in educational technology and has been working in the e-learning industry as a director of content development.

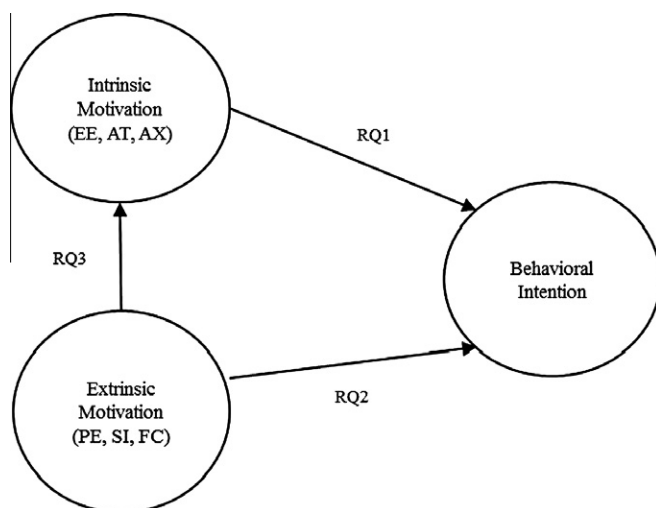


Fig. 1. Research model.

### 3.3. Data collection

The survey was distributed online to around 1000 employees by the HRD staff. Employees received the online survey via the company's intranet and were assured of confidentiality by both the investigators and the organization's management. The data were collected for 3 weeks (September 27–October 19) in 2010 using Survey Monkey (<http://www.surveymonkey.com>), which can be accessed from anywhere via the Internet. Participants had unlimited amount of time to complete the survey. However, they could only access the online survey once. To ensure that the study participants can adequately represent the demographics within the food service company, the data was collected from employees at all seven branches that employed e-learning for training via online surveys. In addition, this data collection approach may reveal some variations of user attitudes induced by different information technology infrastructures within each location. For instance, Seoul, the capital of South Korea, possesses a technology infrastructure that surpasses that of other provinces even within the same company. Despite the variations in infrastructure, however, employees working in these different geographic locations are homogeneous in their qualifications and competencies due to the company's standardized hiring process.

### 3.4. Data analysis

The data analysis consisted of two stages. First is the general assumption assessment including data distribution (Hair, Black, Babin, Anderson, & Tatham, 2006), reliability testing for measurement items (Netemeyer, Bearden, & Sharma, 2003), and validity testing for measurement structure as basic assessment (DeVellis, 2003; Hinkin, 1995, 2005; Johnson & Wichern, 1992). At this stage, inter-construct correlation coefficient estimates were examined along with item internal consistency with Cronbach's alpha coefficient estimates (DeVellis, 2003; Thompson, 2003; Thompson & Daniel, 1996). Additionally, confirmatory factor analysis (CFA) was performed to ensure valid measurement structure (Kline, 2005). Since all research constructs were validated and examined in previous literature (King & He, 2006; Venkatesh et al., 2003), the proposed latent constructs of the psychometric properties of the underlying observed items' could be scanned through CFA (Hair et al., 2006; Thompson, 2004).

Second, in order to answer the proposed research questions, the following multivariate analyses were primarily executed: structural equation modeling (SEM) analysis for assessing the interactive direct and indirect effects between exogenous variables and endogenous variable in complex structure simultaneously (Byrne, 1998; Kaplan, 2009; Kline, 2005).

## 4. Results

Following the two-stage analytical procedures, we first examined the measurement model, then the structural model. This section describes all the results of data analyses, including participants' demographics, basic descriptive results, reliability of all measurement items, and the validity of the measurement structure, and structural relations between the latent constructs as classified as intrinsic and extrinsic motivators.

### 4.1. Participants

Within 3 weeks of data collection period 261 surveys were returned out of 1000 invited participants, giving us a final response rate of 26.1%. Due to incompleteness or errors, 35 data sets were

removed listwise and only 226 data sets were analyzed. Of the 226 completed surveys, 63 were completed by males (28.0%), 145 (64.4%) by females and 17 (7.6%) were not answered. Most participants (92.0%) were in their twenties and thirties. Seventy-six (33.8%) participants were employees, 95 (42.2%) managers, and 35 (15.6%) were store managers, while 19 (8.4%) participants did not indicate their position in this company. Nearly half of the participants (52.0%) worked in Seoul at the time the survey was taken. Almost half of the participants (49.8%) had never experienced e-learning and 106 (47.1%) participants had experienced e-learning in the workplace (see Table 1).

### 4.2. The measurement model

According to the measurement psychometric property issue, prior to any further data analyses, basic assumptions of reliability and validity issues were examined (Kaplan, 2009; Thompson, 2003) by inter-variable correlation coefficient estimates, Cronbach alpha ( $\alpha$ ) coefficient (Cronbach, 1951; Cronbach & Shavelson, 2004), and factor loadings of confirmatory factor analysis (CFA). First of all, according to the central limit theorem, the normal bell-shaped data distribution was assumed, and Table 2 shows inter-construct correlation and item internal consistency estimates (Cronbach  $\alpha$  coefficient) along with descriptive analysis.

The third column on Table 2 shows the convergent validity assessment for each factor. To obtain these values, an average variance shared between each construct and its measure was used (Gall, 2003). According to Fornell and Larcker (1981), convergent validity coefficients should be 0.50 or above. We noticed that all convergent validity coefficients calculated for all factors in this study were higher than or equal to 0.50. The diagonal elements in Table 2 show the reliability of each measure, which is Cronbach's alpha. Internal item consistency for all measurement constructs is acceptable (all  $\alpha$  coefficient estimates are above .80) as reliable observed items ( $\alpha$  ranges from .84 to .96) and the average variance extracted ranges from 0.59 to 0.89.

Discriminant validity is the extent to which the measure is not a reflection of some other variable (Gall, 2003). It is indicated by low

**Table 1**  
Participant demographics.

Variables	Values	Frequency	Percentage
Gender	Male	68	30.1
	Female	158	69.9
Age	20	173	76.5
	30	52	23
	40	1	0.5
Work experience	2 years of less	79	35.0
	2–5 years	104	46.0
	6–10 years	32	14.2
	11–15 years	7	3.1
	15 years or more	4	1.8
Position	Staff	83	36.7
	Manager	101	44.7
	Store Manager	42	18.6
Location	Seoul	84	37.2
	Gyeonggi	35	15.5
	Daejeon	3	1.3
	Busan	13	5.8
	Chungcheong	3	1.3
	Gyengsang	4	1.8
	Jeolla	16	7.1
	Missing	68	30.1
		226	100

**Table 2**  
Descriptive analysis and inter-construct correlation coefficients.

	<i>M</i>	<i>SD</i>	<i>p</i>	1	2	3	4	5	6	7
1. Performance expectancy	4.45	0.96	0.53	(0.90)						
2. Effort expectancy	4.47	0.90	0.50	.635*	(0.84)					
3. Attitude towards e-learning	4.60	0.96	0.68	.791*	.726*	(0.93)				
4. Facilitating conditions	4.37	0.75	0.62	.052*	.068*	.029*	(0.84)			
5. Social influence	4.56	0.92	0.60	.707*	.634*	.699*	.070*	(0.85)		
6. Anxiety	3.30	0.95	0.64	-.374*	-.493*	-.507*	.014*	-.439*	(0.88)	
7. Behavioral intention to use	4.64	1.07	0.75	.445*	.447*	.572*	.055*	.478*	-.559*	(0.96)

Note:  $n = 226$ . Coefficient alpha reliability estimates are reported in the main diagonal.

\*  $p < .01$ .

correlations between the measure of interest and the measures of other constructs. Evidence about discriminant validity of the measures can be verified with the square root of the average variance extracted for each construct higher than the correlations between it and all other constructs (Gall, 2003). The results indicate adequate levels of discriminant validity.

#### 4.3. The structural model

To test the structure validity of the proposed measurements (i.e., intrinsic and extrinsic motivation), two separated confirmatory factor analyses (CFAs) were performed. First, in order to ensure that the intrinsic motivation, including eleven items, was one construct to measure the intrinsic motivation, a higher order CFA was conducted. Second, to assess the applicability of the proposed measures of the extrinsic motivation, another CFA was conducted separately. In order to interpret the results of the CFAs, the following indices were adopted (see Table 3): (1) chi-square; (2) goodness-of-fit index (GFI); (3) adjusted goodness-of-fit index (AGFI); (4) comparative fit index (CFI); (5) normed fit index (NFI); and (6) root mean square residual (RMR) (Bentler, 1990; Bentler & Bonett, 1980; Jöreskog & Söbom, 2001). These CFA results may substantiate the adequacy of the item-to-factor associations and the number of dimensions underlying the proposed model (Hair et al., 2006).

Based on the fit statistics, further evidence of construct validity in a hypothesized model has been provided. Thus, this study confirms that the proposed constructs provided reliable and valid scores. Second, the modified motivators of UTAUT were proven as applicable measures in a proposed model.

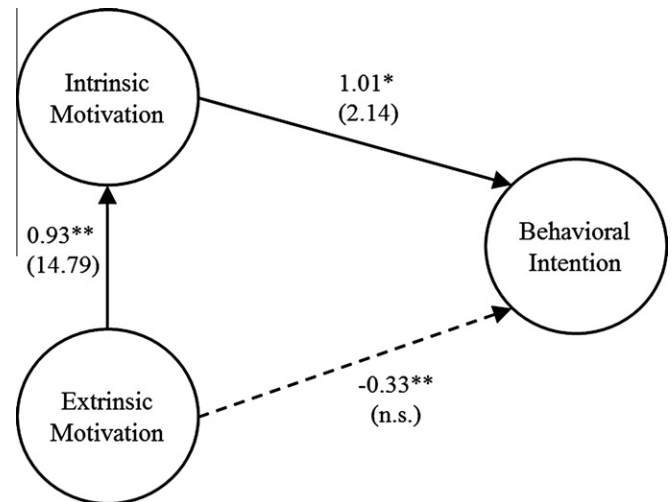
To answer the research questions, we examined the research model illustrated in Fig. 1. This study used the maximum likelihood method to estimate the structural model. Fig. 2 shows estimated path coefficients and the associated  $t$ -value of the paths. The fit statistics indicate that the research model provides a good fit to the data ( $\chi^2 = 135.99$ ,  $df = 24$ ,  $p < .01$ ; CFI = .95; NFI = .95; RMR = .05). We therefore proceeded to test the specified paths for research questions.

As a follow-up step, collective associations among the exogenous and endogenous variables, path coefficient estimates for all relations among the constructs; and standardized path coefficient estimates were considered to determine the influential effect sizes of each relation (Byrne, 1998; Hair et al., 2006; Kline, 2005). All path coefficients were illustrated in Fig. 2. As the standard

**Table 3**  
CFA analysis results of intrinsic and extrinsic motivators.

Models	<i>df</i>	$\chi^2$	GFI	AGFI	CFI	NFI	RMR
Intrinsic	30	76.89*	0.94	0.87	0.97	0.96	0.079
Extrinsic	27	79.85*	0.94	0.85	0.97	0.96	0.057

\*  $p < 0.001$ .



**Fig. 2.** SEM results with SPCs of all inter-constructs' influential associations.

determinant for the statistical significance of standardized path coefficients, cut-off  $t$ -value ( $t$ -value  $\geq |1.96|$ ) was applied (Byrne, 1998; Kline, 2005).

As illustrated in Fig. 2, intrinsic motivation has statically significant direct impact to intention to use e-learning ( $\beta_1 = 1.01$ ;  $|t| = 2.14$ ), while non-significant direct path was found from extrinsic motivation ( $\gamma_2 = -.33$ ;  $|t| = .75$ ). More notably, mediating construct interactively maximizes the influence of extrinsic motivation to intention to use technology through the intrinsic motivation in terms of indirect influential path coefficient estimates ( $\gamma_1 = .93$ ;  $|t| = 14.79$ ). According to these path coefficients estimates, the level of intrinsic motivation plays full mediating role to explain the relation between extrinsic motivation and intention to use technology. In the meantime, the model shows non-significant direct path coefficients and path decomposition between the extrinsic motivation and behavioral intention. Thus research questions therefore were answered in a clear manner.

The findings of this study suggested that extrinsic motivation on e-learning in the workplace did not directly and independently impact behavioral intention to use e-learning. However, extrinsic motivation still remains significant in increasing behavioral intention to use e-learning when mediated by intrinsic motivation. For intrinsic motivation, the study found that it could directly influence employees' intention to use e-learning.

## 5. Discussion and conclusion

The purpose of this study is to investigate the role of motivations that influences employees' intention to use e-learning in a

South Korean workplace. The results showed that intrinsic motivation has a statistically significant direct impact on employees' intention to use e-learning. On the other hand, extrinsic motivation did not affect the employees' intention to use e-learning directly. Its effects were mediated by intrinsic motivation. In this section, research implications of the findings are discussed followed by research limitations and recommendations for future studies.

### 5.1. Intrinsic motivation directly impacts behavioral intention

In the context of workplaces, extrinsic motivators are not as effective as intrinsic motivators. Amabile, Hill, Hennessey, and Tighe (1993) found that employees are less motivated to achieve increased salaries and recognition in their careers. Intrinsic motivation, on the other hand, could lead to better persistence, performance, and satisfaction in a variety of tasks in various domains than extrinsic motivation (Baard, Deci, & Ryan, 2004; Black & Deci, 2000; Deci et al., 1989; Williams, Grow, Freedman, Ryan, & Deci, 1996). Our finding fully supports previous research by identifying a direct relationship between intrinsic motivation and employees' intention to use e-learning. The compulsory e-learning attendances in the surveyed South Korean workplace might further strengthen this relationship due to the reality that fulfilling the e-learning participation requirement does not always lead to the promised rewards (e.g., promotions). A meta-analysis found that rewards do not reduce intrinsic motivation (Cameron & Pierce, 1994). However, another meta-analysis revealed that extrinsic rewards do undermine intrinsic motivation (Deci et al., 1999). The relationship between rewards and intrinsic motivation could be summarized as inconclusive results. According to Deci, Koestner, and Ryan (2001), rewards do play two roles as informational and controlling aspects. The informational aspect delivers self-determined competence that enhances intrinsic motivation while the controlling aspect conveys an external perceived locus of causality that reduces intrinsic motivation (Deci et al., 2001).

### 5.2. Extrinsic motivation has no direct effect on behavioral intention

Extrinsic motivation in this study did not affect users' intention to use e-learning in the workplace. From the perspective of organizational policy, the mandatory e-learning participation (two to four e-learning courses per year requirement) imposed by the studied company might contribute to this result. The studied site required employees to take mandatory e-learning courses as part of the promotion requirement. However, the causality between "taking e-learning courses" and "getting promoted" is uncertain. Therefore employees in the studied food company might have dissociated non-voluntary e-learning participation with any extrinsic rewards. Wu and Lederer (2009) confirmed that the effects of extrinsic motivation might be reduced in non-voluntary environments. They explained that using technology in a non-voluntary environment does not predict behavioral intention to use it through extrinsic motivation. If a company enforces employees to take mandatory e-learning, extrinsic motivation tends to be muted or attenuated. Hartwick and Barki (1994) found that usage intentions may vary when users perceive system use to be mandated because some users do not want to comply with such mandates. Many technology-related behaviors in the company, unfortunately, are often not completely voluntary (Brown, Massey, Montoya-Weiss, & Burkman, 2002).

### 5.3. Intrinsic motivation mediates the relationship between extrinsic motivation and behavioral intention

This study is one of only a few efforts to re-categorize UTAUT sub-constructs into intrinsic and extrinsic motivation. Prior studies

therefore neither supported nor disputed our finding on the mediating role of intrinsic motivation when viewing UTAUT sub-constructs collectively as intrinsic or extrinsic motivators. However, some studies have identified results that can partially support our findings. Karahanna and Straub (1999) reported that "system use is affected through perceived usefulness and perceived ease of use by the degree of social influence exerted by supervisors" in Roca and Gagné (2008, p. 1590). Extrinsic motivators such as performance expectancy could affect the intention to use e-learning through users' attitudes (perceived playfulness). Employees also enjoyed using e-learning when they feel connected and supported by co-workers. In other words, social influence as one of the extrinsic motivators could influence employees' attitudes towards e-learning as an intrinsic motivation (Roca & Gagné, 2008).

From the perspective of classic motivational studies, the support to our findings is also adequate. Ryan and Deci (2000) agreed that interpersonal events and structures (e.g., rewards, communication, and feedback) could enhance intrinsic motivation because exterior environments made people feel competent or satisfied. They also implied that social as well as environmental factors could impact intrinsic motivation. Considering the UTAUT constructs included in extrinsic motivation (PE, SI, and FC), our findings, to a large extent, align with the aforementioned viewpoints. The mediating effects of intrinsic motivation on extrinsic motivation (or the indirect effects between extrinsic motivation on behavioral intention) found in our study further suggest the critical role of extrinsic motivators for the development of intrinsic motivation. This finding might prompt a more integrative view on the relationship between intrinsic and extrinsic motivations than just two separated classes.

Based on the results, several practical implications can be made to help workplaces in South Korea to promote e-learning. First, we suggest that human resource development (HRD) professionals should consider how to facilitate employees' intention to use e-learning in the workplace by focusing on both extrinsic and intrinsic motivations. Second, since it is relatively difficult to change perceived intrinsic motivation (i.e., curiosity and genuine interests) and job-related tasks often are not intrinsically motivating, organizations can focus on external factors (e.g., tangible rewards, available supporting structures) that are easier to manipulate in order to enhance the perceived intrinsic motivation in integrating e-learning.

## 6. Limitations and further research

This study has several limitations. First, findings are based on the perceptions of employees who voluntarily chose to respond to the questionnaire. Therefore, participants may not be representative of all the employees in the company. In addition, the data were collected through a self-reporting mechanism, as opposed to direct observation. Thus, data gathered from the study must be interpreted with caution. The second limitation of this study would be to the time period when the data were collected from the company. In this study the data were collected during a specific time span (September–October, 2010). Consequently, it is not apparent that in other time periods employees' acceptance levels towards e-learning would be the same. As the food service industry has a high turnover rate, different time periods for data collection may affect the findings. Further studies need to focus on collecting and analyzing longitudinal data. The third limitation is that this company has strict educational policies that employees should take at least two or four e-learning courses based on their positions. This suggests that future research should focus on comparing results from voluntary and non-voluntary e-learning settings.

Finally, a number of studies showed that employees' performance, persistence, and creativity are increased when employees'

**Table A1**  
Employees' acceptance levels towards e-learning.

Categorization	Questions	Code
Performance expectancy	1. I would find e-learning useful in my job	PE1
	2. Using e-learning enables me to accomplish tasks more quickly	PE2
	3. Using e-learning increases my productivity	PE3
	4. If I use e-learning, I will increase my chances of getting a raise	PE4
Effort expectancy	5. My interaction with e-learning would be clear and understandable	EE1
	6. It would be easy for me to become skillful at using e-learning	EE2
	7. I would find e-learning easy to use	EE3
	8. Learning to operate e-learning is easy for me	EE4
Attitude towards e-learning	9. Using e-learning is a good idea	AT1
	10. e-learning makes work more interesting	AT2
	11. Working with e-learning is fun	AT3
	12. I like working with e-learning	AT4
Facilitating conditions	13. I have the resources necessary to use e-learning	FC1
	14. I have the knowledge necessary to use e-learning	FC2
	15. E-learning is not compatible with other systems I use	FC3
	16. A specific person (or group) is available for assistance with e-learning difficulties	FC4
Social influence	17. People who influence my behavior think that I should use e-learning	SI1
	18. People who are important to me think that I should use e-learning	SI2
	19. The senior management of this business has been helpful in the use of e-learning	SI3
	20. In general, the organization has supported the use of e-learning	SI4
Anxiety	21. I feel apprehensive about using e-learning	AX1
	22. I hesitate to use e-learning because of making a mistake	AX2
	23. E-learning is somewhat intimidating to me	AX3
Behavioral intention to use	24. I intend to take e-learning in the next 6 months	IU1
	25. I plan to take e-learning in the next 6 months	IU2
	26. I predict I would take e-learning in the next 6 months	IU2

feelings move to interest, excitement, and confidence in using e-learning (Deci & Ryan, 1991; Sheldon, Ryan, Rawsthorne, & Iardi, 1997). Little studies, however, showed empirical differences in the relationship between employees' intrinsic motivation and their performance. Future studies will continue to examine the relationship between intrinsic motivation and activities of employee training in order to improve employees' attitudes as well as to reduce anxiety towards e-learning in the workplace.

## Appendix A

See Table A1.

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