An empirical analysis of the antecedents of web-based learning continuance

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Abstract

Like any other product, service and Web-based application, the success of Web-based learning depends largely on learners’ satisfaction and other factors that will eventually increase learners’ intention to continue using it. This paper integrates the concept of subjective task value and fairness theory to construct a model for investigating the motivations behind learners’ intention to continue using Web-based learning. The model theorizes that four components of subjective task value (i.e., attainment, utility, intrinsic, and cost) and three dimensions of fairness (i.e., distributive, procedural, and interactional) affect learners’ satisfaction. We also argue that satisfaction and four distinct components of subjective task value influence learners’ intention to continue using Web-based learning. The hypothesized model is validated empirically using data collected from 202 learners of a Web-based learning program designed for continuing education. The results showed that attainment value, utility value, intrinsic value, distributive fairness, and interactional fairness exhibited significant positive...
effects on satisfaction. Utility value and satisfaction play significant roles in shaping learners’ intention to continue using Web-based learning.

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1. Introduction

The proliferation of network access and advances in Internet/Web technology, in conjunction with social demands for improved access to higher education has facilitated the rapid growth of online learning or electronic learning (e-learning) (Lorenzetti, 2005). e-Learning also enables organizations to reduce the total cost of and increases the efficiency of training. According to International Data Corporation (IDC), the international e-learning market is growing by leaps and bounds. IDC estimated the international e-learning market to grow from US$ 6.6 billion in 2002 to US$ 23.7 billion in 2006, at a compound annual rate of 35.6%. Cortona Consulting said that the e-learning market could reach $50 billion in 2010. 70% of universities in the USA are now providing e-learning courses, according to the research of Market Data Retrieval. Concurrent with the organizational and universities’ interest in e-learning, a large number of academic papers (Arbaugh, 2002; Carswell & Venkatesh, 2002; Chiu, Hsu, Sun, Lin, & Sun, 2005) have been published on e-learning. These developments reflect the significance of e-learning among scholars and practitioners.

The goal of this study is to explore individuals’ intention to continue using Web-based learning in a voluntary setting. Web-based learning refers to learning delivered through a Web browser over the public Internet, private intranet or extranet. It is considered as a major subcomponent of the broader term e-learning. Like any Web-based application, the success of Web-based learning depends largely on user satisfaction and other factors that will eventually increase users’ intention to continue using it (continuance intention). The importance of continued use (continuance) is evident from the fact that customer turnover can be costly, especially given that it cost more to acquire new customers than to retain existing ones (Hart, Heskett, & Sasser, 1990; Reichheld & Schefter, 2000). In view of this, Web-based learning scholars and practitioners should look for ways to increase learners’ satisfaction levels and continuance intention.

Technology acceptance model (TAM) (Davis, 1989) is one of the most widely used models for explaining an individual’s behavioral intention and actual use of information technology (IT). Several recent studies drawing upon TAM have examined the effects of the two salient beliefs about technological characteristics, namely perceived usefulness and ease of use, on learners’ attitude or behavioral intention in the context of Web-based learning or distance learning (Gong, Xu, & Yu, 2004; Lee, Cho, Gay, Davidson, & Ingraffea, 2003; Stoel & Lee, 2003). However, those studies ignored the potentially important impacts of value and fairness. While the importance of technological characteristics cannot be denied, having well-designed Web-based learning sites/systems does not guarantee the success of Web-based learning. This is because value and fairness issues appear to be significant in guiding a learner’s overall assessment of Web-based learning, thus influencing the learner’s continuance decision.
Web-based learning can be considered as an exchange of time, effort, and money (inputs) for receiving skills, knowledge, grades, credits, or degrees (outputs) in return. According to Zeithaml (1988), it is the overall assessment of what is received and what is given that shapes learners’ intention to continue using Web-based learning. Researchers have conceptualized value as a function of a “get” component, i.e., the benefits an individual receives, and a “give” component, i.e., an individual’s monetary and non-monetary costs in acquiring and using a product or service (Parasuraman & Grewal, 2000; Sirdeshmukh, Singh, & Sabol, 2002). Benefits include the extrinsic and intrinsic utility provided by the ongoing relationship with a service provider (Gwinner, Gremier, & Bitner, 1998). Literature in the marketing suggests that value (benefits and costs) drives satisfaction, loyalty, behavioral intention to remain loyalty, and repurchase intention (Bolton & Drew, 1991; Neal, 1999; Patterson & Spreng, 1997). Value theorists argue that value is a centrally held and enduring belief and plays a central role in our everyday life decisions (Homer & Kahle, 1988; Rokeach, 1968). Equity theory theorizes that individuals seek a fair balance between input (what is given) and output (what is received). According to Adams (1965), individuals become satisfied and motivated whenever they feel their inputs are being fairly rewarded. Literature in the marketing and organization justice has affirmed the importance of fairness considerations in the assessment of satisfaction (Maxham & Netemeyer, 2002; Smith, Bolton, & Wagner, 1999; Tax, Brown, & Chandrashekar, 1998). Accordingly, a more complete study of the motivations underlying individuals’ intention to continue using Web-based learning should address issues related to value as well as fairness. To this end, two theories are applied and integrated: expectancy-value model of achievement motivation (Eccles et al., 1983) and fairness theory.

Eccles et al.’s (1983) expectancy-value model of achievement motivation, which is based on Atkinson’s (1964) expectancy-value model, links individuals’ choice, persistence, and performance to expectancy for success and subjective task value. Eccles et al.’s model outlines four motivational components of subjective task value: attainment value, intrinsic value, utility value, and cost. The model suggests that value related variables are likely to be more influential in situations of choice. Eccles and her colleagues have shown that subjective task value predicts course plans and enrollment decisions in mathematics, physics, and English courses (Eccles, 1987; Eccles, Adler, & Meece, 1984; Meece, Wigfield, & Eccles, 1990). This study follows Eccles et al. (1983) in arguing that subjective task value influences learners’ satisfaction and Web-based learning continuance intention through attainment value (the importance of doing well on Web-based learning), intrinsic value (playfulness of Web-based learning), utility value (helpfulness of Web-based learning to learners’ current and future career goals), and cost (negative aspects of engaging in Web-based learning).

The concept of fairness or justice has long been studied in philosophy, political science, religion, organizational sciences, and economics (Yilmaz, Sezen, & Kabadayi, 2004). Fairness theory has its origins in equity theory. Equity theory (Adams, 1965) is a model of motivation that explains why people strive for fairness or justice in social exchange processes. According to Adams’s (1965) equity theory, an individual’s perception of the fairness of exchange relationships is determined by comparing the output/input ratio for oneself with that of referent others. When the ratios are equal, people are satisfied. Adams (1965) argued that people become demotivated, reduce input and/or seek change whenever they feel their inputs are not being fairly rewarded. Marketing and organizational justice researchers (Blodgett, Hill, & Tax, 1997; Niehoff & Moorman, 1993; Ramaswami & Singh, 2003; Tax et al., 1998) have identified three important dimensions of fairness: distributive, procedural, and interactional. This study follows prior research in arguing that
fairness influences learners’ satisfaction with Web-based learning through distributive fairness (fairness of the grades learners receive), procedural fairness (fairness of the procedures that produce the grades), and interactional fairness (fairness of the instructors’ treatment during online interaction).

This paper makes two key contributions. First, although empirical evidence has demonstrated that subjective task value and fairness matter for individuals’ satisfaction or continuance intention, fundamental gaps remain in the understanding of value and fairness components that might explain individuals’ satisfaction and continuance intention in the context of Web-based learning. This study develops the measures for the components of subjective task value and fairness and tests their reliability and validity, and empirically examines their influences on satisfaction and continuance intention. Second, to the best of our knowledge, this is the first study that examines the integrated influence of subjective task value and fairness on learners’ satisfaction and intention to continue using Web-based learning. In sum, by explicating the unique role of subjective task value and fairness, this paper aims at contributing to the continued development and success of Web-based learning in general.

2. Theoretical background

2.1. Web-based learning

Web-based learning is a major subcomponent of the broader term e-learning or distance learning. Web-based learning is often called online learning. e-Learning refers to learning that content is delivered via the Internet, intranet, extranet, audio or video tape, satellite TV, and CD-ROM (Kaplan-Leiserson, 2000). e-Learning applications and processes include Web-based learning, computer-based training, virtual classrooms and digital collaboration. Distance learning refers to learning situation in which the instructor and learners are separated by time, location, or both (Perraton, 1988). Learning courses are delivered to remote locations via written correspondence, text, graphics, audio- and videotape, CD-ROM, online learning, audio- and videoconferencing, interactive TV, and FAX. The definition of distance education is broader than and entails the definition of e-learning.

Numerous studies have discussed the reasons that learners choose Web-based learning or distance learning. Lorenzetti (2005) reported that time flexibility is a major draw for students to choose to study online. Other reasons include less conflict with work (Dutton, Dutton, & Perry, 2002), the convenience of not having to travel to and attending a traditional face-to-face classroom (Motiwalla & Tello, 2000; Wegner, Holloway, & Garton, 1999), and the flexibility of accessing course materials anytime and anywhere (wherever Internet connection is possible) (Hong, Lai, & Holton, 2003). Willis (1993) stated that adult learners pursue distance learning for a wide variety of reasons: constraints of time, distance, and finances (cost effective).

There have been considerable studies interested in exploring factors that influence learner satisfaction or outcomes in the context of Web-based learning or distance learning. For example, Carswell and Venkatesh (2002) examined the influence of technological characteristics (e.g., visibility, result demonstrability) on learners’ outcomes (i.e., intention, acceptance, and performance) in an asynchronous distance learning environment. Martins, Steil, and Todesco (2004) examined
the effect of innovation characteristics (e.g., observability and trialability) on adoption of the Internet as a learning tool. Other studies focused on the impact of personal cognition such as self-efficacy (Lim, 2001; Wang & Newlin, 2002), computer confidence (Osborn, 2000), and locus of control (Morris, Wu, & Finneghan, 2005). Arbaugh (2002) suggested examining the effects of technological characteristics (e.g., perceived flexibility) and behavioral characteristics (e.g., virtual immediacy behaviors) on student learning in and satisfaction with Web-based courses.

Prior studies have shown that technological and personal cognition factors play significant roles in Web-based learning, e-learning, or distance learning. However, those studies ignored the potentially important impact of value and fairness. According to Bandura (1986), of all the cognitive forces that guide human behavior and stand at the core of social cognitive theory is self-efficacy. Bandura (1986) suggests that individuals who have high levels of self-efficacy should be more likely to perform related behavior in the future. Web-based learning requires investment of time, effort, and money in developing knowledge or receiving grades and credits. Accordingly, individuals who have high levels of self-efficacy may have low intention to continue using Web-based learning if they think that Web-based learning has low levels of value and fairness. The overall assessment of the value and fairness of Web-based learning thus plays an important role in shaping an individual’s satisfaction and intention to continue using Web-based learning. The question – why do individuals spend money and their valuable time and effort on Web-based learning, should be addressed from the perspectives of both value and fairness. Consequently, the subjective task value concept in the expectancy-value model of achievement motivation and fairness theory are applied and integrated for addressing our research question.

2.2. Subjective task value

Expectancy-value model of achievement motivation (Eccles et al., 1983) posits that individuals’ performance, persistence, and choice are most directly predicted by their expectancies for success on the tasks and the subjective task value they attach to success on the tasks. Eccles et al. (1983) defined different components of subjective task value: attainment value, intrinsic value, utility value, and cost. Attainment value is the personal importance of doing well on the task. According to Eccles et al. (1983), it incorporates a variety of dimensions, including perceptions of the task’s ability to confirm salient and valued characteristics of the self (e.g., masculinity, femininity, competence), to provide a challenge, and to offer a forum for fulfilling achievement, power and social needs. Intrinsic value is the enjoyment an individual gets from performing the activity, or the subjective interest an individual has in the subject. Utility value is how well a task relates to current and future goals, such as career goals. Finally, cost is conceptualized in terms of the negative aspects of engaging in the task (e.g., performance anxiety and fear of both failure and success), as well as both the amount of effort that is needed to succeed and the lost of opportunities resulting from making one choice rather than another.

In studying how expectancies and subjective task value influence elementary through secondary school students’ performance and choice, Eccles and her colleagues (1983) showed that components of subjective task value predicted both intentions and actual decisions to keep taking mathematics and English in the context of traditional classroom education. Wigfield and Eccles (1989) found that components of subjective task value predicted junior and senior high school students’ intention to keep taking mathematics. Battle and Wigfield (2003) also showed that components of
subjective task value predicted intentions to attend graduate school. However, the possible impact of the components of subjective task value is still unclear in the Web-based learning context. No empirical work has been done to address this issue. This begs the question – whether an individual's assessment of what is received (attainment value, intrinsic value, and utility value) and what is given (cost) is strong enough to stimulate or inhibit his or her intention to continue using Web-based learning.

2.3. Fairness theory

The earliest influential theories of fairness or justice were the rule of distributive justice (Homans, 1961) and the equity theory (Adams, 1965). Homans' (1961) simple formula for justice stressed the difference between the rewards people received for investments. Researchers have conceptualized three types of fairness: distributive, procedural, and interactional. Distributive fairness refers to the perceived fairness of the outcomes an individual receives (Homans, 1961). Procedural fairness refers to the perceived fairness of the procedures that produce the outcome (Thibaut & Walker, 1975). Thibaut and Walker (1975) identified two types of control as essential determinants of procedural fairness: control over the presentation of evidence (process control) and control over the final decision (decision control). Leventhal (1980) suggested six procedural fairness rules, including consistency, bias suppression, accuracy, correctability (an appeal mechanism to appeal decisions), representativeness, and ethicality. Finally, Bies and Moag (1986) separated out interpersonal aspect of procedural justice, referred to as interactional fairness, which emphasizes the perceived fairness of the interpersonal treatment received during the implementation of a procedure (Bies & Moag, 1986). Bies and Moag (1986) identified truthfulness (honesty and avoiding deception), courtesy, respect for individual rights, propriety of behavior (avoiding prejudice), and justifying decisions as typifying fair treatment.

Learners spend valuable time and efforts on Web-based learning thus expect that the grades they receive, the procedures for evaluating their inputs, and the treatment by instructors during online interaction are fair. Fairness has been studied to a limited degree in marketing in conjunction with relationship quality (Kumar, Scheer, & Steenkamp, 1995), organizational citizenship (Niehoff & Moorman, 1993), work outcomes (Ramaswami & Singh, 2003), and service recovery (Blodgett et al., 1997). Research has shown the important role of fairness in explaining job satisfaction (Moorman, 1991), satisfaction with complaint handling (Tax et al., 1998), satisfaction with service encounter (Smith et al., 1999), satisfaction with recovery (Maxham & Netemeyer, 2002), and reseller satisfaction (Yilmaz et al., 2004). However, the possible impact of three dimensions of fairness is still unclear in the Web-based learning context. No empirical work has been done to address this issue. This begs the question – whether an individual's perceptions of fair treatment in the Web-based learning process is strong enough to enhance his or her satisfaction with Web-based learning.

3. Research model and hypotheses

The study draws on the concept of subjective task value in expectancy-value model of achievement motivation and fairness theory to investigate the influences of value and fairness on learners’
satisfaction and continuance intention in the context of Web-based learning. Following prior research (Blodgett et al., 1997; Moorman, 1991; Niehoff & Moorman, 1993; Tax et al., 1998), we define fairness with three distinct dimensions: distributive, procedural, and interactional. Following Eccles et al. (1983), we identified four components of subjective task value: attainment value, utility value, intrinsic value, and cost. The proposed theoretical model is shown in Fig. 1. The dependent variable is Web-based learning continuance intention, which refers to the subjective probability that an individual will continue using Web-based learning. The basic assumption is that Web-based learning continuance intention is determined by attainment value, utility value, intrinsic value, cost, and satisfaction. Satisfaction, in turn, is jointly determined by distributive fairness, procedural fairness, interactional fairness, attainment value, utility value, intrinsic value, and cost.

3.1. Distributive fairness

In this study, distributive fairness refers to learners’ perceived fairness of the grades they receive. Equity theory (Adams, 1965) postulates that individuals who are fairly rewarded experience satisfaction and will be motivated to engage in a certain behavior. According to Kumar et al. (1995), distributive fairness is helpful in building good relationships between instructors and learners, which in turn will lead to learners’ satisfaction. While the influence of distributive fairness on learners’ satisfaction has not been explicitly examined in the Web-based learning research, support for the relationships can be found in other settings. For example, some studies found that distributive fairness exerted a significant influence on satisfaction with job (Lind & Tyler, 1988; Moorman, 1991), service encounter (Smith et al., 1999), and complaint handling (Tax et al., 1998). Therefore, the following hypothesis is proposed.

**H1:** Distributive fairness is positively related to learners’ satisfaction with Web-based learning.

3.2. Procedural fairness

In this study, procedural fairness refers to the perceived fairness of the procedures that produce the grade. Folger and Greenberg (1985) argued that how outcomes are determined may be more
important than the actual outcomes. Prior research indicates that if individuals believe that the procedures used to produce the outcomes are fair, they are likely to be satisfied with the outcomes, even if the outcomes are considered unfair (Lind & Tyler, 1988). Both organizational justice theorists (Folger & Konovsky, 1989) and consumer behavior researchers (Maxham & Netemeyer, 2002) suggested that perception of procedural fairness enhances the probability of maintaining a long-term overall satisfaction between parties. According to Seiders and Berry (1998), grading process is an integral part of the Web-based learning service, thus the instructors can enhance learners’ satisfaction with Web-based learning by engaging activities that enhance learner perceptions of procedural justice. Prior research has found relationships between procedural fairness and satisfaction with variables such as pay (Folger & Konovsky, 1989), reseller (Yilmaz et al., 2004), service encounter (Smith et al., 1999), and complaint handling (Tax et al., 1998). Accordingly, this study theorizes that if the instructor’s grading process is perceived by learners as fair, they are more satisfied with Web-based learning.

H2: Procedural fairness is positively related to learners’ satisfaction with Web-based learning.

3.3. Interactional fairness

In this study, interactional fairness refers to the extent to which learners feel they have been treated fairly regarding their online interaction with the instructor throughout the Web-based learning process. Since interaction between learners and instructors plays an important role in the online learning process (Palloff & Pratt, 1999), instructors can enhance learners’ satisfaction with the Web-based learning by engaging activities that enhance learner perceptions of interactional fairness. This notion has some support in other settings. Maxham and Netemeyer (2002) found effects of interactional fairness on satisfaction with recovery and overall firm satisfaction. Tax et al. (1998) reported a strong effect of interactional fairness on satisfaction with complaint handling, while Smith et al. (1999) demonstrated that positive perceptions of interactional fairness significantly enhanced customer satisfaction with service counter. Therefore, the following hypothesis is proposed.

H3: Interactional fairness is positively related to learners’ satisfaction with Web-based learning.

3.4. Attainment value

In this study, attainment value represents the importance of doing well on Web-based learning in terms of the learner’s self-schema and core personal values. Wigfield and Eccles (1992) argued that tasks will have higher attainment value to the extent that they allow the individual to confirm salient aspects of his or her self-schema. Attainment value is similar to the notions of integrated regulation of extrinsic motivation in self-determination theory (Ryan & Deci, 2000). In integrated regulation, individuals assimilate identified importance of a behavior into their coherent sense of self, and thus fully accept it as their own. Ryan and Deci (2000) argued that when identifications have become fully integrated, one will behave with a true sense of volition and willingness. In general, students will be more likely to engage in a task, expend more effort on it, and do better on it when they value it (Wigfield, 1994). Meece et al. (1990) found that the attainment value junior high school students attached to math competence predicted their intentions to continue taking math. Therefore, the following hypotheses are proposed.


**H4:** Attainment value is positively related to learners’ satisfaction with Web-based learning.

**H5:** Attainment value is positively related to learners’ intention to continue using Web-based learning.

3.5. Utility value

In this study, utility value is how well taking Web-based learning courses relates to current and future career goals, such as solving problems at work, promotion, and pursuing advanced studies. Utility value of an activity can be tied to the construct of extrinsic motivation in self determination theory (Deci & Ryan, 1985), in that it taps more instrumental reasons for engaging in a task. Extrinsic motivation refers to doing something because it leads to a separable outcome. Eccles and Wigfield (2002) argued that a learning activity can have positive values to a person because it facilitates important future goals, even if he or she is not interested in the learning activity for its own sake. Ryan and Deci (2000) argued that “students can perform extrinsically motivated actions with willingness that reflects an inner acceptance of the value or utility of task”. Utility value has long been identified as a major influence on students’ achievement choices and behaviors. In a study of college women’s value orientations toward family, career, and graduate school, Battle and Wigfield (2003) found that utility value predicted intentions to attend graduate school. Several researchers have found that students’ perceptions of the utility of mathematics are strongly related to their intentions to continue or discontinue their mathematical study (Brush, 1980; Fennema & Sherman, 1977). Sullins, Hernandez, Fuller, and Tashiro (1995) found that value factors significantly predicted intention to enroll in future biology courses.

In consumer behavior, perceived value has been defined as “the consumer’s overall assessment of the utility of a product based on perceptions of what is received and what is given” (Zeithaml, 1988). A number of studies have demonstrated the effect of personal value on satisfaction and behavioral intention. Spreng, Dixon, and Olshavsky (1993) argued that value should be a direct antecedent of satisfaction. Bojanic (1996) suggested that high levels of perceived value result in purchase and ultimately higher levels of customer satisfaction. Patterson and Spreng (1997) found that perceived value had a significant effect on customer satisfaction in the context of business-to-business professional services. Therefore, the following hypotheses are proposed.

**H6:** Utility value is positively related to learners’ satisfaction with Web-based learning.

**H7:** Utility value is positively related to learners’ intention to continue using Web-based learning.

3.6. Intrinsic value

This study follow Davis, Bagozzi, and Warshaw’s (1992) definition of intrinsic value as the extent to which the activity of using a Web-based learning is perceived to be personally enjoyable in its own right aside from the instrumental value of the technology. According to self determination theory, learners are self-determining and intrinsically motivated in Web-based learning when they are interested in it or enjoy doing it. Triandis (1980) argues that affect (e.g., the feelings of joy, elation, and pleasure) has an impact on behavioral intentions. Hsu and Chiu (2004) extended and empirically validated the theory of planned behavior (Ajzen, 2002) in the electronic service (e-service) context. The results showed that perceived playfulness had a significant effect on
individuals’ satisfaction with e-service. Wigfield and Eccles (1989) indicated that junior and senior high school students’ interest in math predicted their intentions to keep taking math. In a study of college students’ course performance and future enrollment intentions, Bong (2001) found that students who were intrinsically interested in topics covered in the present course would be more willing to take similar courses in the future. Therefore, the following hypotheses are proposed.

- **H8**: Intrinsic value is positively related to learners’ satisfaction with Web-based learning.
- **H9**: Intrinsic value is positively related to learners’ intention to continue using Web-based learning.

### 3.7. Cost

Cost refers to negative aspects of engaging in Web-based learning. In this study, we focus on restriction on learners’ interactions with other learners and instructors, and feeling of isolation or not being part of the learning community. Online learning is very different from face-to-face instruction. Learners are geographically separated and thus most of the time, the interaction among learners is based on asynchronous and text-based communication, which can lead to restriction on socialization or feeling of isolation. Online learning students tend to suffer from isolation—a significant factor contributing to withdrawal from study (Bennett, Priest, & Macpherson, 1999). Kahl and Cropley (1986) suggested distance learning students feel more isolated than face-to-face students and experience lower levels of self-confidence as a result. This has a significant effect on the distance learning students’ motivation and learning and even can lead them to drop out. Arbaugh (2000) found that perceived interaction difficulty was negatively correlated with students’ satisfaction with Web-based MBA courses. Billings, Conners, and Skiba (2001) found that students felt somewhat isolated from other students and instructors in the Web-based learning environment. Isolation was negatively related to satisfaction with Web-based courses. Battle and Wigfield (2003) found that cost was a significant and negative predictor of college women’s intentions to attend graduate school. Therefore, the following hypotheses are proposed.

- **H10**: Cost is negatively related to learners’ satisfaction with Web-based learning.
- **H11**: Cost is negatively related to learners’ intention to continue using Web-based learning.

### 3.8. Satisfaction

Satisfaction is an individual’s feelings of pleasure or disappointment resulting from comparing the perceived performance (or outcome) of Web-based learning in relation to his or her expectations. Oliver (1980) theorized that satisfaction is positively correlated with future intention, both directly and indirectly via its impact on attitude. In the final step of satisfaction formation processes, satisfaction determines intentions to patronize or not to patronize the store in the future (Swan & Trawick, 1981). McGorry (2003) argued that student satisfaction with online learning courses is likely to determine whether the student takes subsequent courses. Chiu et al. (2005) reported that learners’ satisfaction with e-learning was significantly associated with their continuance intention. Therefore, the following hypothesis is proposed.

- **H12**: Satisfaction is positively related to learners’ intentions to continue using Web-based learning.
4. Research methodology

4.1. Measurement development

Measurement items were adapted from the literature wherever possible. A pretest of the questionnaire was performed using six experts in the IS area to assess its logical consistency, ease of understanding, sequence of items, and contextual relevance. The comments collected from these experts led to several minor modifications of the wording and the item sequence. Furthermore, a pilot study was conducted involving 20 master students who ever took Web-based learning course. Comments and suggestions on the item contents and structure of the instrument were solicited. The questionnaire was further modified based on the comments and suggestions.

Items for measuring attainment value were adapted from Eccles et al. (1983) and Battle and Wigfield (2003). The items measured the importance of doing well on Web-based learning. Items for measuring utility value were also adapted from Eccles et al. (1983) and Battle and Wigfield (2003). These items focused on how well taking Web-based learning courses relates to learners' current and future career goals, such as getting a job, solving problems at work, promotion, and pursuing advanced studies. Items for intrinsic value reflect whether Web-based learning is interesting, enjoyable and fun, similar to those applied by Battle and Wigfield (2003) and Moon and Kim (2001). Items for measuring cost were based on Eccles et al.'s (1983) concept. These items measured four negative effects of Web-based learning. Distributive fairness was measured with items adapted from Folger and Konovsky (1989). The measure focused on the extent to which the grade received by a learner was perceived to be related to his or her effort, performance, and the amount of time spent. Procedural fairness was assessed with items adapted to reflect the degree to which fair procedures were used by the instructor in arriving at the grading decisions, following Folger and Konovsky (1989) and Moorman (1991). Interactional fairness was measured with items based on Folger and Konovsky (1989) and Moorman (1991), focusing on the instructor's interaction with learners. Specific items asked whether the instructor showed concern to the learner's questions, whether the instructor treated the learner with dignity and respect, and whether the instructor dealt with the learner in a truthful manner. Items related to satisfaction were adapted from Oliver (1980) and Oliver and Swan (1989). Items for measuring continuance intention were adapted from prior work by Mathieson (1991) and Bhattacharjee (2001). For all the measures, a seven-point Likert scale was adopted with anchors ranging from strongly disagree (1) to strongly agree (7).

4.2. Survey administration

Data were gathered from students of a Web-based learning program provided by National Kaohsiung Normal University (NKNU) in Taiwan. The program provides credits for individuals interested in special education and computer skills. The Web-based learning service is a Unix-based system and its learning is delivered via blend of asynchronous and synchronous technologies. Synchronous Web-based learning service consists of real-time interaction between learners and instructors, facilitated by tools such as Web Meeting (videoconferencing) and chat rooms. Asynchronous Web-based learning service is a self-study that may be supplemented by non-real
time interaction with the instructor, for instance through email, message boards, and forums. The survey began on October 4, 2004 and ended on November 25, 2004. The first page of the questionnaire explained the purpose of this study and ensured the confidentiality. A total of 600 surveys were distributed to individuals who at least took one course offered by the NKNU Web-based learning service. A total of 221 surveys were returned. The exclusion of responses from incomplete questionnaires resulted in a total of 202 usable questionnaires (a net response rate of 33.7%). Among the respondents, 69% were female and 31% were male. Fifty-six percent have earned a bachelor’s degree and 25% have received a master’s degree. Among the respondents, 80% ever took one Web-based course, 15% ever took two or three Web-based courses, and 5% ever took at least four Web-based courses. On average, the respondents were 28 years of age and spent 17 h per week in using the Internet.

4.3. Data analysis

Data analysis utilized a two-step approach as recommended by Anderson and Gerbing (1988). The first step involves the analysis of the measurement model, while the second step tests the structural relationships among latent constructs. The aim of the two-step approach is to assess the reliability and validity of the constructs before their use in the full model.

Confirmatory factor analysis (CFA) was applied to assess the construct validity of the nine scales (attainment value, utility value, intrinsic value, cost, distributive fairness, procedural fairness, interactional fairness, satisfaction, and continuance intention) with LISREL. Each item was modeled as a reflective indicator of its latent construct. The nine constructs were allowed to co-vary freely in the CFA model. Model estimation was done using the maximum likelihood approach, with the item correlation matrix as input. Table 1 presents the results of the CFA analysis.

For measurement models to have sufficiently good model fit, the $\chi^2$ value normalized by degrees of freedom ($\chi^2$/df) should not exceed 3, goodness-of-fit index (GFI), Adjusted GFI (AGFI) should exceed 0.8 (Doll, Xia, & Torkzadeh, 1994), non-normed fit index (NNFI) and comparative fit index (CFI) should exceed 0.9, and root mean square error of approximation (RMSEA) should not exceed 0.08. As shown in Table 2, the fit indices are within accepted thresholds, except for AGFI, which is slightly lower than the commonly cited threshold: $\chi^2$ to degrees of freedom ratio of 1.45 ($\chi^2$ = 797; df = 551), GFI = 0.82, NNFI = 0.95, CFI = 0.95, and RMSEA = 0.047. According to Boudreau, Gefen, and Straub (2001) and Gefen, Karahanna, and Straub (2003), it is common that not all fit indices are beyond acceptable thresholds in LISREL. Hence, this model fitted reasonably well with the data.

Reliability was examined using the composite alpha values. As shown in Table 1, all the values were above 0.7; this indicates a commonly acceptable level for explanatory research. Additionally, convergent validity of the resulting scales was verified by using two criteria suggested by Fornell and Larcker (1981): (1) all indicator loadings should be significant and exceed 0.7 and (2) average variance extracted (AVE) by each construct should exceed the variance due to measurement error for that construct (i.e., AVE should exceed 0.50). For the current CFA model, only two of the 36 loadings were slightly below the 0.7 threshold (see Table 1). AVE ranged from 0.54 to 0.81 (see Table 3), greater than variance due to measurement error. Hence, the convergent validity was strongly supported.
### Summary of measurement scales

<table>
<thead>
<tr>
<th>Construct</th>
<th>Measure</th>
<th>Mean</th>
<th>SD</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attainment value (AV)</strong></td>
<td>Composite alpha = 0.89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AV1</td>
<td>The amount of effort it took through Web-based learning was worthwhile to me</td>
<td>5.77</td>
<td>0.85</td>
<td>0.79</td>
</tr>
<tr>
<td>AV2</td>
<td>Web-based learning made me a more knowledgeable person</td>
<td>6.00</td>
<td>0.78</td>
<td>0.93</td>
</tr>
<tr>
<td>AV3</td>
<td>Web-based learning broadened my view</td>
<td>6.02</td>
<td>0.77</td>
<td>0.89</td>
</tr>
<tr>
<td>AV4</td>
<td>Being successful at Web-based learning confirmed my competence</td>
<td>5.77</td>
<td>0.95</td>
<td>0.63</td>
</tr>
<tr>
<td><strong>Utility value (UV)</strong></td>
<td>Composite alpha = 0.83</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UV1</td>
<td>What I learned through Web-based learning was helpful for me to get a job</td>
<td>5.28</td>
<td>1.11</td>
<td>0.78</td>
</tr>
<tr>
<td>UV2</td>
<td>What I learned through Web-based learning was useful for resolving my problems at work</td>
<td>5.55</td>
<td>0.94</td>
<td>0.74</td>
</tr>
<tr>
<td>UV3</td>
<td>What I learned through Web-based learning was useful for my promotion</td>
<td>4.86</td>
<td>1.15</td>
<td>0.62</td>
</tr>
<tr>
<td>UV4</td>
<td>The credits I got through Web-based learning were useful for pursuing advanced studies</td>
<td>5.70</td>
<td>0.95</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Intrinsic value (IV)</strong></td>
<td>Composite alpha = 0.92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV1</td>
<td>I think Web-based learning is interesting</td>
<td>5.40</td>
<td>0.98</td>
<td>0.78</td>
</tr>
<tr>
<td>IV2</td>
<td>I think Web-based learning is enjoyable</td>
<td>5.29</td>
<td>1.00</td>
<td>0.95</td>
</tr>
<tr>
<td>IV3</td>
<td>I think Web-based learning is fun</td>
<td>5.27</td>
<td>1.00</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Cost (C)</strong></td>
<td>Composite alpha = 0.90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>Web-based learning reduced opportunities for interaction among learners</td>
<td>4.80</td>
<td>1.35</td>
<td>0.78</td>
</tr>
<tr>
<td>C2</td>
<td>Web-based learning reduced opportunities of student–teacher dialogue</td>
<td>4.83</td>
<td>1.35</td>
<td>0.81</td>
</tr>
<tr>
<td>C3</td>
<td>Web-based learning reduced the sense of being part of the learning community</td>
<td>5.21</td>
<td>1.26</td>
<td>0.87</td>
</tr>
<tr>
<td>C4</td>
<td>Web-based learning reduced opportunities for discussing with and learning from other learners</td>
<td>4.85</td>
<td>1.39</td>
<td>0.86</td>
</tr>
<tr>
<td><strong>Distributive fairness (DF)</strong></td>
<td>Composite alpha = 0.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DF1</td>
<td>The grade I received was fair considering my effort</td>
<td>4.88</td>
<td>1.10</td>
<td>0.80</td>
</tr>
<tr>
<td>DF2</td>
<td>The grade I received was fair considering my performance</td>
<td>4.84</td>
<td>1.10</td>
<td>0.87</td>
</tr>
<tr>
<td>DF3</td>
<td>The grade I received was fair considering the amount of time I spent</td>
<td>4.94</td>
<td>1.04</td>
<td>0.93</td>
</tr>
<tr>
<td>DF4</td>
<td>Overall, the grade I received was fair</td>
<td>5.02</td>
<td>1.00</td>
<td>0.81</td>
</tr>
<tr>
<td><strong>Procedural fairness (PF)</strong></td>
<td>Composite alpha = 0.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF1</td>
<td>The instructor collected accurate information necessary for making the grading decisions</td>
<td>4.73</td>
<td>1.13</td>
<td>0.84</td>
</tr>
<tr>
<td>PF2</td>
<td>The instructor provided opportunities to appeal or challenge the grading decisions</td>
<td>4.76</td>
<td>1.21</td>
<td>0.80</td>
</tr>
<tr>
<td>PF3</td>
<td>The instructor generated standard so the grading decisions could be made with consistency</td>
<td>4.74</td>
<td>1.09</td>
<td>0.86</td>
</tr>
</tbody>
</table>
Finally, discriminant validity of the resulting scales was assessed using the guideline suggested by Fornell and Larcker (1981): the square root of the AVE from the construct should be greater than the correlation shared between the construct and other constructs in the model. Table 3 lists the correlations among the constructs, with the square root of the AVE on the diagonal. All the diagonal values exceed the inter-construct correlations; hence the test of discriminant validity was acceptable. Therefore, we conclude that the measures have demonstrated sufficient construct validity.

The structural model reflecting the assumed linear, causal relationships among latent constructs was tested with the data collected from the validated measures. The structural model yielded an acceptable fit: $\chi^2/df = 1.45$ ($\chi^2 = 802; df = 554$), GFI = 0.82, AGFI = 0.78, CFI = 0.95, NNFI = 0.94, and RMSEA = 0.047.

The test results of the structural model are summarized in Fig. 2. Seven out of the 12 paths exhibited a $P$-value less than 0.05, while the remaining five were not significant at the 0.05 level of significance. The paths from distributive fairness, interactional fairness, attainment value, utility
value, and intrinsic value to satisfaction were significant, while procedural fairness and cost showed no significant influence on satisfaction. Consequently, hypotheses 1, 3, 4, 6 and 8 were supported empirically while hypotheses 2 and 10 were not supported. Utility value significantly and positively affected continuance intention, while attainment value, intrinsic value, and cost did not exhibit significant positive effects on continuance intention. Hypothesis 7 was supported while hypotheses 5, 9, and 11 were not supported. Satisfaction exhibited a strong positive effect on continuance intention, supporting hypothesis 12.

The explanatory power of the research model is also shown in Fig. 2. The $R^2$ value for continuance intention shows that attainment value, utility value, intrinsic value, cost, and satisfaction account for 66% of variance of continuance intention. The $R^2$ value for satisfaction shows that

![Fig. 2. SEM analysis of research model.](image-url)

*p-value < 0.05
5. Discussion and conclusions

Creating perceptions of value is a primary means of enhancing learners’ feeling of satisfaction and developing long-term relationship with them, which is as important as learners’ perceptions of fairness. This study provides an initial step toward understanding the integrated influence of subjective task value and fairness on learners’ satisfaction and continuance intention in the context of Web-based learning.

The findings indicated that learners who experienced higher levels of distributive fairness and interactional fairness were more satisfied with Web-based learning. Contrary to our expectations, we found that procedural fairness did not have a significant impact on satisfaction. This finding is inconsistent with Folger and Greenberg’s (1985) argument that how outcomes are determined may be more important than the actual outcomes. One possible explanation for the insignificant relationship between procedural fairness and satisfaction is that higher levels of distributive fairness and interactional fairness compensate for lower levels of procedural fairness. In other words, learners may be satisfied with the Web-based learning when a low quality of procedures were used by the instructor to arrive at grading decisions, provided that the instructor dealt with them in a truthful manner, the instructor showed concern to their questions or problems, and the grades they received were fair. The grading of the National Kaohsiung Normal University’s (NKNU) Web-based learning service is based on learners’ midterm and final exams, term reports, and participation in online interaction (office hours). Learners would receive the final grades through mail two or three weeks latter after the semester ended. To enhance learners’ satisfaction, this study suggests that the NKNU Web-based learning system should provide a real-time feedback mechanism that allows learners to access the details about grading process. For example, the mechanism could show learners’ grades of each part (e.g., exams, reports, and online interaction) and their ranking in the whole class for each part. Instructors of the NKNU Web-based learning service were scheduled to offer six times of online interaction during the semester and each interaction should last three hours. The findings indicated that even though each instructor had about 50 learners, he or she could still offer fair treatment to learners during online interaction, which in turn increased learners’ satisfaction with Web-based learning. The findings suggest that a learner should collect information about whether or not instructors are fair in grading and treating learners during online interaction before selecting a course in order to enhance his or her satisfaction with the Web-based course. The findings also suggest that Web-based learning providers (academics) could provide some reward mechanisms to stimulate instructors to deal with learners in a truthful manner and show concern and respect to learners during online interaction.

Additionally, the findings indicated that the influences of attainment value, utility value, and intrinsic value on satisfaction were significant, whereas the influence of cost was not significant. One possible explanation for the finding is that learners participating in Web-based learning do not really expect extensive interaction. The findings suggest that learners may be satisfied with the Web-based learning even when negative aspects of it existed, provided that doing well on it is important to them, taking Web-based learning courses relates to their current and future career.
goals, and it is interesting, enjoyable and fun. Prensky (2001) argued that computer games give fun in the learning process and thus motivate individuals to learn. Klaila (2001) argued that “e-learning consumers should expect programs that incorporate the same innovative tools and techniques used in the computer gaming industry – such as graphics, interaction, and skill-building challenges – to deliver an educational experience that’s compelling, informative, and fun”. Neal and Normore (2005) suggested that surprising and challenging situations, collaboration, interactivity, and flexibility of the program make e-learning fun. Accordingly, developers and designers of Web-based learning sites can employ aforementioned elements to reduce monotony, exploit learners’ playful characteristics, and increase their satisfaction. To enhance satisfaction, learners could take courses from Web-based learning academics working with corporations to offer courses that are practical and helpful to their careers.

The key finding of this study is that only utility value and satisfaction make significant contributions to learners’ intention to continue using Web-based learning. The finding suggests that satisfaction plays the major role in shaping learners’ intention to continue using Web-based learning. Utility value explained a significantly greater percentage of variance of learners' continuance intention than did attainment value, intrinsic value, and cost. The finding suggests that learners in our study put more emphasis on the utility of learning activities than on the importance, interest, and negative aspects as they evaluate the value of Web-based learning. In other words, learners are goal-oriented and concern extrinsic reasons for engaging in Web-based learning. To increase learners’ intention to continue using Web-based learning, the providers should offer courses that could help learners develop their skills and knowledge and degrees that meet learners’ career goals.

As shown in Table 4, attainment value and intrinsic value had positive and indirect effects on continuance intention through satisfaction. The results indicate a strong mediation of satisfaction in the effects of attainment value and intrinsic value. It implies that while attainment value and intrinsic value may increase learners’ satisfaction with Web-based learning, they may not be strong enough to increase learners’ continuance intention directly. Web-based learning providers should develop a long-term strategy to enhance learners’ satisfaction and maintain or enhance users’ loyalties to Web-based learning services. Additionally, distributive fairness was found to be the second factor influencing continuance intention in terms of total effect (direct plus indirect effect), while utility value was found to be the third factor. The results suggest that learners are more concerned with the fairness of the outcomes than the utility of Web-based learning. The results also suggest that individuals who are fairly rewarded not only experience satisfaction but also will be motivated.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distributive fairness</td>
<td>0.00</td>
<td>0.389 (0.48 × 0.81)</td>
<td>0.389</td>
</tr>
<tr>
<td>Procedural fairness</td>
<td>0.00</td>
<td>−0.081 (−0.10 × 0.81)</td>
<td>−0.081</td>
</tr>
<tr>
<td>Interactional fairness</td>
<td>0.00</td>
<td>0.113 (0.14 × 0.81)</td>
<td>0.113</td>
</tr>
<tr>
<td>Attainment value</td>
<td>0.01</td>
<td>0.162 (0.20 × 0.81)</td>
<td>0.172</td>
</tr>
<tr>
<td>Utility value</td>
<td>0.15</td>
<td>0.154 (0.19 × 0.81)</td>
<td>0.304</td>
</tr>
<tr>
<td>Intrinsic value</td>
<td>0.00</td>
<td>0.122 (0.15 × 0.81)</td>
<td>0.122</td>
</tr>
<tr>
<td>Cost</td>
<td>0.01</td>
<td>0.041 (0.05 × 0.81)</td>
<td>0.051</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.81</td>
<td>0.00</td>
<td>0.810</td>
</tr>
</tbody>
</table>
to continue using Web-based learning. Accordingly, an interesting area for future research is to examine the direct effects of the three dimensions of fairness on Web-based learning continuance intention. Finally, the results suggest that failure to include the influence of distributive fairness, interactional fairness, attainment value, utility value, and intrinsic value may lead to inappropriate conclusions and limit the explanatory power of learners’ satisfaction with Web-based learning.

Although the findings are encouraging and useful, the present study has certain limitations. First, whether our findings could be generalized to all types of Web-based learning is unclear. This study focuses on Web-based learning for continuing education. Factors influencing satisfaction and continuance intention of part-time students might be different from those of full-time students. Further research is necessary to verify the generalizability of our findings. Second, the results may have been impacted by self-selection bias. Our sample comprised only active users of Web-based learning. Individuals who had already ceased to participate in Web-based learning might have different perceptions about the influence of components of subjective task value and dimensions of fairness, and so may have been differently affected by them. Therefore, the results should be interpreted as only explaining satisfaction and continuance intention of active users of Web-based learning. Whether the results can be generalized to non-participants or to disaffected users will require additional research. Third, the effects of fairness and value components on satisfaction and continuance intention may change with increasing user experience over time. For example, attainment value might exert its influence on learners’ continuance intention at the early adoption stage. Its influence on continuance intention might decrease as learners have more experience in using Web-based learning (take more Web-based courses). Yet, the learners’ responses in our research were cross-sectional data and did not present an opportunity to examine the long-term trend of these hypothesized relationships. Further longitudinal studies are recommended to validate our research model in this regard. Finally, the program offered by NKNU is for any individual who has a need for continuing education. Learners participated in the NKNU Web-based learning in a voluntary setting (i.e., under their full volitional control). Some organizations or companies offered online learning in which individuals participated in the learning programs in a mandatory setting (i.e., based on the organization’s regulation or other normative considerations). Our findings may not be generalized to the mandatory setting. Further research is necessary to verify the differences between the voluntary and mandatory settings.

Finally, DeLone and McLean’s (2003) IS success model posits that information quality, system quality, and service quality are major determinants of users’ satisfaction with and intention to use information systems. Later studies could explore the effect of information quality, system quality, and service quality on learners’ satisfaction with and intention to continue using Web-based learning. Theory of planned behavior (TPB) (Ajzen, 2002) theorizes that attitude, subjective norm, perceived controllability, and self-efficacy are important predictors of behavioral intention. Therefore, future research could examine the influences of attitudinal beliefs, subjective norm, perceived controllability, and self-efficacy on Web-based learning continuance intention.

References


