

EXTENDING THE TECHNOLOGY ACCEPTANCE MODEL FOR THE WORLD-WIDE-WEB CONTEXT: PLAYFULNESS AS A SILENT BELIEF

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ABSTRACT

Ease of use and usefulness have been believed to be fundamental in determining the acceptance and use of various, corporate information technologies. These beliefs, however, may not have the same explanatory power on the user's acceptance behavior towards newly emerging information technologies, such as World-Wide-Web (WWW). In this study, we introduce playfulness as a new construct to reflect the user's intrinsic belief in WWW acceptance. Using playfulness as an intrinsic motivation factor, we extend and empirically validate the Davis, et al.'s Technology Acceptance Model (TAM) for the WWW context.

KEYWORDS

TAM, Technology Acceptance Model, World-Wide-Web, Playfulness

1. Introduction

During the past ten years, perceived ease of use and perceived usefulness constructs have both been believed to be important in determining the individuals' acceptance and use of information technologies. These variables are fundamental salient beliefs (motivational factors) comprising the Technology Acceptance Model (TAM) [12]. IS researchers have investigated and replicated these two constructs and agreed that these constructs are valid in predicting the individual's acceptance of various, corporate information technologies. However, depending on

the specific technology context, additional explanatory variables may be needed beyond the ease of use and usefulness constructs. Davis [10, 11] himself argued that future technology acceptance research needs to address how other variables related to usefulness, ease of use, and user acceptance. Factors contributing to the acceptance of a new information technology are likely to vary with the technology, target users, and the context. Now the World-Wide-Web (shortly WWW) is seen as the emerging new information technology, with such potency that it has even individuals to change their information access methods and organizations to change their business strategy. Thus, research on the acceptance of WWW will enhance our understanding of the individual's beliefs or motives to use WWW and how these factors affect the individual's WWW acceptance behavior.

The purpose of this study is to extend the Technology Acceptance Model (TAM) [12] for the WWW context. We propose a new variable ("perceived playfulness") to enhance understanding of individual's acceptance behaviors towards WWW. Besides, this research assesses the effects of difference between individual's intrinsic and extrinsic motivation factors on the individuals' WWW acceptance behavior.

The remainder of this paper is organized as follows. The first section provides a brief review of the relevant literature on TAM and an overview of how playfulness can be used as a theoretical base for extending TAM. Next, we present a set of hypotheses based on this extension of TAM and discuss the research method used to test the proposed model. Finally, we present the analysis and results of our study, followed by the discussion of its implications for practitioners and researchers.

2. Literature review

2.1. Extrinsic and intrinsic motivation on IT acceptance

Recently, in the technology acceptance research area, motivation theories have been used to understand individuals' IT acceptance behaviors. Motivation theorists have often distinguished the effects of extrinsic and intrinsic motivation on individuals' behaviors. In Deci's work [15], extrinsic motivation refers to the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improving job performance, pay, or promotions. Intrinsic motivation refers to the performance of an activity for no apparent reinforcement other than the process of performing the activity per se. If a situation contains a specific goal, which provides satisfaction independent of the actual activity itself, such behavior is said to be extrinsically motivated. On the other hand, if an activity is valued for its own sake and appears to be self-sustained, such behavior is said to be intrinsically motivated.

In the technology acceptance research, majority of the work has been conducted with the extrinsic motivation perspective. On differences between intrinsic and extrinsic motivation factors on the individual's IT usage behaviors, Davis, et al. [13] investigated the relative effects of extrinsic and intrinsic motivation source on intention to use, and usage of, computer in the workplace context. In the study, they defined perceived usefulness as an extrinsic source of motivation and perceived enjoyment as an intrinsic source of motivation. They found that perceived enjoyment and perceived usefulness mediated the influence of perceived ease of use on intention. They also argued that "while usefulness will once again emerge as a major determinant of intentions to use a computer in the workplace, enjoyment will explain significant variance in usage intentions beyond that

accounted for by usefulness alone” [p. 1113]. Igbaria et al.’s study [22, 23] also found that system usage is affected by both extrinsic motivation (perceived usefulness) and intrinsic motivation (perceived fun). However, adoption of individual’s intrinsic motivation factor such as perceived enjoyment or perceived fun as a research construct needs further theoretical validation. For example, Davis et al. [13]’s measurements of perceived enjoyment do not reflect the comprehensive set of intrinsic motivation states such as activity absorption, exploratory behaviors, curiosity, and arousal. To reflect more comprehensive characteristics of intrinsic motivation in the human-computer interactions, we propose the “playfulness” concept as an individual’s intrinsic salient belief to explain the individual’s intrinsically motivated behaviors.

2.3. Research on playfulness in human-computer interaction

Playfulness concept, which is based on the Lieberman’s pioneering works [26] and Barnett’s studies [4, 5], provides a strong theoretical base for studying the effects of intrinsic motivation on individuals’ information technology utilization behaviors.

There are two research approaches using the playfulness concept to explain the individual’s computer usage behaviors [44]. The first approach, focusing on the trait of playfulness, treats “playfulness” as a motivational characteristic of individuals. The second approach, emphasizing the state of playfulness, defines “playfulness” as a situational characteristic of the interaction between an individual and the situation. General traits refer to comparatively stable characteristics of individuals that are relatively invariant to situational stimuli. States, however, refer to affective or cognitive episodes that are experienced in the short run and fluctuate over time. Unlike traits, states can be influenced by situational factors and the interactions between the individual and the situation. The trait of playfulness represents a relatively enduring tendency to interact playfully with something, while the state of playfulness represents a temporary state of playfulness with something.

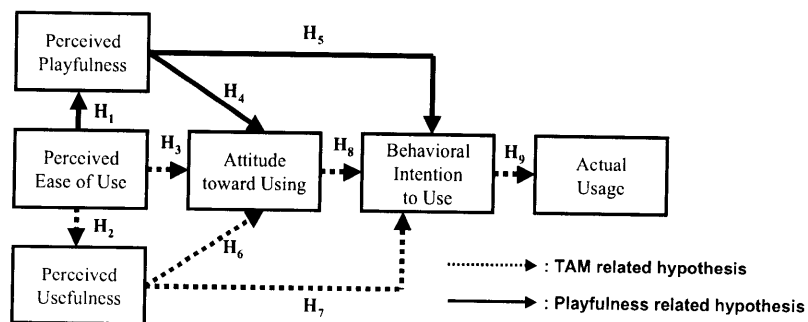
In the trait-based approach, Webster and Martocchio’s [44] “Microcomputer Playfulness Scale” is a specific adaptation of the Barnett [4]’s work to the study of computer usage. In their study, they conceived playfulness as the characteristic of an individual. Martocchio and Webster [30] found that individuals considered to be high on the playfulness trait demonstrated higher performance and showed higher affective responses to computer training tasks. Also, Atkins and Kydd [2] examined the influence of the individual characteristic of playfulness on the use of WWW. They found that both playfulness and usefulness affect the WWW use differentially for entertaining purposes and for course work purposes. While the trait-based approach focused on playfulness as the individual’s characteristic, the state-based research emphasize playfulness as the individual’s subjective experience of human-computer interaction. Majority of the research on playfulness as the individual’s interaction state are based on the Csikszentimihalyi [9]’s “flow theory.” The flow theory emphasizes the role of a context rather than individual differences in explaining human motivated behaviors. He defined the flow as “the holistic sensation that people feel when they act with total involvement.” [p. 36] When in the flow state, a person may have more voluntary interaction with his or her environment. Based on the flow theory, Several IS researchers [41, 45] conceived that the flow concept is useful for understanding playfulness and individuals’ evaluation of the IT usage. Trevino and Webster [41] found that flow is influenced by the technology type, ease of use, and computer skill. Also, Webster, et al. [45] examined the state of flow in a specific human-computer interaction. They found that the flow experience is associated with perceived characteristics of the computer software as well

as with relevant work-related outcomes. But, from the point of the technology acceptance research, their studies cannot theoretically explain the effects of playfulness on the individual's attitude and actual behaviors. To overcome this problem, we propose playfulness as an intrinsic belief or motive, which is shaped from the individual's experiences with the environment. More specifically, we examine playfulness as intrinsic salient belief that is formed from the individual's subjective experience with WWW. Therefore, individuals who have more positive playfulness belief with WWW should view WWW interactions more positively than those who interact less playfully.

3. Research model and hypotheses

3.1. Research model & hypothesis

The present model for this research (Fig. 1) is an extension of the Technology Acceptance Model (TAM) based on the individuals intrinsic motivation theory. Perceived playfulness, the extended part of the model, is the construct of interest because it operationalizes how intrinsic motives affect the individual's acceptance of WWW. Based on the proposed construct of perceived playfulness, we hypothesized the following relationships (H1, H4, and H5). The basic assumption is that playfulness will have a positive effect on the individuals' attitude toward using WWW and their behavioral intentions to use WWW.



Hypothesis 1: There will be a positive relationship between perceived ease of use and perceived playfulness of using the WWW.

Hypothesis 4: There will be a positive relationship between Perceived Playfulness and Attitude toward Using the WWW.

Hypothesis 5: There will be a positive relationship between Perceived Playfulness and Behavioral Intention to Use the World-Wide-Web.

Because TAM is used as the baseline model, we then verify the following TAM's hypothesized relationships in the context of WWW.

H2: There will be a positive relationship between Perceived Ease of Use and Perceived Usefulness in the WWW

context.

H3: There will be a positive relationship between Perceived Ease of Use and Attitude toward Using in the WWW context.

H6: There will be a positive relationship between Perceived Usefulness and Attitude toward Using in the WWW context.

H7: There will be a positive relationship between Perceived Usefulness and Behavioral Intentions to Use in the WWW context.

H8: There will be a positive relationship between Attitude toward Using and Behavioral Intentions to Use in the WWW context.

H9: There will be a positive relationship between Behavioral Intentions to Use and Actual Use in the WWW context.

4. Research methodology

Subjects

The data for this study were gathered by means of a questionnaire. Overall, of the 208 questionnaires that were distributed, 152 usable questionnaires were received and used for analysis, thus giving a response rate of 78 percent. Ninety-one percent of the respondents were male, and 62 percent have more than a year of experience with the WWW.

Measurement development

To develop and validate the instrument to measure perceived playfulness, several steps were taken. These were (1) development of the measure from the literature, (2) initial pretest, and (3) pilot test of the measure. In this study, perceived playfulness is defined as “the strength of one’s belief that interacting with the WWW will fulfill his or her intrinsic motives.” To measure perceived playfulness, we operationalized perceived playfulness in terms of the degree of individual’s perceptions about concentration, enjoyment, and curiosity experienced while using WWW.

5. Results

The hypothesized relationships depicted in Figure 2 were tested using the regression analysis to maintain consistency with earlier studies. In this research, the stepwise multiple regression analysis technique is recommended to examine the contribution of each predictor variables to the regression model [21].

Hypothesis testing

Hypothesis 1 and 2 examine the links between the user’s beliefs about perceived ease of use and perceived playfulness and perceived usefulness. Perceived ease of use is significantly related with perceived playfulness

(beta = .378, t-value = 5.007, $p < .001$) and perceived usefulness (beta = .305, t-value = 3.928, $P < .001$). Therefore, hypothesis 1 and 2 were not rejected.

Hypothesis 3, 4, and 6 examine the effects of individual's perceptions of WWW on the attitude toward using WWW. The proposed model explains a significant percentage of variance in attitude ($R^2 = 38\%$, F-value = 30.692, $p < .001$). It is observed that at 0.001 significance level, perceived playfulness influences user's attitude toward using WWW. The positive influences of perceived usefulness and ease of use on attitude toward using as suggested by the original TAM are confirmed by our observations. Also, we conducted the stepwise multiple regression to examine the contribution of each predictor variable to the regression model [21]. The results shows that attitude toward using is influenced by three fundamental beliefs. Therefore, hypothesis 3, 4, and 6 were not rejected.

In hypothesis 5, 7, and 8, we investigate the influence of attitude, perceived usefulness, and perceived playfulness on the behavioral intention to use WWW. Behavioral intention's 39% of the variance is explained by attitude toward using, perceived usefulness, and perceived playfulness. Attitude toward using WWW has a strong significant influence on the behavioral intention (beta = 0.285, t-value = 3.750, $p < .001$). Also, perceived usefulness (beta = 0.269, t-value = .269, $p < .001$) and perceived playfulness (beta = 0.245, t-value = 3.302, $p \leq .001$) have a significant effect on the behavioral intention. The positive influences of perceived usefulness and attitude toward using as suggested by TAM are confirmed by our findings. Also, perceived playfulness has a significant positive effect on behavioral intentions to use. Therefore, Hypothesis 5, 7, and 8 were not rejected.

Individual's actual behavior is highly correlated with his or her behavior intentions. In our research, it is observed that at 0.001 significance level, behavioral intention to use WWW in the future has a strong positive relationship with actual WWW use. Therefore, Hypothesis 9 was not rejected.

7. Conclusion, limitations, and future research

This research has implications for the design and implementation of the WWW systems. As suggested by the previous research, perceived ease of use and perceived usefulness were verified to be important to user's perceptions of the WWW systems usage. In addition, perceptions of the playfulness appear to influence user's attitude toward using and behavioral intentions to use WWW. Thus, perceived playfulness may also be an important consideration in the design of the WWW systems. Systems that are designed to provide more concentration, curiosity, and enjoyment are expected to result in more positive attitudes and behavioral intentions on WWW users.

This study reports on an effort to conceptualize the impacts of intrinsic and extrinsic motivation on the individuals' WWW usage behaviors and to develop a measure of the playfulness concept that has adequate reliability and validity. Although these findings provide meaningful implications for the WWW technology, our study has the following limitations. First, the use of self-report scales to measure the study variables suggests possibility of the common method bias for some of the results obtained. In order to pursue further investigation of the conceptual model, it would be appropriate to develop a more direct and objective measures for user acceptance of WWW. Second, three beliefs (i.e., ease of use, usefulness, and playfulness) are influenced by the

various externally controllable factors such as development methodologies, training, organizational support and policy, individual and task characteristics, and user participation. Therefore, further research is needed to examine the relative influences of those external factors (individual, task, situational, technology, and organizational characteristics) on the perception and acceptance behavior. Finally, this study was conducted with a snapshot research approach, but, to provide more accurate explanation on the TAM's causal links, a longitudinal approach also needs to be taken.

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