

**Beyond the Usefulness and Ease of Use:
Extending the TAM for a World-Wide-Web Context**

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ABSTRACT

Ease of use and usefulness are believed to be fundamental in determining the acceptance and use of various, corporate ITs. These beliefs, however, may not explain the user's behavior towards newly emerging ITs, such as the World-Wide-Web (WWW).

In this study, we introduce playfulness as a new factor that reflects the user's intrinsic belief in WWW acceptance. Using it as an intrinsic motivation factor, we extend and empirically validate the Technology Acceptance Model (TAM) for the WWW context.

Keywords: Technology Acceptance; TAM; Playfulness; World-Wide-Web

1. Introduction

In the past ten years, perceived ease of use and perceived usefulness constructs have been considered important in determining the individuals' acceptance and use of IT. These variables are fundamental salient beliefs (motivational factors) comprising the Technology Acceptance Model (TAM) [6]. IS researchers have investigated and replicated these two constructs and agreed that they 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 [5] himself argued that future technology acceptance research needs to address how other variables affect usefulness, ease of use, and user acceptance. Factors contributing to the acceptance of a new IT are likely to vary with the technology, target users, and context. Now the World-Wide-Web (WWW) is seen as an emerging new IT, with such potency that it has made individuals change their information access methods and organizations to change their business strategy. Thus, research on the acceptance of the WWW will enhance our understanding of the individual's beliefs or motives to use the WWW and to show how these factors affect individual's acceptance the use of the WWW.

The purpose of this study is to extend the Technology Acceptance Model (TAM) in the WWW context. We propose a new variable ("perceived playfulness") to enhance understanding of individual's WWW acceptance behavior. This research also assesses the effect of the difference between an individual's intrinsic and extrinsic motivation factors on his or her acceptance behavior.

2. Theoretical Background

Technology Acceptance Model (TAM) was conceived to explain and predict the

individual's acceptance of IT. TAM is based on the Fishbein and Ajzen's [11] Theory of Reasoned Action (TRA), which suggests that social behavior is motivated by an individual's attitude toward carrying out that behavior, a function of one's beliefs about the outcomes of performing that behavior and an evaluation of the value of each of those outcomes. According to TRA, behavior is determined directly by the intention to perform, because people, in general, behave as they intend to do, within the available context and time.

One obstacle to using TAM has been problems in applying it beyond the workplace. This is because TAM's fundamental constructs do not fully reflect the variety of user task environments. Recently, Dishaw and Strong [10] point out that a weakness of TAM is its lack of task focus. Therefore, to increase external validity of TAM, it is necessary to further explore the nature and specific influences of technological and usage context factors that may alter the user's acceptance.

Motivation theorists have often distinguished the effects of extrinsic and intrinsic motivation on individuals' behaviors [3, 8, 9, 13]. In Deci's work, *extrinsic motivation* refers to the performance of an activity: it is perceived to help achieve valued outcomes that are distinct from the activity itself, such as improving job performance, pay, etc. *Intrinsic motivation* refers to the performance of an activity for no apparent reason other than the process of performing it.

In technology acceptance research, most of the work has been conducted from an extrinsic motivation perspective. Davis et al [7] investigated the relative effects of extrinsic and intrinsic motivation source on intention to use, and usage of, the computer in the workplace. 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's measurements of perceived enjoyment do not reflect a comprehensive set of intrinsic motivation states such as activity absorption, exploratory behaviors, curiosity, and arousal. We

propose the “playfulness” concept as an individual’s intrinsic salient belief to explain the individual’s intrinsically motivated behaviors.

Playfulness, which is based on Lieberman’s pioneering works [12] and Barnett’s studies [1, 2], provides a strong theoretical base for our work.

The majority of the research on playfulness as the individual’s interaction state are based on the Csikszentimihalyi’s “flow theory” [4]. It 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.*” When in the flow state, a person may have more voluntary interaction with his or her environment.

On the basis of the Csikszentimihalyi’s and Deci’s works, we define three dimensions of perceived playfulness: the extent to which the individual

- (a) perceives that his or her attention is focused on the interaction with the WWW,
- (b) is curious during the interaction, and
- (c) finds the interaction intrinsically enjoyable or interesting.

3. Research Model and Hypotheses

The model for this research (Fig. 1) is an extension of the TAM based on an individuals intrinsic motivation theory. Perceived playfulness, the extended part of the model, is the construct of interest because it operationalizes the question of how intrinsic motives affect the individual’s acceptance of the WWW.

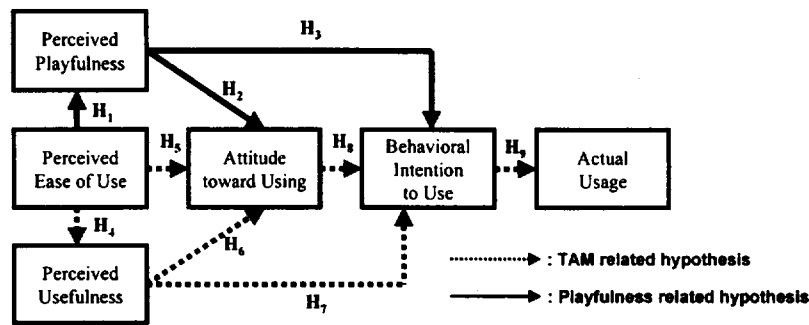


Figure 1. Research Model

H1: There is a positive relationship between perceived ease of use and perceived playfulness of using the WWW.

H2: There is a positive relationship between Perceived Playfulness and Attitude toward Using the WWW.

H3: There is a positive relationship between Perceived Playfulness and Behavioral Intention to Use the WWW.

H4: There is a positive relationship between Perceived Ease of Use and Perceived Usefulness in the WWW context.

H5: There is a positive relationship between Perceived Ease of Use and Attitude toward Using in the WWW context.

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

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

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

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

4. Results

The unit of analysis in our research is the individual user of the WWW. The population of interest is individuals who use it for their tasks.

The sample consisted of 152 graduate students, who were majoring in the School of Management. All of the subjects had prior experience with the use of the WWW.

The data were gathered by means of a questionnaire. Overall, of the 208 that were distributed, 152 usable questionnaires were received and used for analysis, 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.

The intent of our study was to extend TAM by adding a playfulness concept in the WWW context. We hoped to explain user acceptance of the WWW. The hypothesized relationships were tested using regression analysis to maintain consistency with earlier studies. Table 1 presents a summary of the hypothesis tests.

Table 1. Results of hypothesis tests

Model	R ²	R ² change	Beta	Hypothesis Result
(1) Actual use (AU) AU = BI + errors	.378***		.615***	H9 was not rejected
(2) Behavioral Intentions to Use (BI) BI = A + U + P + errors	.394***			
A		.265***	.285***	H8 was not rejected
U		.084***	.269***	H7 was not rejected
P		.045***	.245***	H3 was not rejected
(3) Attitude toward Using (A) A = E + P + U + errors	.384***			
E		.248***	.330***	H5 was not rejected
P		.091***	.256***	H2 was not rejected
U		.045***	.232***	H6 was not rejected
(4) Perceived Playfulness (P) P = E + errors	.143***		.378***	H1 was not rejected
(5) Perceived Usefulness (U) U = E + errors	.093***		.305***	H4 was not rejected

*** $p < .001$

AU: Actual Use; BI = Behavioral Intentions to Use; A = Attitude toward Using; E = Perceived Ease of Use; U = Perceived Usefulness; P = Perceived Playfulness

5. Conclusion and Limitations

Perceived ease of use and perceived usefulness were shown to be important to user's perceptions of the WWW systems. In addition, perceptions of playfulness appear to influence user's attitude toward using the WWW. Thus, perceived playfulness may also be an important consideration in the design of future WWW systems: they must provide more concentration, curiosity, and enjoyment.

Although our findings provide meaningful implications for WWW technology, our study has some limitations. First, the use of self-report scales to measure study variables suggests the possibility of a common method bias for some of the results. In order to pursue further investigation, it would be appropriate to develop a more direct and objective measure for user acceptance of the WWW. Second, three beliefs (ease of use, usefulness, and playfulness) are influenced by externally controllable factors such as development methodologies, training, organizational support and policy, individual and task characteristics, and user participation. Finally, this study was conducted with a snapshot research approach, but a longitudinal approach also should be considered.

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