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WEB SITE ACCEPTANCE: THE EFFECTS OF TASK TYPE

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Abstract

Company web sites support a plethora of customer-oriented activities. While web designers should adhere to evolving web design standards, another dimension of effective web design involves better understanding users' perceptions and motivation regarding their web site experiences. As such, this research examines differences in user perceptions and motivation across different web-based tasks to better understand what drives a user's intention to revisit a web site. A within-subject experimental design was used to test individual intention to return and reuse a web site. Results demonstrate that the primary driver of intention to return to a web site varies based on the type of task performed.

Keywords: Internet, technology acceptance, user involvement

Introduction

Consumer-based Internet commerce is expected to grow from \$1.8 billion in 1998 to \$35.3 billion by 2002 (Forrester Research 1998) with many firms aggressively developing a consumer web presence (ActiveMedia Research, December 1999). A growing body of research guides web site developers in constructing effective web sites (e.g., Nielsen 1999; Spool, Scanlon, Snyder, DeAngelo and Schroeder 1998). While many of the web site design techniques are appropriate across a breadth of customer web site interactions, prior research has not examined explicitly how the task affects web site usage patterns. Another body of research uses the technology acceptance model (TAM) (Davis 1989; Davis, Bagozzi and Warshaw 1989) to better understand users' adoption of a new technology.

This research is designed to 1) increase web developers awareness of which user perceptions and motivations are most important in influencing usage intentions across different task processes, 2) help marketing or other managers determine how to better position their site to meet users' needs, and 3) inform researchers on the importance of specifying task activities within a technology when investigating user acceptance.

Theoretical Development

Motivational Influences on TAM

TAM applies an expectancy framing to understand and explain behavioral intention to use a technology based on user perceptions (Davis 1989; Davis et al. 1989) and has been applied and validated across a wide range of tasks and technologies (e.g., Gefen and Straub 1997; Hendrickson, Massey and Cronan 1993; Igbaria, Zinatelli, Cragg and Cavaye 1997; Mathieson 1991; Segars and Grover 1993; Szajna 1994, 1996; Taylor and Todd 1995).

While TAM's expectancy perspective provides insight into technology use, it may not capture the full range of factors influencing one's behavior (Venkatesh 1999). Prior research has identified the significant role that motivational influences play in technology acceptance (Davis, Bagozzi and Warshaw 1992; Venkatesh 1999; Venkatesh and Speier 1999). These motivational influences have been conceptualized in a number of ways (see Figure 1).

The most basic elements of motivation relate to extrinsic and intrinsic motivation (Davis, et al. 1992; Venkatesh 1999; Venkatesh and Speier 1999). Extrinsic motivation is an expectancy belief associated with the perceived value derived from using a

technology or performing an activity (Bandura 1977). Intrinsic motivation is defined as engaging in an activity for the pleasure and satisfaction that one experiences (Vallerand 1997) and affects time spent on a task, increasing performance, and causing greater use of a technology (Csikszentmihalyi 1975; Venkatesh and Speier 1999).

Flow has been described in human-computer interactions in general (Csikszentmihalyi 1990; Trevino and Webster 1992; Webster, Trevino and Ryan 1993) and Internet use specifically (Hoffman and Novak 1996). Flow captures the user's affective experience when navigating through a web site, where a positive interaction with the web site facilitates learning and future use (Hoffman and Novak 1996). Flow in the Hoffman, Novak and Peralta (1999) study of on-line environments was operationalized as being deeply involved, totally immersed, completely captivated, achieving a state of mind where nothing else matters, and having time stand still. Engagement has been conceptualized as an intrinsically rewarding interaction where one's attention is held and focused, curiosity is aroused, and intrinsic interest in the activity exists. Engagement has been operationalized using the same items as flow with the exception of those items measuring control over the technology (Webster and Hackley 1997; Webster and Ho 1997).

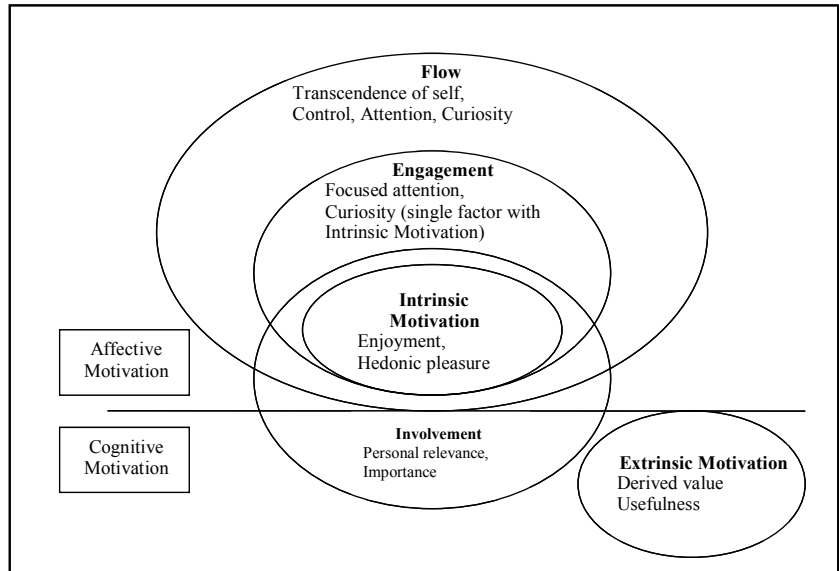


Figure 1. Motivational Influences on Technology Acceptance—Relevant Constructs

Being “in flow” or fully engaged are relatively rare experiences (Csikszentmihalyi 1990; Massimini and Carli 1988; Mitchell 1988). It seems unlikely that a typical individual will experience flow and engagement each time they interact with the Internet. Therefore, a less intense motivational experience is used in this study—involvement. Involvement is an internal state variable indicating the amount of arousal, interest, or drive evoked by a particular object (Dholakia 1998) and is a determinant of behavior in both information systems (Barki and Hartwick 1989) and marketing (Zaichkowsky 1985). Multiple facets of involvement (Laurent and Kapferer 1985; Rosbergen, Pieters and Wedel 1997; Vaughn 1980) include affective and cognitive (Day, Stafford and Camacho 1995).

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Affective involvement emphasizes intrinsically motivating responses to an event and has been operationalized consistently with intrinsic motivation. Better understanding an individual's affective involvement with the Internet is critical (Eighmey and McCord 1998; Pitkow and Recker 1994) given the entertainment aspect of many web sites and users' growing expectations regarding pleasurable technology interactions (Brody 1992). Cognitive involvement suggests that a user's motivation to perform an activity is dependent on the degree to which that activity is personally relevant (Zaichkowsky 1985) which increases motivation to perform specific behaviors (Celsi and Olson 1988).

How does involvement integrate with TAM? The ease of use associated with a web site will influence involvement (Trevino and Webster 1992). Technology interactions that are easier to use are more pleasurable (Davis 1989; Spool et. al. 1998) and are perceived as more feasible by the user (Trevino and Webster 1992). Increased pleasure is consistent with the affective aspect of involvement while increased feasibility is consistent with the cognitive aspect of involvement.

Prior research has demonstrated a strong empirical relationship between involvement and attitude toward a product or service (Gabbott and Hogg 1999) and attitude toward using computers (Harris 1999). Atkinson and Kydd (1997) found a positive relationship between intrinsic enjoyment and attitudes and behaviors toward web site usage. Also, improving the affective aspects of involvement increases the deliberation and thoroughness of cognitive processing (Bagozzi, Gopinath and Nyer 1999; Celsi and Olson 1988; Isen, Johnson, Mertz and Robinson 1985; Mano 1992) leading to higher perceptions of usefulness (Batra and Ray 1986). ITAM¹ integrates involvement within TAM in Figure 2.

¹We expect ITAM to explain greater variance in intention than TAM and this will be assessed as a manipulation check.

Users' Web-Based Tasks

Individuals visit web sites for a multitude of reasons and a growing number of classification schemes exist (Hoffman and Novak 1996; Hoffman, Novak and Chatterjee 1995; Peterson, Balasubramanian and Bronnenberg 1997). Hoffman and Novak (1996) describe six distinct categories of Internet-based commercial activity including: 1) online storefront, 2) Internet presence, 3) information content, 4) mall, 5) incentive site, and 6) search agent.² While a firm might develop a web site that supports one or more of these categories, an individual is likely to have a specific task in mind when using the web. This study focuses on three such task types: transactions, promotions, and information-gathering.

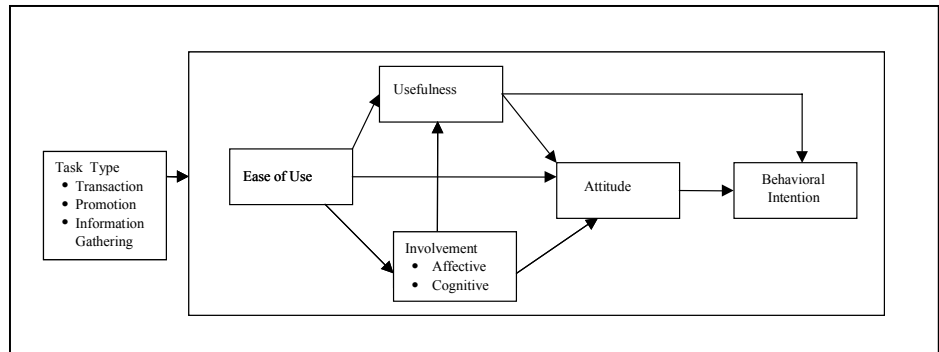


Figure 2. ITAM Research Model

Hypothesis Development

Within ITAM, usefulness, ease of use, and affective involvement all influence attitude toward using a web site, however their respective influence is different across tasks and subsequent hypotheses delineate these differences. The relationship between cognitive involvement and attitude is expected to be positive and invariant to task type and therefore, is included in the model but not in hypotheses.

Usefulness. Given a well-defined goal, transaction sites tend toward utilitarian experiences and thus, individuals will likely prefer highly useful information and processes to aesthetic features (Nielsen 1996). Similarly, perceptions of usefulness have been identified as the key driver of web site usage in work over play related activities (Atkinson and Kydd 1997). When processing a transaction, individuals need both sufficient information to make a selection and transaction processes that are easy to perform and consistent with their expectations. Should usefulness be low, intention to return to the site is likely to be low. Individuals performing an information-gathering task have a well-defined goal—finding information. However, unlike transaction processes, individuals have very different mental models regarding the underlying relationships between different pieces of information (Narayanan and Hegarty 1998). Thus, when designing a site where users will gather information, the site must be both useful and easy to use. A promotion site must engender a strong motivational response in order to entice the user to stay (Salam, Rao and Pegels 1998). Promotion sites are unlikely to be viewed as enhancing one's productivity—usefulness should play a limited role in explaining future intention to use a site:

- H1a: The combined direct and indirect effects of *perceived usefulness* will explain greater variance in intention for transaction over promotion and information-gathering tasks.
- H1b: The combined direct and indirect effects of *perceived usefulness* will explain greater variance in intention for information-gathering over promotion tasks.

Affective Involvement. Affective involvement appears to be the most critical driver for promotion tasks. When entering a promotion, individuals must find the web site “fun” and an engaging experience to encourage them to stay and ultimately revisit the site (Fleming 1998; Kirsner 1998; Eighmey 1997; Schlosser, Shavitt and Kanfer 1999). Prior research has demonstrated that affective motivation influences Internet usage for play, but not for structured work tasks (Atkinson and Kydd 1997):

- H2: The combined direct and indirect effects of *affective involvement* will explain greater variance in intention for promotion over transaction and information-gathering tasks.

Ease of Use. Prior research demonstrates the importance of ease of use when searching for hypertext information (Ramarapu, Frolick, Wilkes and Wetherbe 1997) and accessing information to support decision processes in on-line environments (Widing

²The search agent task type will not be examined as it refers to identifying other web sites.

and Talarzyk 1993). Thus, for tasks that require information-gathering either as the task itself or as part of a transaction task, ease of use should influence intention to use the web site. There is evidence that ease of use is more critical for tasks that require information-gathering (Klein 1998; Widing and Talarzyk 1993). Promotion tasks have little information-gathering activity and the importance of the affective response is likely to overwhelm any influence ease of use might have on usage intention:

H3: The combined direct and indirect effects of *perceived ease of use* will explain greater variance in intention for information-gathering and transaction over promotion tasks.

Research Method

Experimental Design

A within-subject experimental design was used to test the hypotheses with each subject performing three tasks. Subjects were given unlimited time to complete the tasks and the presentation of tasks was counterbalanced within experimental sessions. 226 undergraduate students were volunteers and received 1% credit towards their final course grade for participating in the experiment. The variables and experimental procedures were tested and validated in pilot studies.

Task Type

Three task types identified from existing frameworks were manipulated: transaction, promotion, and information-gathering. The transaction task was defined as a customer purchasing a good or service over the Internet after examination of alternatives. This task was operationalized as an airline web site where subjects were told they were flying to Florida for spring-break, then reviewed flight options, booked a reservation, and "paid" for the tickets using a credit card number.

The promotion task was operationalized as a customer reviewing and entering a contest on a radio station web site with information about radio personalities, music play lists, etc. The station promoted a special contest where the respondent signed up to win concert tickets. There were no sales transaction capabilities built into the web site.

The information-gathering task was operationalized by an individual gathering information about re-location sites. Subjects were asked to assess if a specific college and the community in which it was located met expectations. Subjects needed to examine a variety of detailed information provided by the site.

Intermediate, Dependent, and Control Variables

Validated items from prior TAM research were used to measure ease of use, usefulness, attitude toward using, and behavioral intention (Davis 1989; Matheson 1991; Taylor and Todd 1995). Affective and cognitive involvement were measured using a revised version (McQuarrie and Munson 1992) of the product involvement inventory (PII) (Zaichkowsky 1985). Control measures were included for prior Internet experience, gender (Venkatesh and Morris 2000) and computer self-efficacy (Compeau and Higgins 1995) with no significant differences within tasks and hence these measures were not tested within ITAM.

Procedure

All experimental sessions were conducted in a networked computer laboratory housing state of the art personal computers. Given the potential variation in download times across networked computers, the homepage for each of the three tasks was opened so that pages would be in resident memory and load quickly. Links to other pages were not preloaded. Subjects were provided a brief scenario of each of the three task types explaining why a visit to this site was important. Each scenario was written to emphasize one task type and was a plausible activity a college student might perform. Each web site was designed conforming to identical high usability criteria focusing on menu structures, the use of icons as tracking devices and other graphics to either reinforce content or provide navigational assistance (Nielsen 1999). All sites included a site map link and had a menu bar link listing at the top of the page and a high-level menu and sub menu link listing at the bottom of the page to facilitate usability. These precautions were necessary to control for each participant having the same quality of web interaction experience.

Results

Measurement Model

A two-stage approach (Anderson and Gerbing 1988) using EQS was used to test the: 1) measurement and 2) path models. By examining pairs of constructs in a series of two-factor confirmatory factor models (Bagozzi, Yi and Phillips 1991), results indicated that the constructs exhibited discriminant validity. The psychometric properties of the scales revealed the lowest loading on any factor .68 and most loadings > .90. Estimates of Cronbach's alpha for all constructs exceeded .80 demonstrating high reliability (Nunnally 1978). The normed, nonnormed, and comparative fit indices were over .98 indicating a good fit of the confirmatory measurement model (Bentler 1990).

Manipulation Checks

A manipulation check indicated the ITAM model exhibited better goodness of fit characteristics ($\chi^2_{2159} = 390.85$, $p < .001$; CFI = .97, RMSEA = .06) than the TAM model ($\chi^2_{2147} = 424.25$, $p < .001$; CFI = .93, RMSEA = .10). The change in chi square test is significant (Bentler and Bonett 1980; Hoyle and Panter 1995) suggesting that ITAM fits the data better than TAM ($\Delta\chi^2_{296} = 215.10$, $p < .001$).

Hypothesis Testing

Table 1 presents the comprehensive standardized path results. In order to test for significant differences across tasks, constraints were added within EQS to set paths between factors equal to one another. The LaGrange Multiplier (LM) test (Bentler 1989, 1990) provides a chi square value, that when significant, indicates there is a significant difference in explanatory power across task types.

Results indicate that the effects of perceived usefulness on intention explain significantly greater variance for transaction (path = .534) over promotion (.147) ($\chi^2_{21} = 5.411$, $p < .020$) and information-gathering (.324) tasks ($\chi^2_{21} = 3.909$, $p < .048$). Thus, H1a is supported. Similarly, the effects of perceived usefulness on behavioral intention explain significantly greater variance for information-gathering (.324) over promotion (.147) tasks ($\chi^2_{21} = 4.548$, $p < .044$) providing support for H1b. The influence of affective involvement on usefulness explains significantly greater variance for promotion (path = .416) over transaction (.275) ($\chi^2_{21} = 9.653$, $p < .002$) and information-gathering (.158) ($\chi^2_{21} = 12.011$, $p < .001$) tasks. Thus, H2 is supported. The influence of perceived ease of use on intention explains significantly greater variance for transaction (path = .528) and information (.349) over promotion (.255) tasks ($\chi^2_{21} = 8.645$, $p < .003$ and $\chi^2_{21} = 3.945$, $p < .047$, respectively). Thus H3 is supported. Finally, while not hypothesized, it was observed that the indirect effect of ease of use on intention was significantly stronger for transaction than information-gathering tasks ($\chi^2_{21} = 4.715$, $p < .030$).

Discussion and Conclusions

Results from this study lead to two primary contributions: 1) integrating affective and cognitive involvement into TAM enhances our understanding of intention to return to a web site; and 2) the importance of perceptions and motivations in explaining intention is dependent on the task an individual is performing. More specifically, usefulness and ease of use are primary drivers of transaction and information-gathering tasks, however, the strength of these effects in predicting intention are strongest for transaction tasks. Alternatively, affective involvement is the primary driver of promotion tasks.

Implications on User Acceptance Research and Future Directions

From the standpoint of user acceptance research, this study encourages the integration of involvement into TAM within the context of web design. There is growing evidence that, depending on the circumstance, affective experiences can play a significant role in technology acceptance. Better understanding the circumstances where affective motivation is an important driver of acceptance leads to a more robust framework from which to assess technology acceptance outcomes and enables technology manufacturers to more effectively design and build their products.

Table 1. Multigroup Simultaneous ITAM Model—Standardized Results, Direct and Indirect Effects

	Behavioral Intention Predictor	Attitude Predictor	Affective Involvement Predictor	Cognitive Involvement Predictor	Usefulness Predictor
Transaction	ATT = .479*** USE = .534*** EXP = .026 EOU = .528** AFF = .275 COG = .372*	USE = .253** EOU = .710*** AFF = .258 COG = .402***	EOU = .774 ***	EOU = .262*	EOU = .454*** AFF = .368 * COG = .436 ***
Promotion	ATT = .587*** USE = .147 EXP = -.151 EOU = .255*** AFF = .416** COG = .349*	USE = .010 EOU = .448** AFF = .556*** COG = .510***	EOU = .688 ***	EOU = .181	EOU = -.056 AFF = .637 *** COG = .434**
Information	ATT = .388*** USE = .324** EXP = -.012 EOU = .349* AFF = .158 COG = .191	USE = .092 EOU = .653*** AFF = .256* COG = .305**	EOU = .470 ***	EOU = .304*	EOU = .331* AFF = .202 COG = .252*

Cells contain path coefficients of the combined direct and indirect effects for each construct.

* $p < .05$; ** $p < .01$; *** $p < .001$

ATT = attitude, USE = usefulness, EXP = Experience, EOU = ease of use, AFF= affective involvement, COG=cognitive involvement.

The circumstances where affective involvement is appropriate should be examined in future research. For example, affective involvement is likely to provide little additional explanatory power in understanding user acceptance in situations where technology use is dictated or when there are no alternative technologies for performing a task. Alternatively, there are many technologies where knowledge workers can choose across a breadth of capabilities and use of these technologies is typically not mandated. When examining these or other types of non-mandated technologies, assessing involvement in the early design stages and during use may provide critical insight into capabilities that result in acceptance and “deep” use of the technology into multiple facets of an employees’ work and/or personal life.

Another contribution of this study to technology acceptance research is the delineation of the motivational influences of TAM. Flow, engagement, intrinsic motivation, and involvement have all been shown identified as predictors of user acceptance. This research study provides a dichotomization of these influences and evidence that both aspects of motivation— affective and cognitive—should be considered when examining user acceptance. This study also demonstrates that cognitive involvement provides explanatory power over and above usefulness—e.g., usefulness addresses specific extrinsic motivation while cognitive involvement appears to be a more general cognitive reaction to the site.

A further example of how the results of this study can be built upon is by developing a more in-depth examination of the influential role of affective involvement on intention to return to a web site for promotion tasks. For example, there are theoretical reasons to believe that navigation and iconic displays influence affective involvement, however, there are likely other design criteria that affect this emotional response. Specifically, there is evidence that web page download time influences user perceptions of how interesting a web site is (Ramsay, Barbese and Preece 1998).

This research also makes a contribution to the technology acceptance literature. Prior research has examined factors influencing technology acceptance across a wide range of technologies; however, no prior research has examined acceptance differences within a technology. ITAM offers a rich research model to study the effects of web design characteristics on user acceptance of web technology. Specifically, this study has shown the viability of the model for understanding user perceptions and interactions related to performing specific tasks with a technology. Thus, ITAM could provide the theoretical framing when examining how web design features affect web site usage.

Implications for Web Site Designers and Future Directions

This research also has important practical implications for work in the area of web site design for companies engaged in e-commerce. The results of this study suggest web site designers must first identify the type of task that their potential users will be performing. As technology improves and new ways of using the Internet go on-line, designers must understand the importance of which design criteria to focus on depending on task performed on the web site.

Another contribution of this paper is the important implication for work in the area of web site marketing. Since different web site features affect web site usage, developers should be aware of which features to promote given the type of task users will be performing. For example, this study suggests the web site's usefulness should be promoted when users are performing a transaction, etc. While this paper presumes an individual is likely to have a specific task in mind when using the web, it is quite possible to find sites with a combination of informational, promotional or transactional content. Future research should attempt to examine the interaction of different combinations of web site task types and motivational influences on individual technology acceptance.

Limitations

The meaningfulness of the findings from any study must be assessed in light of the study's limitations. The increased control afforded by a laboratory experiment must be traded-off against generalizability. Limitations in generalizability in this study mainly involve the use of student subjects. Student subjects typically differ from business professionals in their experience with the problem domain and their motivation to perform a task successfully. In this study, two steps were taken to offset the use of students as subjects. First, students had considerable experience using the Internet to accomplish a diverse set of tasks and the tasks performed in the study were contextual consistent with tasks that many undergraduate students perform. Second, students were provided an incentive of 1% of class credit to participate in the study and post experimental interviews indicated that subjects found the experiment to be interesting. The experiment did include a within-subjects component and it is possible that fatigue could play a role in the results. However, the presentation of tasks was counterbalanced for this reason and there was not statistically significant effect for task order.

References

Available on request.