

HOW CAN WEB PERSONALIZED SERVICE ADD VALUE TO ELABORATION AND DECISION OUTCOME? A TASK-TECHNOLOGY FIT PERSPECTIVE

*Tsai-Hsin Chu, Department of E-learning Design and Management, National Chiayi University, 85
Wunlong Village, Mingsyong, Chiayi 621, Taiwan, R.O.C.
+886 5 2263411, thchu@mail.ncyu.edu.tw*

Yen-Hsien Lee, Department of Management Information Systems, National Chiayi University, 580
Xingming Rd., Chiayi 600, Taiwan, R.O.C.
+886 5 2732894, yhlee@mail.ncyu.edu.tw (Corresponding author.)*

ABSTRACT

When websites increase investment to develop personalized service, the effect of personalized service needs to be investigated under task situations. Web personalized services may improve the performance of individuals who perform focus search. But, they may not benefit the individuals who intend to broadly scan. Applying task-technology fit (TTF) theory and elaboration likelihood model, this study attempts to examine the effect of personalization to users' elaboration process and performance. Our findings suggest that personalized service can increase individual's attention on the recommendation, no matter the task characteristic is. Our findings also suggested that personalized service can help the efficiency of individuals who perform scan task, but its persuading effectiveness is limited.

Keywords: web personalized service, task-technology fit, elaboration likelihood model, decision-making.

INTRODUCTION

Web personalized service leverages personalized technologies to provide the right content to the right person at the right time [10], and has been widely applied by websites. Research advocates web personalization of its potential for fostering customer's performance as it provides individualized contents, offerings and services to control aimless surfing activity [7] [9], to facilitate business-to-customer interaction [1], and to achieve profitable growth [7] [9] [10].

When websites increase investment on developing personalized technologies, the effectiveness of personalized service may not be congruent. When they access websites, people are engaged with information acquisition activities which involve focused search and scan [11]. Personalized services can satisfy individuals' information needs for focused search by providing converged information based on their preference, and can increase website use performance thereafter. However, these technologies may not benefit the individuals who intend to broadly scan. People may need to expand effort on getting back the information which has been filtered by technologies in order to have a comprehensive understanding [5]. In this light, the fitness between task and personalized technology may be important to explain people's elaboration and website use performance.

In this study, we apply TTF perspective and the elaboration likelihood model to examine two research questions: (1) is the fitness perception of personalized service contingent on tasks performance? And (2) how does the fitness perception affect the elaboration process and final decision of users?

LITERATURES

Task-Technology Fit perspective

Suggested by Goodhue and Thompson [6] the TTF theory emphasizes that a technology increases an individual's performance when it can fit the characteristics of task [3] [6]. The *TTF* means the degree

that IT can support individual's task [6]. This perspective suggests that individuals have better performance when they perceive the higher TTF [3] [6]. The process of how the fitness affects performance has not been established, yet.

Elaboration Likelihood Model (ELM)

The elaboration likelihood model (ELM) [8] dilates on the process of elaboration where an individual processes information after attention and before behavior. The elaboration is a critical process because it determines how information is interpreted and the result of persuasion [2]. The ELM suggests that an individual engages in elaborative process by issue-relevant thinking (i.e. via *central route*) or by using simple decision rules to make decisions (i.e. via *peripheral route*) [2] [10]. *Central route* denotes that decision relies on direct examination of task-related contents of messages [10]. ELM suggests that an individual who elaborates via central route expands more cognitive efforts on noting and evaluating the details of information contents. *Peripheral route* denotes that decision relies on easy-to-process cues, rather than the process of deliberate thinking [4] [10].

RESEARCH FRAMEWORK AND HYPOTHESIS

In order to investigate the dynamics between TTF and performance, this study extend TTF by EML model to build a conceptual framework. The conceptual framework model of this study is shown as Figure 1. Four hypotheses are proposed as follows.

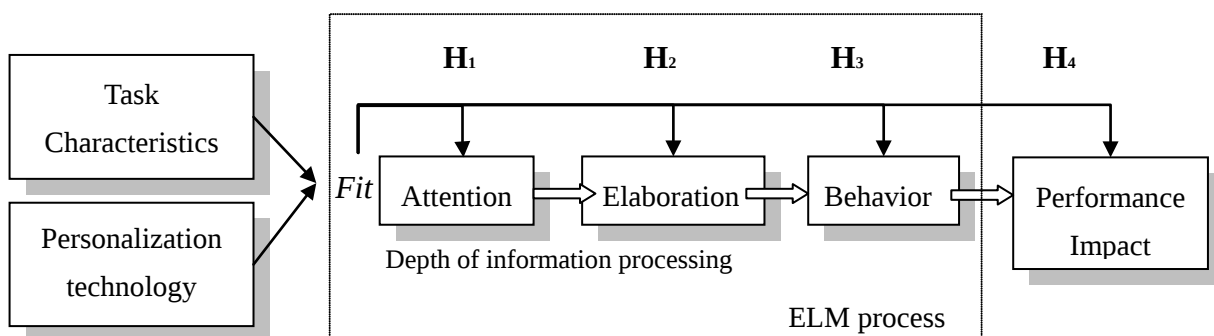


Figure 1. The conceptual model

An individual may perceive better quality of information when there is fitness between task and technology. Specifically, when users perform a focused search task, they may be more likely to pay attention on the information content that personalized service sieve out to fit their preference. On the contrary, when users perform a scan, using the personalized service that filters information may result in partial information. In this situation, users will seek other information sources to retrieve the whole information back. Therefore, we propose the research hypotheses H1 and two sub-hypotheses.

H1: The TTF affects an individual's attention to the recommended information.

H1a: Individuals who perform a focused search task pay more attention to the information in the recommendation zone when they are provided personalized service.

H1b: Individuals who perform a scan task pay less attention to the information in the recommendation zone when they are provided personalized service.

H2: The TTF affects an individual's elaboration process.

H2a: Individuals who perform focus search task are more likely to explore the information in the recommendation zone when they are provided personalized service.

H2b: Individuals who perform scan task are less likely to explore the information in the

recommendation zone when they are provided personalized service.

H3: The FFT affects an individual's acceptance of recommendation.

H3a: Individuals who perform focus search task are more likely to accept the recommended items when they are provided personalized service.

H3b: Individuals who perform scan task are less likely to accept the recommended items when they are provided personalized service.

H4: The TTF affects an individual's decision-making time.

H4a: Individuals who perform focus search task expand the shorter decision-making time when they are provided personalized service.

H4b: Individuals who perform scan task expand the longer decision-making time when they are provided personalized service.

RESEARCH DESIGN

This study conducted an experiment to investigate research questions. The participants of this experiment were volunteers and were recruited from BBS and publicly forums with a clear statement of the conditions of subjects of this experiment. The participants could visit our experiment website freely in their place at any time. No time limited was set for completing the task.

The participants registered and filled out the basic information and their preference of games. Then, the participants requested to login the experiment website and performed a task of downloading a game from a pool of 24 games. When they login, the participants were randomly assigned to either personalized or non-personalized interface. Both of the two interfaces shared the similar layout which was consisted of three zones: recommendation, hot download, and all games. The "hot download" zone was designed to provide a peripheral cue for participants a reference of the popular games chosen by the others. The participants could finish the experiment task as they successfully download a game. The system would record automatically the browsing path and the time used by each participant in order to understand their elaboration process and the performance, respectively. Finally, the participants were asked to conclude the characteristic of the task that they just performed a focus search or scan.

RESEARCH FINDING

Subjects. There were 259 individuals in total participated the experiment. Of these responses, 31 were discarded because either their tasks or questionnaires were incomplete. The remaining 228 responses were used for following analysis. The subjects included 56.14% of male and 43.86% of female. Most of the subjects were young people who are mostly between 21 to 25 years old, and were college students (67.98%). The subjects were experienced and heavy users of the Internet.

Among the 228 responses, 113 subjects (49.55%) were randomly assigned to the personalized interface while 115 subjects (50.45%) used the non-personalized interface. The comparable ratio obviated the potential sampling bias of using dominated interface. Regarding to perception of task characteristics, 147 subjects (54.47%) perceived the task as focused search, and only 81 subjects (35.53%) thought it as scan.

Hypotheses tests

The effect on "attention": In this study, the measure of attention is based on whether the subject's first click is fallen in recommendation zone. As the measure of attention is a Boolean value, we use χ^2 to test the relationship between TTF and attention.

The result of χ^2 showed that there were significant correlations between TTF and attention ($\chi^2(3)=44.947^{***}$, $p=.000 < 0.001$). The table 1 showed the description statistics of the attention to recommendation zones among four TTF groups. For the individuals who carried out focused search, more than half of the subjects (58.82%) who used personalized interface were attracted by the games in recommendation zone. However, only 10.13% of the subjects who used non-personalized interface pay their attention on the games in recommendation zone. Thus H1a was supported. On the other hand, for those individual who performed scan task, more subjects (55.56%) in personalized service group noted the games in recommendation zone than those in non-personalized group, thus we rejected H1b.

Table 1. Frequency of the first click among TTF groups

Task/ Technology Groups		Recommendation	Hot downloads	All Games	Total
Focused search	Personalization	40	13	15	68
	Non-Personalization	8	31	40	79
Scan	Personalization	25	6	14	45
	Non-Personalization	3	17	16	36
Total		76	67	85	228

The effect on “elaboration”: In this study, the elaboration is represented by the proportions of which the subjects clicked on game descriptions in the three zones. Table 2 showed the proportion of click’s frequency under different TTF conditions. We used one-way ANOVA and a post hoc test with LSD to test differences of elaboration among the TTF groups.

Our result of ANOVA showed significant differences in the elaboration to the recommendation zone among four groups ($F=19.974^{***}$, $p=.000 < 0.001$). For subjects who engaged in the task of focused search, those who received personalized service presented remarkably more elaboration to the recommendation zone than those who did not have personalized service, thus the hypothesis H2a was supported. In addition, for subjects who engaged in the task of scan, those who had personalized service demonstrated more elaboration to the recommendation zone than the one of those who did not have personalized service, thus the hypotheses H2b was incapable to earn the support.

Table 2. The proportions of click for elaboration in three zones of TTF groups

Task/Technology Groups		Recommendation		Hot download		All Games	
		Mean	Sd.	Mean	Sd.	Mean	Sd.
Focused search	Personalization	.378	.265	.296	.224	.330	.289
	Non-Personalization	.143	.169	.351	.223	.510	.208
Scan	Personalization	.295	.251	.271	.274	.430	.307
	Non-Personalization	.110	.141	.455	.275	.430	.249
Total		.238	.241	.335	.248	.430	.269

The effect on “behavior”: In this study, the behavior is measured with whether the final choice fall in the recommendation zone or not. Since the scale of behavior is a Boolean value, we use χ^2 to test the correlation between the TTF and the final choice.

The result of χ^2 test showed that the subjects from four groups behaved differently when they decided to download a game as their final choices ($\chi^2(3)=20.838^{***}$, $p=.000 < 0.001$). For the individuals who performed focused search, those of using personalization interface presented higher percentage of accepting recommendation than the other. In this group, there were 30.88% of subjects whose choices fell in the recommendation zone finally. Therefore, this result supported the hypothesis H3a. On the

other hand, for the subjects who perform scan task, to provide personalized service brought no significant correlation to the acceptance of recommended information ($\chi^2(1)=1.000$, $p=.317>0.05$), thus the hypothesis H3b had been rejected.

Table 3. The zone of final decision of four TTF groups

Task/Technology Groups		Recommendation	Hot download	All Games	Total
Focused search	Personalization	21	16	31	68
	Non- Personalization	7	24	48	79
Scan	Personalization	6	16	23	45
	Non- Personalization	3	17	16	36
Total		37	73	118	228

The effect on “performance”: In this study, the performance is measured by the time that the subjects spend to complete the task. This study uses the ANOVA to test the effect of the TTF for the decision-making time. The result of ANOVA test showed some differences, but the effect could not reach the 0.05 significant level ($F=2.119$ †, $p=.099 < 0.1$). The post hoc test with LSD showed no significant differences in decision-making time for the subjects who carried out the focused search whether there was the personalized service or not ($p=.284>0.05$). Thus the hypothesis H4a was rejected. On the other hand, for those who performed scan task, the subjects of having personalized service showed the shorter decision-making time than those of lacking for personalized service did ($p=.024*<0.05$). Thus the hypothesis H4b was rejected.

Table 4. The decision-making time of four TTF group (seconds)

Task/Technology Groups		Average	Sd.
Focused search	Personalization	128.75	89.741
	Non-Personalization	143.56	78.109
Scan	Personalization	116.64	68.573
	Non- Personalization	159.17	98.104
Total		136.29	84.046

DISCUSSION AND CONCLUSION

This study explores the research question: how the personalized service affects user’s elaboration and the decision-making performance under the situation of TTF. First, providing personalized service helped attract a user’s attention to the recommended information. For either focus search or scan task, to provide the personalized service could be beneficial for attracting individual’s acceptance and selective attention to the recommended messages.

Second, our findings showed that to provide personalized service could be effective to stimulate individuals to read the information of the recommendation zone. However, the trajectories of elaboration among the TTF groups were different. The users who performed focused search task tend to elaborate via central route which engages in issue-relevant thinking. For these users, those of having personalized service were more likely to elaborate the games in the recommendation zone, while those of lacking personalized service tended to elaborate the information in the all games zone. For the users who wanted to scan, those with personalized service tended to elaborate more on all games (i.e. via central route which engage in a deliberate process), but those of lacking for the personalized service prefer to explore “hot download” to consult other people’s choices (i.e. via peripheral route which relies on simple rules of decision).

Third, regarding to behavior, we are surprised to find that most subjects' final choice fell in the "all games" zone rather than the recommendation zone (see table 3). Only 37 individuals (16.23%) accepted the recommendation and downloaded a game from the recommendation zone. This indicate that most users keep referring to multiple information sources rather than accept directly the recommendation, especially when there is no time limitation. This finding is incongruent with the idea of which the preferences matching affected the decision that Tam and Ho [10] advocated.

Fourth, in decision making time, this study found that to provide the personalized service to users who scan could effectively shorten their time of making decisions. This might be because the scanning users tended to scan a large amount of information, and the personalized service could help them quickly to screen out the information that was irrelevant, and further shortened their time of information processing. However, this effect did not valid for the users who performed focused search task.

Our findings contribute to academy by exploring the elaboration process to deepen current understanding toward TTF and performance. Our findings also contribute understanding of the efficiency and effectiveness of providing website personalized service under two task situations. For practice, our findings can provide website owners an assessment and a reference when they try to provide personalized service on their website.

REFERENCE

- [1] Ardissono, L., Goy, A., Petrone, G., & Segnan. M. Personalization in Business-to-Customer Interaction. *Communication of ACM*, 2002, 45 (5), 52-53.
- [2] Areni, C.S., Ferrell, M. E. & Wilcox, J.B. The persuasive impact of reported group opinions on individuals low vs. high in need for cognition: rationalization vs. biased elaboration? *Psychology Marketing*, 2000, 17(10), 855-875.
- [3] D'Ambra, J. D. & Wilson, C. S. Use of the World Wide Web for International Travel: Integrating the Construct of Uncertainty in Information Seeking and the Task-Technology Fit (TTF) Model. *Journal of the American Society for Information Science and Technology*, 2004, 55 (8), 731-742.
- [4] Eagly, A. H. & Chaiken. S. *The Psychology of Attitudes*. Harcour Brace Jovanovich, Orlando, FL, 1993.
- [5] Edmunds, A., & Morris, A. The Problem of Information Overload in Business Organisations: A Review of the Literature, *International Journal of Information Management*, 2000, 20, 17-28.
- [6] Goodhue, D. L. & Thompson, R. L. Task-technology fit and individual performance, *MIS Quarterly*, 1995,19(2), 213-236.
- [7] Ho, S. Y. The attraction of internet personalization to web users, *Electronic Markets*, 2006, 16(1), 41-50.
- [8] Petty, R.E. & Cacioppo, J.T. The elaboration likelihood model of persuasion, *Advanced Experiment social Psychology*, 1986, 19, 123-205.
- [9] Rubini, D. Overcoming the paradox of personalization: building adoption, loyalty, and trust in digital markets, *Design Management Journal*, 2001, 12(2), 49-54.
- [10] Tam, K. Y., & Ho, S. Y. Web personalization as a persuasion strategy: an elaboration likelihood model perspective, *Information Systems Research*, 2005, 16(3), 271-291.
- [11] Vandenbosch, B., & Higgins, C. Information Acquisition and Mental Models - An Investigation into the Relationship between Behavior and Learning, *Information Systems Research*, 1996, 7(2), 198-214.