INFORMATION ADOPTION IN AN ONLINE DISCUSSION FORUM

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Abstract: This paper introduces the research model of user intention to continue adopting information in an online discussion forum. The model is built upon the information adoption model and the IS continuance model. Since the focus of this study is on continuance intention, the model takes user evaluation process into account and includes some important constructs (satisfaction, information quality, source credibility, and information usefulness) to explain the continuance behavior. An online survey was conducted and a total of 315 completed questionnaires were collected. Among the 315 respondents, 144 respondents have adopted the information in an online discussion forum. The research model explains 60% of the variance. The results also provide strong support for the existing theoretical links, as well as for those newly hypothesized in this study.

1   INTRODUCTION

With the advanced Internet development, people can interact and exchange information with other people in online social spaces, like instant messaging, blogs, online discussion forums, newsgroups, chat rooms, wikipedia, youtube, and all social networking sites. This is an interesting phenomenon as the contents in the communities are collaboratively created and shared by members who are not limited by physical or temporal constraints.

The success of a virtual community depends primarily on whether members are willing to continue to use the community, as well as to share and adopt knowledge. A review study (Lee et al. 2003a) however showed that there are very few studies related to user behaviors in virtual communities in information systems (IS) literature. In order to gain a better understanding of continuance of virtual communities, this study attempts to examine user behaviors in virtual communities, in particular, user intention to continue adopting information in an online discussion forum.

The rest of this paper is organized as below. The next section provides a review on the literature related to information adoption and information systems continuance. The third section describes the research model and hypotheses. Then the research methodology is described. The last section summarizes the findings and discusses the implications for both research and practice.

2   LITERATURE REVIEW

Online discussion forum is one of the earliest and most popular technologies for collaborative knowledge creation and sharing (Wagner and Bolloju 2005). In the context of online discussion forums, usage behaviour involves both knowledge sharing (e.g., posting questions and answers, experience sharing etc.) and knowledge adoption (e.g., reading messages, seeking information, using knowledge from the forum, etc.), and the sustainability of an online discussion forum depend on both the supply and demand of knowledge. In this study, the focus is on continuance adoption of

information in an online discussion forum. Both the Information Adoption Model and the Information Continuance Model are reviewed in this section.

2.1 Information Adoption Model

In the past two decades, there are plenty of studies on the adoption of information systems/technologies (Lee et al., 2003b, Legris et al., 2003). Adoption theories describe the processes people will face when they decide to perform an action or activity for the first time they receive the ideas, information, or technologies. The theories also suggest that people form intentions to adopt a technology based on their beliefs about the consequence of adoption and their valuation of these consequences. Applying this concept in the adoption of information, Sussman and Siegal (2003) proposed the Information Adoption Model and explained information adoption in terms of information usefulness, source credibility and argument quality.

2.2 Information Continuance Model

The Information Systems Continuance Model (Bhattacherjee 2001) is built on expectation confirmation theory and suggested that IS continuance relates satisfaction and perceived usefulness to the degree in which user expectation about an information system is confirmed. Expectation provides a baseline level to evaluate the actual performance of an information system and confirmation in turn determines satisfaction. The IS Continuance Model has been receiving a lot of attention in recent IS research (e.g., Hong et al., 2006, Lin et al. 2005, Thong et al. 2006). The model however is too generic and may not provide enough insight to explain user intention to continue adopting knowledge in an online discussion forum. Therefore, this study attempts to use both the Information Adoption Model and IS Continuance Model to explain the continuance of information adoption.

3 RESEARCH MODEL

Figure 1 depicts the research model of intention to continue adopting information in an online discussion forum. The model is basically an extension of the Information Adoption Model in the continuance stage. The model postulates that information quality and source credibility are the factors affecting user perception on the usefulness of information, as well as user satisfaction with the

information in an online discussion forum. Information usefulness and user satisfaction in turn affect user intention to continue adopting information in an online discussion forum.
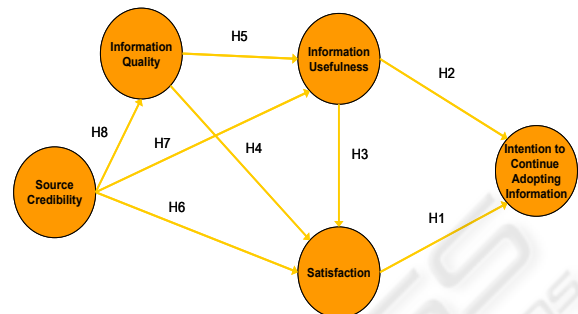

Figure 1: Research Model.

In this section, the key components of the research model and their interrelationships are addressed.

3.1 Intention to Continue Adopting Information

Information adoption refers to using the information (messages) in an online discussion forum. Since the focus is on continuance behavior, a similar conceptualization of IS continuance intention is used. Intention to continue adopting information is defined as *the likelihood a user will continue adopting and using information from an online discussion forum*.

3.2 Satisfaction and Information Usefulness

Applying the IS continuance model to the domain of information usage in an online discussion forum, information usefulness and user satisfaction with the information in an online discussion forum are proposed to be important factors determining continuance behavior.

User satisfaction is one of the most important measures of information systems success (Seddon et al. 1999, Mahmood et al. 2000, Rai et al. 2002, DeLone and McLean 1992, 2003, Zviran and Erlich 2003). A high level of user satisfaction is associated with enhanced IS continuance (Bhattacherjee 2001) and improved user performance (Gelderman 1998). In this study, user satisfaction refers to the affective response to user evaluation on the information in an online discussion forum. The hypothesis is:

H1: User satisfaction positively affects intention to continue adopting information in an online discussion forum.

The IS continuance model (Bhattacherjee 2001) also suggests that perceived usefulness of an information system is an important factor of IS continuance intention. Bhattacherjee (2001) argued that human tendencies for pursuing instrumental behaviors are independent of the timing or stage of behavior. This argument is supported by a number of studies that attempted to compare the determinants of IS usage at both pre-adoption and post-adoption stages (Davis and Venkatesh 2004, Karahanna et al. 1999). Perceived usefulness is found significant to user affect across different stages of IS use. In the adoption model, perceived usefulness is the primary motivator of user attitude toward IS use. In the post-adoption (continuance) model, perceived usefulness is a key factor of user satisfaction with IS use.

Applying this conceptualization in the context of online discussion forum, and it is believed that if users find the information in the forum is useful, they will have a higher tendency to continue using the forum. Similar to the IS continuance model, information usefulness is expected to enhance user satisfaction with the information in an online discussion forum. Therefore, the hypotheses are:
H2: Information usefulness positively affects intention to continue adopting information in an online discussion forum.
H3: Information usefulness positively affects user satisfaction with an online discussion forum.

3.3 Information Quality

High information quality has long been found associated with system use, user satisfaction, and net benefits (DeLone and McLean 1992, 2003). Turban and Gehrke (2000) urged that the quality of the web content determines whether potential customers will be attracted to or driven away from the website. Janda et al. (2002) and Szymanski and Hise (2000) suggested that information quality is a strong determinant of consumer satisfaction with Internet shopping. In the context of online discussion forum, argument quality (i.e., information quality) is identified as the extent to which users think that information is relevant, timely, accurate and complete. It reflects the features of the content contained in a message. The quality of information in an online discussion forum is expected to determine user satisfaction with the information. The

information adoption model also suggests that information quality affects information usefulness of an online discussion forum. Therefore, the hypotheses are:
H4: Perceived information quality positively affects user satisfaction with an online discussion forum.
H5: Perceived information quality positively affects information usefulness of an online discussion forum.

3.4 Source Credibility

Source credibility represents the informational authority, and it serves as the informational indicator when people cannot distinguish good messages from bad ones (Sussman and Siegal 2003). If users find that contributors are trustworthy, participants tend to consider the information useful and credible, just like readers believe the news published in authorized newspapers valuable and convincing (Donath 1999). In recent years, source credibility is found to be an important determinant of information usefulness and user satisfaction (Sussman and Siegal 2003; Bhattacherjee and Sanford 2004). Further, source cue is the heuristic judgment of information quality (Rieh et al. 1998). That means information from identified trustworthy experts will be perceived to be of high quality in the context of online discussion forums.
H6: Source credibility positively affects user satisfaction with an online discussion forum.
H7: Source credibility positively affects information usefulness of an online discussion forum.

Information (message) is the basic component of an online discussion forum. Users evaluate their experiences with the online discussion forum on the information itself and the source. Since it is not about the initial adoption of information in an online discussion forum, users already have some experiences with the forum, and they are able to evaluate both the information itself and the source credibility. It is also believed that if users find the source has high credibility, there is a higher chance that they think the information has higher quality. That means, perceived quality of the information is partly determined by the credibility of the source (i.e., who writes the messages). Therefore, the hypothesis is:
H8: Source credibility positively affects perceived information quality of an online discussion forum.

4 METHODOLOGY

The research model was empirically tested in a real virtual community, Hong Kong Education City (www.hkedcity.net). Hong Kong Education City (HKed City) is a leading and one-stop education portal with a vision to build Hong Kong into a learning city. Details about the measures, data collection method, and survey responses are discussed in the following sections.

4.1 Measures

The measures of the constructs in the current study are listed in Appendix A. A multi-item approach is used. That means each construct is measured by a few items for construct validity and reliability. A slider scale is used in this study and provides a continuous scale from 0 to 100 or -50 to 50 (See Figure 2). Respondents can either click or drag the slider to indicate their preference point.
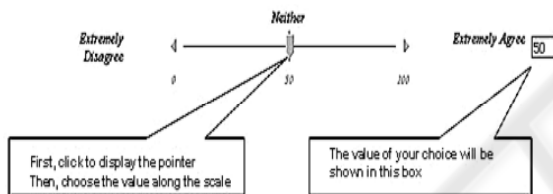

Figure 2: The Slider Scale.

4.2 Data Collection

The target respondents of this study were the teachers who have used the HKed City. In order to reach the respondents, an invitation email with the URL to the online questionnaire was sent to both primary and secondary school teachers. To increase the response rate, an incentive of three USB flash drives and thirty book coupons were offered as lucky draw prizes. The reminder emails were also sent a few weeks after the first invitation email.

4.3 Survey Response

A total of 315 responses were collected in this study and 144 of them have adoption information in the online discussion forum of HKed City. Among the respondents, 55% were male and 45% were female. About 15% were aged 21-30 and only 5% were aged 51 or above. 72% were secondary school teachers and 28% were primary school teachers, and around 15% had more than 20 years teaching experiences.

In terms of the usage behavior in the virtual community (HKed City), over 50% had less than 2-year experience with the virtual community, and 25% respondents used it every week. The nonresponse error estimation was conducted and we did not find the error exists in this study.

5 DATA ANALYSIS

Following the two-step analytical procedures (Hair et al. 1998), the measurement model is first examined and then the structural model is assessed.

5.1 Measurement Model

Convergent validity, which indicates the extent to which the items of a scale that are theoretically related to each other should be related in reality, was examined using the composite reliability (CR) and the average variance extracted (AVE). The critical values for CR and AVE are 0.7 and 0.5 respectively (Fornell and Larcker 1981). As shown in Table 1, all CR and AVE values meet the recommended thresholds and all item loadings are higher than 0.70.

Table 1: Psychometric Properties of Measures.

Construct/Item	Loading
Information Adoption (CR: 0.97, AVE: 0.95)	
IA1	0.97
IA2	0.97
Information Usefulness (CR: 0.98, AVE: 0.93)	
IU1	0.97
IU2	0.97
IU3	0.96
Information Quality (CR: 0.98, AVE: 0.76)	
IQ1	0.88
IQ2	0.91
IQ3	0.88
IQ4	0.80
Source Credibility (CR: 0.98, AVE: 0.88)	
SC1	0.88
SC2	0.94
SC3	0.94
SC4	0.95
Satisfaction (CR: 0.97, AVE: 0.87)	
SAT1	0.94
SAT2	0.93
SAT3	0.95
SAT4	0.92
Note: CR – Composite Reliability, AVE – Average Variance Extracted	

Discriminant validity is the extent to which the measure is not a reflection of some other variable. It is indicated by low correlations between the measure of interest and the measure of other constructs (Fornell and Larcker 1981). Evidence about discriminant validity can be demonstrated when the squared root of the average variance extracted for each construct higher than the correlations between it and all other constructs. Table 2 shows that the squared root of average variance extracted for each construct is greater than the correlations between the constructs and all other constructs. The results suggest that an adequate discriminant validity of the measures.

Table 2: Discriminity Validity of Measures.

Construct	IA	IU	SAT	IQ	SC
Information Adoption (IA)	**0.97**				
Information Usefulness (IU)	0.75	**0.96**			
Satisfaction (SAT)	0.73	0.88	**0.93**		
Information Quality (IQ)	0.81	0.89	0.87	**0.87**	
Source Credibility (SC)	0.73	0.85	0.89	0.89	**0.94**

5.2 Structural Model

Figure 3 presents the overall explanatory power, estimated path coefficients (all significant paths are indicated with asterisks), and associated t-value of the paths of the research model. Test of significance of all paths were performed using the bootstrap resampling procedure.
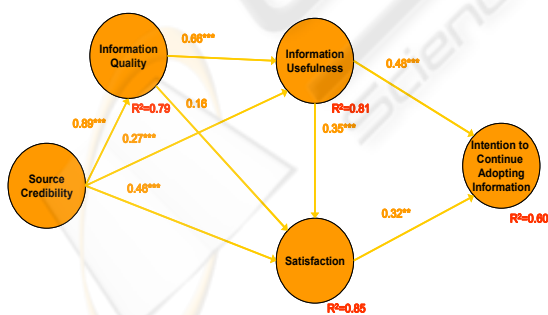

Figure 3: PLS Result.

The research model accounts for 60 percent of the variation in *"Intention to Continue Adopting Information in an Online Discussion Forum"*, the exogenous variables explain 85 percent of the variation in *"Satisfaction with the information in an Online Discussion Forum"*, 81 percent of the variation in *"Information Usefulness"*, and 79 percent of the variation in *"Information Quality"*.

All the structural paths in the research model are found to be statistically significant, except the path from information quality to satisfaction. The strength of the path provides some insights into the relationships among the model's constructs. Both information usefulness and satisfaction have a strong and significant impact on Intention to continue adopting information in an online discussion forum, with path coefficients at 0.48 and 0.32 respectively. In turn, information usefulness is significantly affected by information quality (β=0.66, t=9.68) and source credibility (β=0.27, t=3.83). Satisfaction is determined by information usefulness (β=0.35, t=4.08) and source credibility (β=0.46, t=4.05). Finally, source credibility exhibits a very strong impact on information quality, with path coefficient at 0.89.

6 CONCLUSION

The research model seeks to explain user intention to continue adopting information in an online discussion forum. The results show that all path coefficients are found statistically significant except the path from information quality to user satisfaction. The findings are supported by Bhattacherjee's(2001) IS continuance model. Surprisingly, information quality does not have any direct effect on user satisfaction. Information quality only affects user satisfaction indirectly through information usefulness. In other words, users' affective responses were not based on the quality of the messages in the online discussion forum directly, but instead were based on how useful they find the messages. The result is contrary to conventional prediction as per IS success model (DeLone and McLean 2003). One possible explanation is that most Internet users today suffer from information overload. Rheingold (2000) argued that in the information age, most people are suffered from *"too much information available and few effective filters for sifting the key data that are useful and interesting to us as individuals"*. People tend to use heuristic evaluation policies that do not consider simultaneously the values of all information, and they focus only on the "useful" information. In consumer research, Jacoby (1994) also argued that consumers tend not to be overloaded as they tend to be selective in the amount and nature of information

they process. In this case, it is probable that users focus more on information usefulness instead of information quality, as they tend to minimize their evaluation process in the online environment.

In interpreting the results of this study, one must pay attention to a number of limitations. The first bias might have been introduced by the omission of important variables. The theoretical model accounts for 60% of the variance in continuance intention and this suggests that some important predictors may be missing. A second threat to validity may be common method bias, as this study only uses one single questionnaire to measure all constructs included. A third potential bias is related to the sample frame and response rate. Compared with the number of emails that are sent, the number of responses is relatively low. There are a few reasons that lead to the relatively low response rate in this study: (1) The sample frame complied in this study is relatively large as it contains both users and non-users of Hong Kong Education City. (2) The invitation is sent in mid May. It is still the academic period and most teachers are very busy with their work. (3) The length of the questionnaire is a bit too long. Past research demonstrated that survey length is negatively related to the response rate. (4) Respondents may be being oversurveyed. There is an increase in the number of requests of online survey, and this may be the reason of lower response rate. (5) Similarly, there is an increase in unsolicited emails to Internet users. Information overload causes them to develop ways for dealing with emails (e.g., using filtering software) and discourage them from reading unsolicited emails. (6) Respondents may have a perception that the chance of winning the lucky draw prize is low. The incentive may not be attractive enough to draw their interest to participate in this study.

Finally, care must be taken when extrapolating the findings to other types of virtual communities. This study represents one type of professional group where the participants usually share some common interests, background, and goals to participate and collectively contribute to the professional knowledge. It would be interesting to compare this finding with the studies in other types of virtual communities in future research.

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APPENDIX

Appendix A: Measures

Information Adoption		
IA1	Please express the degree to which you might intend to continue adopting knowledge in Teachers' Channel in the next few weeks.	Modified from Bagozzi and
IA2	I intend to continue adopting knowledge in Teachers' Channel in the next few weeks.	Dholakia 2002

Information Usefulness		
The information in the discussion forum of Teachers' Channel is		
IU1	(Not Valuable/ Valuable)	Sussman and Siegal 2003
IU2	(Uninformative/ Informative)	
IU3	(Harmful/ Helpful)	

Information Quality		
Based on your experience of using the discussion forum of Teachers' Channel, please provide your evaluation on the quality of information in terms of the following features, as in: "The information in the discussion forum is _____".		
IQ1	(Irrelevant/ Relevant)	Lee et al. 2003c
IQ2	(Inappropriate/ Very Appropriate)	
IQ3	(Inapplicable/ Very Applicable)	
IQ4	(Out-dated/ Current)	

Source Credibility		
Based on your experience of using the discussion forum of Teachers' Channel, please provide your evaluation on the people who write messages in terms of the following features.		
SC 1	(Not Very Knowledgeable/ Very Knowledgeable)	Sussman and Siegal 2003
SC 2	(Not Experts/ Experts)	
SC 3	(Arrogant/ Modest)	
SC 4	(Unlikable/ Likable)	

Satisfaction		
How do you feel about the information in the discussion forum of Teachers' Channel?		
SAT 1	(Strongly Dissatisfied/ Strongly Satisfied)	Bhattacherjee 2001
SAT 2	(Strongly Displeased/ Strongly Pleased)	
SAT 3	(Strongly Frustrated/ Strongly Contented)	
SAT 4	(Absolutely Terrible/ Absolutely Delighted)	