User Experience, Satisfaction, and Continual Usage Intention of IT: A Replication Study in China

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Abstract:

Continual use of information technology remains a key concern of organizations. This study replicated Deng, Turner, Gehling, and Prince's (2010) article, exploring the effect of user experience – cognitive absorption – on user satisfaction, thus influencing continual usage intention of IS. We collected 219 valid responses from college students at two universities in northern China through an online survey. Consistent with the original study, the hypotheses were tested by using Structural Equation Modeling technique with SmartPLS 3. Our results – which indicated support for the same hypotheses in the original study – suggest that non-instrumental factors as well as instrumental ones influence satisfaction, which is a direct influence on continuance intention.

Keywords: cognitive absorption, perceived utilitarian performance, perceived hedonic performance, expectation disconfirmation, satisfaction, continuance intention

1   Introduction

Research into initial information systems (IS) adoption and use has been arguably one of the top few topics of IS research over the past several decades. However, the research community has recognized that for IS to achieve its potential, it is imperative that individuals continue to use beneficial technologies after this initial adoption. IS scholars have investigated various factors that contribute to a user's intention to continue to use technology (Bhattacherjee 2001, Kim & Malhotra, 2005; Limayem, et al., 2007; Vedadi & Warkentin, 2016; Vedadi & Warkentin, 2020). To investigate users' decisions on continuing using an IS, researchers have previously focused on user satisfaction and its association with quality or functionality dimensions of IT artifacts. These dimensions are commonly defined as instrumental variables fulfilling users' requirements to achieve goals, such as perceived usefulness, perceived ease of use, and information quality (Karahanna et al., 1999; Kim & Steinfield, 2004; Thong et al., 2006). Deng et al. (2010) went beyond and explored non-instrumental qualities by emphasizing IS engagement rather than the traditional technology properties in order to reveal the influence of user experience on user satisfaction and continuance intention of mobile technology. Leveraging the literature of cognitive absorption (CA) and drawing on Expectancy Disconfirmation Theory (Oliver, 1980), Deng et al. (2010) contended that CA, as a user's holistic experience, is associated with performance-related perceptions, expectation disconfirmation, and user satisfaction. Consequently, user satisfaction determines if the user is prone to continue using the IS. The proposed research model was empirically tested with existing users of mobile Internet service through an online survey approach. The findings suggest that CA is an important antecedent of IS continuance and plays a key role in inducing user satisfaction.

Replication studies have been acknowledged as a significant contribution within the IS discipline (Olbrich et al., 2017; Dennis & Valacich, 2014). Olbrich et al. (2017) argued that replications provide a feasible approach for knowledge accumulation related to an IS topic. If a replication yields results comparable with the original paper, it can increase generalization of original hypotheses in terms of new setting or context. The purpose of this study was to test the boundary conditions of the original theoretical model by applying it in the modern era and into a different context – the Chinese user. China is the largest online community in the world with the most Internet users and five out of the ten largest publicly traded Internet companies (Flannery, 2017). Furthermore, the use of smartphones has become pervasive and Chinese users heavily rely on mobile services in their daily lives, such as grocery shopping, transportation, and medical appointment. In fact, one in four Chinese users only accesses the Internet via mobile phones (Flannery, 2017). It is fascinating to explore how users perceive and make decisions about continuously using mobile Internet services in the Chinese environment. Guided by this objective, we held the instrument constant while changing the context of data collection, termed a methodological replication (Dennis & Valacich, 2014). We did not attempt to explore cultural factors – especially those that may be different than the cultural factors in the original context – that may contribute to any novel outcomes, and thus we did not collect any additional data (about, for example, individual-level espoused cultural values (Srite & Karahanna, 2016)).

What are the contextual differences between the original study's context and the replication study's context? The two macro contrasts are the time periods (or eras) and the countries of data collection. With regard to the former, replication of the original study offers temporal confirmation that the theorical relationships hold despite advances in technologies, increases in internet speeds, evolutions in cultural values, and the role of governments and laws. Such changes are diverse, extensive, and beyond the scope of a replication, but it speaks to the value of a theory or model if it can be replicated at a later time under different conditions. With regard to the country of data collection, there are also countless contextual differences imposed by the technological landscapes (though both countries (at both times) had robust and developed internet platforms), by espoused cultural values that may influence how one views technologies, and by economic differences that may limit opportunities in one country or another. Again, these possible differences were not measured and they are potentially very extensive and diverse, so any differences in outcomes (of the two studies) could only be a matter of conjecture. However, if the results of the hypotheses tests are consistent, it speaks to the robustness of the original theoretic framework and the breadth of its boundary conditions.

2 Theoretical Framework and Hypotheses

Expectancy Disconfirmation Theory (EDT) is a cognitive theory explaining customers' post-adoption satisfaction with products, services, or technologies (Oliver, 1980). Disconfirmation of expectations, as the discrepancy between expectations and actual usage, are either positive or negative. Positive disconfirmation occurs when the perceived performance of a product or service is greater than expected, while negative disconfirmation is that the perceived performance is less than expected. The more positive disconfirmation an individual perceives, the greater satisfaction he or she has. Grounded in EDT, Deng et al. (2010) asserted that expectation disconfirmation, perceived utilitarian performance, and perceived hedonic performance are related to user satisfaction of information systems. In their proposed model, perceived utilitarian performance refers to an individual's belief regarding the functionality or quality of information technology (IT) product or service, whereas perceived hedonic performance focuses on an individual's feelings or emotions with IS usage such as enjoyment, fun, and entertainment. Furthermore, user satisfaction is "a pleasurable fulfillment response" evaluating how well a product or service meets requirements from consumer's perspective. In essence, a user's evaluations of the system determine if he or she will continue using that system. In other words, an IS user would be likely satisfied if the performance of the system goes beyond his or her expectations; hence, his or her satisfaction motivates the continuance use of the system.

Cognitive absorption (CA), an optimal user experience, consists of five components – temporal dissociation, focused immersion, heightened enjoyment, control, and curiosity (Agarwal & Karahanna, 2000). This experience induces a user's perceptions of system performance, expectation disconfirmation, and satisfaction. The research model is illustrated in Figure 1 along with the same hypotheses.

Hypothesis 1: The higher utilitarian performance a user perceives of an IT, the more satisfied he/she is with the IT.

Hypothesis 2: The higher hedonic performance a user perceives of an IT, the more satisfied he/she is with the IT.

Hypothesis 3: The more positive a user's expectation disconfirmation, the more satisfied he/she is with the IT.

Hypothesis 4: The more satisfied a user is with his/her use experience of an IT, the more likely he/she will continue to use the technology.

Hypothesis 5: The more a user feels the experience of cognitive absorption with an IT, the higher utilitarian performance he/she perceives of the IT.

Hypothesis 6: The more a user feels the experience of cognitive absorption with an IT, the higher hedonic performance he/she perceives of the IT.

Hypothesis 7: The more a user feels the experience of cognitive absorption with an IT, the more positive is his/her expectation disconfirmation.

Hypothesis 8: The more a user feels the experience of cognitive absorption with an IT, the more satisfied he/she is with the IT.
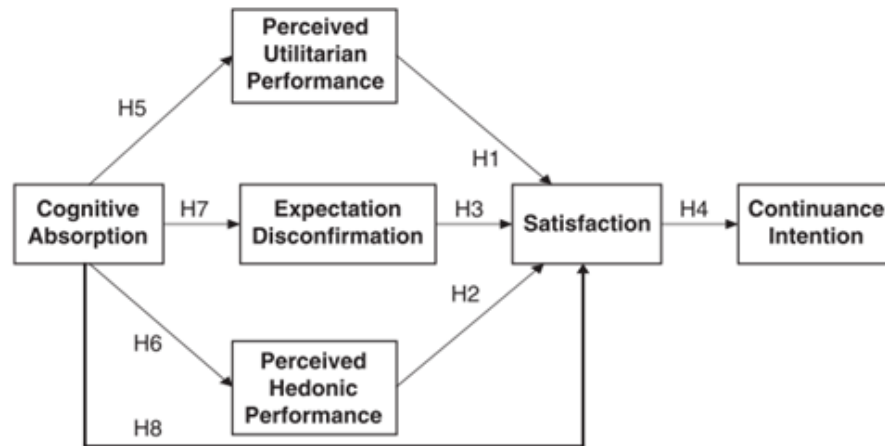
Figure 1. Research Model (Deng et al., 2010)

3   Method

In the original study, an email invitation was sent to over 10,000 college students at a university in the southeastern United States. The link in the email directed participants to a cross-sectional online survey. 289 usable responses were collected from 196 females (67.82%) and 93 males (32.18%). 79.58% of respondents' ages were between 16 and 30 years old. In addition, the results indicated that about 70% of respondents used their mobile Internet service at least once per day.

In this replication, the same cross-sectional online survey and administration protocol was conducted as in the original study, but data were collected from students at two universities in northern China. The survey link was distributed via social media (WeChat) and directed respondents to the survey in Qualtrics. We also slightly altered the survey to set up a filter question at the beginning to ask if a respondent used mobile Internet service at least once a day. Hence, 100% of respondents in our replication study had the experience of using the technology at least once a day.

To establish measurement validity, we assessed and refined the original measures, including their item wording, randomized the items to reduce common-method bias, and added an attention check question to eliminate careless responses. Mobile Internet service, used in the original study, was appropriate in our context, fulfilling users' both utilitarian and hedonic performance requirements. To ensure instrument clarity and fidelity in the context of Chinese students, we translated the original survey into Chinese, using the translation and back-translation method (Brislin, 1980). One of the authors whose native language is Chinese first translated the original survey into Chinese. Following the back-translation approach, two doctoral students who are proficient in both Chinese and English were asked to translate the Chinese version back to English. To reduce bias, another potential doctoral student who is unaware of the research context evaluated and compared the translations. We made some slight changes in the Chinese version, based on this feedback. Then before sending it to respondents, one experienced Chinese scholar reviewed the Chinese version and confirmed that the instruments were comparable, and that the Chinese version was complete.

The survey was sent to 300 college students. 288 students participated survey (96% response rate) and a total of 219 usable responses were received (76% usable rate). 10 responses were deleted because of filter questions, 2 responses were deleted because the respondents failed to pass attention check question, and 57 responses were deleted due to incomplete answers. The usable responses came from 13% male students and 87% female students. All respondents were between 18 and 25 years old. Consistent with the original paper, we adopted Partial Least Square (PLS) technique to analyze data, using SmartPLS 3, testing both measurement quality and the path modeling for the hypotheses.

4   Results

4.1   Common Method Variance

Common method variance problems are easily raised when employing specific method of collecting data, leading to systematic construct variance, systematic error variance, or random error variance about the relationships between constructs (MacKenzie & Podsakoff, 2012). In addition to mitigating its effect by randomizing the items in the questionnaire, we also performed Harman's one-factor test (Podsakoff & Organ, 1986), a major statistical remedy used to address the common method variance. An unrotated factor analysis consisting of all the items was conducted to examine if a single factor would emerge or account for the majority of variance which indicated the common method variance. Only 23.91% of the total variance was explained by a single factor, suggesting that common method variance was not a significant concern in this study.

4.2   Measurement Model

Five dimensions of CA – utilitarian performance, hedonic performance, expectation disconfirmation, satisfaction, and continuance intention – are first-order constructs, consisting of reflective indicators. All first-order constructs were assessed in terms of construct validity and reliability based on confirmatory factor analysis (CFA). Hulland (1999) suggested dropping the items with loading below 0.5. Thus, the same three items – CO2, FI4, and CI4 – were dropped due to low loadings, consistent with the original study. Other items – TD2, TD4, FI1, HE4, UT6, UT7, UT9 – were also dropped due to low loadings. To establish convergent validity, all factor loadings should exceed 0.7 and average variance extracted (AVE) should be above 0.5 (Fornell and Larcker, 1981). Our result showed that most factor loadings exceeded 0.7, indicating convergent validity (Fornell & Larcker, 1981). Three item loadings are above 0.6 and one loading is above 0.5 (see Table 3). AVE for each construct exceeded 0.5. Also, the composite reliability of constructs is all above 0.7, indicating construct reliability (Chin, 1998). Composite reliability and AVE are displayed in Table 1. With regard to discriminant validity, the square root of AVE on the diagonal should be greater than the correlations of constructs with other constructs off the diagonal (Fornell & Larcker, 1981). Our result indicated reasonable discriminant validity, and cross-loadings also suggested the same validity (see Table 2 and Table 3).

Table 1. CR and AVE		
	CR	**AVE**
CACO	0.830	0.710
CACU	0.835	0.629
CAFI	0.744	0.502
CAHE	0.856	0.665
CATD	0.792	0.565
UT	0.943	0.735
HED	0.974	0.823
ED	0.840	0.569
SAT	0.896	0.742
CI	0.886	0.721
CACO = Control CACU = Curiosity CAFI = Focused immersion CAHE = Heightened enjoyment CATD = Time dissociation UT = Utilitarian performance HED = Hedonic performance ED = Expectation disconfirmation SAT = Satisfaction CI = Continuance intention		

Table 2. The Square Root of AVE									
	CACO	CACU	CAFI	CAHE	CATD	CI	ED	HED	SAT	UT
CACO	**0.843**									
CACU	0.232	**0.793**								
CAFI	0.114	0.195	**0.709**							
CAHE	0.209	0.499	0.408	**0.816**						
CATD	-0.094	0.129	0.322	0.405	**0.751**					
CI	0.106	0.204	0.198	0.554	0.289	**0.849**				
ED	0.034	0.242	0.177	0.286	0.089	0.370	**0.754**			
HED	0.124	0.149	0.072	0.230	-0.015	0.283	0.207	**0.907**		
SAT	0.101	0.298	0.090	0.477	0.262	0.549	0.358	0.258	**0.861**	
UT	0.181	0.186	0.126	0.253	0.060	0.347	0.208	0.820	0.326	**0.858**

Table 3. Loadings and Cross-loadings									
	TD	FI	HE	CO	CU	UT	HED	ED	SAT	CI
TD1	**0.876**	0.282	0.398	-0.005	0.144	0.026	-0.051	0.106	0.267	0.297
TD3	**0.740**	0.173	0.280	-0.093	0.074	0.044	0.017	0.050	0.153	0.162
TD5	**0.616**	0.266	0.193	-0.170	0.048	0.085	0.028	0.021	0.137	0.152
FI2	0.279	**0.558**	0.323	0.041	0.168	0.015	0.059	0.053	-0.053	0.086
FI3	0.208	**0.886**	0.312	0.166	0.158	0.151	0.078	0.168	0.104	0.173
FI5	0.315	**0.641**	0.311	-0.055	0.120	0.029	0.003	0.118	0.068	0.146
HE1	0.300	0.169	**0.757**	0.194	0.387	0.188	0.206	0.164	0.387	0.415
HE2	0.278	0.400	**0.837**	0.248	0.454	0.228	0.225	0.242	0.344	0.425
HE3	0.418	0.405	**0.850**	0.067	0.375	0.200	0.131	0.284	0.444	0.518
CO1	-0.111	0.087	0.166	**0.904**	0.219	0.175	0.123	0.043	0.107	0.132
CO3	-0.034	0.113	0.197	**0.776**	0.167	0.124	0.081	0.009	0.055	0.028
CU1	0.102	0.138	0.420	0.187	**0.835**	0.172	0.107	0.188	0.216	0.182
CU2	0.160	0.211	0.437	0.209	**0.853**	0.189	0.170	0.186	0.244	0.145
CU3	0.022	0.098	0.317	0.151	**0.681**	0.060	0.062	0.212	0.262	0.167
UT1	0.087	0.096	0.220	0.181	0.183	**0.849**	0.659	0.147	0.293	0.284
UT2	0.008	0.077	0.188	0.135	0.118	**0.854**	0.701	0.171	0.275	0.278
UT3	0.121	0.166	0.263	0.138	0.218	**0.879**	0.694	0.205	0.316	0.364
UT4	0.043	0.053	0.173	0.164	0.115	**0.894**	0.730	0.189	0.243	0.306
UT5	0.026	0.111	0.180	0.096	0.152	**0.890**	0.760	0.219	0.232	0.293
UT8	-0.001	0.118	0.245	0.204	0.141	**0.774**	0.680	0.142	0.289	0.245
HED1	-0.011	0.091	0.221	0.125	0.118	0.734	**0.915**	0.184	0.260	0.266
HED2	-0.043	0.046	0.235	0.110	0.169	0.766	**0.935**	0.194	0.255	0.243
HED3	0.009	0.079	0.230	0.112	0.147	0.765	**0.938**	0.198	0.230	0.265
HED4	-0.013	0.033	0.167	0.102	0.108	0.701	**0.847**	0.195	0.185	0.286
HED5	-0.032	0.056	0.175	0.102	0.135	0.747	**0.912**	0.181	0.246	0.226
HED6	-0.039	0.077	0.206	0.148	0.138	0.725	**0.881**	0.140	0.233	0.210
HED7	0.023	0.065	0.231	0.126	0.164	0.767	**0.928**	0.208	0.230	0.283
HED8	-0.004	0.070	0.189	0.068	0.092	0.747	**0.897**	0.207	0.226	0.285

Table 3. Loadings and Cross-loadings										
ED1	0.176	0.213	0.294	0.059	0.170	0.173	0.161	**0.734**	0.217	0.305
ED2	0.129	0.186	0.238	-0.015	0.240	0.121	0.134	**0.854**	0.269	0.293
ED3	-0.057	0.047	0.107	0.012	0.162	0.214	0.222	**0.704**	0.312	0.252
ED4	-0.037	0.047	0.189	0.052	0.146	0.135	0.123	**0.714**	0.306	0.260
SAT1	0.197	0.078	0.471	0.107	0.248	0.293	0.208	0.367	**0.885**	0.530
SAT2	0.266	0.060	0.340	-0.002	0.249	0.250	0.228	0.217	**0.816**	0.367
SAT3	0.228	0.091	0.408	0.136	0.275	0.295	0.236	0.320	**0.882**	0.500
CI1	0.255	0.113	0.478	0.084	0.129	0.365	0.282	0.331	0.497	**0.868**
CI2	0.271	0.255	0.504	0.062	0.165	0.287	0.249	0.353	0.499	**0.883**
CI3	0.203	0.129	0.425	0.133	0.244	0.220	0.179	0.247	0.391	**0.794**

For the second-order of CA (cognitive absorption), the path coefficients between CA and its five dimensions were all significant ($p < 0.01$). The composite reliability of CA was also above 0.8. The path coefficient between CA and control was low, which is less than 0.3. Thus, the result is weak to support five factors are reflective dimensions of CA.

4.3 Structural Model

The path coefficients and R-squared values are displayed in Figure 2. All relationships between variables are significant and positive, except for the relationship between perceived hedonic performance and satisfaction. Perceived hedonic performance has a nonsignificant relationship with satisfaction. Satisfaction predicts continuance intention and explains 30.1% variances of continuance intention. The R-squares of perceived utilitarian performance, expectation disconfirmation, and perceived hedonic performance are low, which are relatively weak. Furthermore, we examined the indirect effect and direct effects to explore the mediation effect of satisfaction. The result shows that satisfaction has a partial mediation effect between cognitive absorption and continuance intention. In total, seven out of eight same hypotheses are found to be supported in the model. Table 4 summarizes the hypotheses tests.
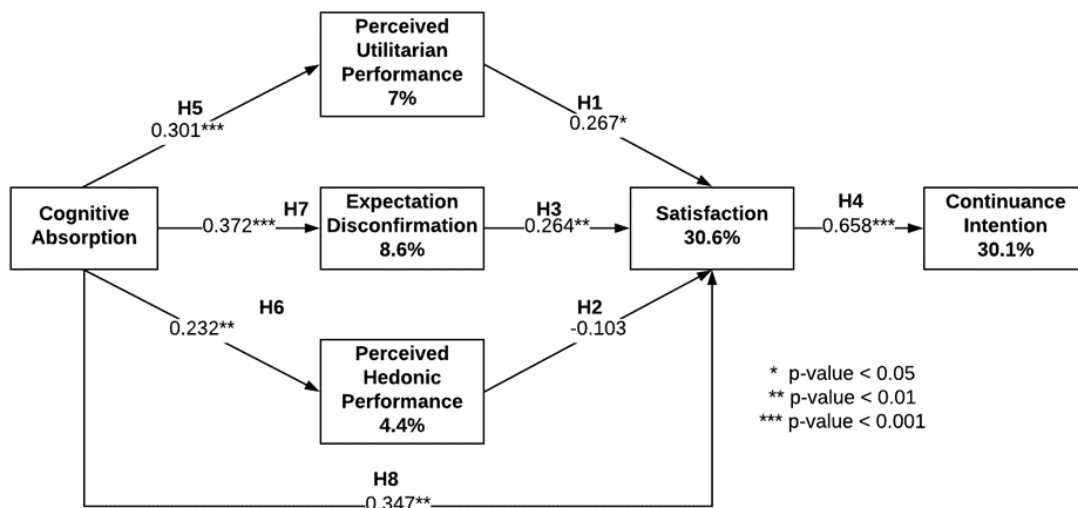

Figure 2. PLS Structural Model Results

Table 4. Hypotheses Summary		
#	**Hypotheses**	**Support**
H1	Perceived utilitarian performance - Satisfaction	Yes
H2	Perceived hedonic performance - Satisfaction	No
H3	Expectation disconfirmation - Satisfaction	Yes
H4	Satisfaction - Continuance intention	Yes
H5	Cognitive absorption - Perceived utilitarian performance	Yes
H6	Cognitive absorption - Perceived hedonic performance	Yes
H7	Cognitive absorption - Expectation disconfirmation	Yes
H8	Cognitive absorption - Satisfaction	Yes

The comparison summary between the original study and the current study is as follows (see Table 5):

Table 5. Comparison Summary		
Research Study Factor	**The Original Study**	**The Replication Study**
Theoretical Foundations	Expectation disconfirmation theory	Same
Experimental Design	A cross-sectional survey of users	Same
Survey Environment and Technology	Mobile Internet service	Same
Sampling Frame	Over 10,000 college students who are existing users of mobile Internet service at a university in the southeastern United States	300 college students who are existing users of mobile Internet service at two universities in north China
Survey Platform	A web-based survey with URL found in the survey invitation	Qualtrics - web-based online form with URL found in the survey invitation
Response Rate	289 of about 10,000 (<3%)	288 of 300 (96%)
Usable Responses	289	219
Procedural and statistical remedies for common method bias (common method variance)	No	Yes
Attention Check Question	No	Yes
Analysis Tool	PLS	SmartPLS 3
Hypotheses Supported	Seven out of eight hypotheses were supported, but H2 was not	Seven out of eight same hypotheses were supported, but H2 was not
R-Squared for The Dependent Variable	49%	30.1%

5   Discussion and Conclusions

The result of our methodological replication indicated that user experience, which is conceptualized as cognitive absorption, is an antecedent of IS Continuance Intention. The research model that was originally

sent to over 10,000 college students who were existing users of mobile Internet service at a university in the southeastern United States. In our study, we examined the model by sampling college students who are using mobile Internet service at two universities in northern China. Furthermore, 100% of our sample users used mobile Internet service at least once a day, which is greater than 70% in the original study. In addition, mobile Internet service was still chosen as the technology in the current study since it provides user experiences that include both utilitarian and hedonic aspects. However, we believe the technology of mobile Internet service is more mature and diverse now than in 2010. For instance, to improve consumers' satisfaction or to enhance business performance, e-commerce websites and apps could be more adaptive to show content changes to reflect product availability or could be more self-adaptive to suggest particular products to customers based on their shopping or searching history. Notably, adaptation and self-adaptation are two major characteristics of an IT artifact (Matook and Brown, 2017), demonstrating how mobile Internet service may be different today than in the original study's context. Another contrast is the cultural contextual difference between the original sampling frame (US) and ours (China). Future studies may replicate Deng et al's article in other different contexts like other countries or using other sampling frames like working professionals in terms of methodological replications or may follow the conceptual replication approach (Dennis & Valacich, 2014) to use different measures of key constructs or data analyses like covariance-based analysis to capture a complete picture of this phenomenon.

One of the interesting findings is that perceived hedonic performance has a nonsignificant rather than a negative and significant relationship with satisfaction in our study. First, we assume gender difference may be the possible cause since 87% of our usable responses were from females and only 13% of responses came from male students. Prior studies have shown that gender might interact with hedonic value, thus affecting individuals' intention to adopt the technology (Venkatesh et al., 2012). Notably, male users demonstrated a greater tendency to novelty seeking and technology innovativeness that contributed to hedonic motivation. Furthermore, Weiser (2000) found that males, in general, spend more time on the Internet for entertainment and leisure. Joiner et al. (2012) also argued that male users are more likely to use the Internet for gaming and entertainment. It's been suggested that gender exhibits a moderation effect on the relationship between entertainment and user's satisfaction, and that entertainment plays a more significant role in satisfaction with social network websites for male users (Chan et al., 2015). In contrast, our female respondents may not perceive hedonic performance is a determinant of satisfaction, while perceived utilitarian performance becomes the primary cause to experience user satisfaction. This is slightly consistent with the findings of the original study that perceived hedonic performance has a negative suppression effect on utilitarian performance when both utilitarian and hedonic performance are present in a relation of satisfaction. In other words, perceived utilitarian performance has been found to be a stronger predictor of satisfaction than hedonic performance, particularly for older users (Deng et al., 2010). In fact, researchers revealed that perceived usefulness was assessed to be higher in the female user group than among males while adopting e-mail services (Gefen & Straub, 1997). Furthermore, a recent study by Lin et al. (2017) concluded that individuals' decisions on continuance usage of social networking site were determined by a different set of factors or different weights of the same factors due to gender differences.

In addition to gender difference, user experiences like the frequency of using the technology may expound why hedonic perception was not significant in a post-adoption context. Initially, users may be more aware of novelty of a particular technology, while the effect of hedonic motivation would diminish as the experience increased. As a result, they may continue using the technology for more utilitarian purposes, such as performance effectiveness and efficiency (Venkatesh et al., 2012). Thus, the hedonic dimension turns out to be a less salient factor impacting continuance use with increasing experience.

An alternative explanation of this contrast could also be the broad definition of the term "mobile Internet service." Individuals access the internet with various wireless (mobile) devices via the affordances of the mobile ecosystem, including hardware devices, software, wireless connections to the internet (e.g. speed, latency, etc.), and the functionality of various websites they contact. The original study assessed respondents' perceptions and intentions of the ecosystem (hardware, software, functionality) termed "mobile internet service," which was construed by each respondent in their own way, but which likely focused on the affordances of the broad platform.

Mobile Internet service as an IT artifact in the study includes a rich set of mobile Internet-based applications which could be more complicated compared with the technology used in the original study. For instance, respondents in China may have been thinking of various mobile Internet services they were using, such as WeChat (social medium), Didi (ride-sharing app), and Alipay (online payment platform). These could be considered as diverse contexts in terms of user experience. Choosing different services by respondents may influence the statistical results. This is also considered as a limitation of a methodological replication not designed to expand or extend the original study with new findings. We suggest future studies may adapt the measures accordingly in terms of the different technologies or contexts, and may explore the nuances of the mobile Internet services and their affordances.

With regard to R squared values, less variance of the dependent variable in the current study was explained than in the original study by the same set of independent variables. It's not surprising to observe a set of other factors come to play in place as information technology becomes more dominant in people's lives, such as habit (Dai et al., 2020), imitation (Vedadi & Warkentin, 2020), and trust (Gao et al., 2015). Future research can also look into other situational factors like emotion to examine people's intentions to continue using a certain technology. Furthermore, information security could be another interesting area to explore since cybersecurity remains to be a major concern for individual users while utilizing mobile services (e.g., Wu et al., 2020).

Another limitation of both original and current research is the cross-sectional data collection process. Users' perceptions may change over time. For example, the immersion or enjoyment of a product may not be enduring, which may influence their satisfaction and continuous usage intention. This suggests that a longitudinal study design should be followed for IT continuance intention and behavior.

However, despite certain contrasting elements of the results, the replication primarily showed that today's college students are largely influenced by the same factors as yesterday's students when deciding whether or not to continue to use information technology, even when they live in different cultural contexts. Maybe hedonism is a constant and "fun is fun" anytime and anywhere, and maybe we are much more alike than we are different.

References

Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, 24(4), 665-694.

Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, 25(3), 351-370.

Brislin R. (1980). Translation and content analysis of oral and written materials. Triandis H, Berry J, eds. *Handbook of Cross-Cultural Psychology* (Allyn & Bacon, Boston), 389–444.

Chan, T. K., Cheung, C. M., Shi, N., & Lee, M. K. (2015). Gender differences in satisfaction with Facebook users. *Industrial Management & Data Systems*, 115(1), 182-206.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern Methods for Business Research*, 295(2), 295-336.

Dai, H. M., Teo, T., & Rappa, N. A. (2020). Understanding continuance intention among MOOC participants: The role of habit and MOOC performance. *Computers in Human Behavior*, 112, 106455.

Deng, L., Turner, D. E., Gehling, R., & Prince, B. (2010). User experience, satisfaction, and continual usage intention of IT. *European Journal of Information Systems*, 19(1), 60-75.

Dennis, A. R., & Valacich, J. S. (2014). A replication manifesto. *AIS Transactions on Replication Research*, 1(1), 1–5.

Flannery R. (2017, October 10). What makes China's Internet growth so fast and volatile? *Forbes*. Retrieved from https://www.forbes.com/sites/russellflannery/2017/10/10/what-makes-chinas-internet-growth-so-fast-and-volatile/?sh=23cc8d854852.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*,18(1), 39-50.

Gao, L., Waechter, K. A., & Bai, X. (2015). Understanding consumers' continuance intention towards mobile purchase: A theoretical framework and empirical study–A case of China. *Computers in Human Behavior*, 53, 249-262.

Gefen, D., & Straub, D. W. (1997). Gender differences in the perception and use of e-mail: An extension to the technology acceptance model. *MIS Quarterly*, 21(4), 389-400.

Joiner, R., Gavin, J., Brosnan, M., Cromby, J., Gregory, H., Guiller, J., ... & Moon, A. (2012). Gender, internet experience, internet identification, and internet anxiety: a ten-year followup. *Cyberpsychology, Behavior, and Social Networking*, 15(7), 370-372.

Karahanna, E., Straub, D. W., & Chervany, N. L. (1999). Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs. *MIS Quarterly*, 23(2), 183–213.

Kim, D., & Steinfield, C. (2004). Consumers mobile internet service satisfaction and their continuance intentions. *Proceedings of The Tenth Americas Conference on Information Systems*, 2776– 2780.

Kim, S. S., & Malhotra, N. K. (2005). A longitudinal model of continued IS use: An integrative view of four mechanisms underlying postadoption phenomena. *Management Science*, 51(5), 741-755.

Limayem, M., Hirt, S. G., & Cheung, C. M. (2007). How habit limits the predictive power of intention: The case of information systems continuance. *MIS Quarterly*, 31(4), 705-737.

Lin, X., Featherman, M., & Sarker, S. (2017). Understanding factors affecting users' social networking site continuance: A gender difference perspective. *Information & Management*, 54(3), 383-395.

MacKenzie, S. B., & Podsakoff, P. M. (2012). Common method bias in marketing: Causes, mechanisms, and procedural remedies. *Journal of Retailing*, 88(4), 542-555.

Matook, S, Brown, S. A. (2017). Characteristics of IT artifacts: A systems thinking‐based framework for delineating and theorizing IT artifacts, *Information Systems Journal*, 27(3), 309-346.

Olbrich, S., Frank, U., Gregor, S., Niederman, F., & Rowe, F. (2017). On the merits and limits of replication and negation for IS research. *AIS Transactions on Replication Research*, 3(1), 1-19.

Oliver, R. L. (1980). A cogntive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research*, 17(4), 460–469.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12(4), 531-544.

Srite, M., & Karahanna, E. (2006). The role of espoused national cultural values in technology acceptance. *MIS Quarterly*, 30(3), 679-704.

Thong, J. Y., Hong, S. J., & Tam, K. Y. (2006). The effects of post-adoption beliefs on the expectation-confirmation model for information technology continuance. *International Journal of Human-Computer Studies*, 64(9), 799-810.

Vedadi, A., & Warkentin, M. (2016). Continuance intention on using mobile banking applications: A replication study of information systems continuance model. *AIS Transactions on Replication Research*, 2(1), 1-11.

Vedadi, A., & Warkentin, M. (2020). Can secure behaviors be contagious? A two-stage investigation of the influence of herd behavior on security decisions. *Journal of the Association for Information Systems*, 21(2), 428-459.

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.

Weiser, E. B. (2000). Gender differences in Internet use patterns and Internet application preferences: A two-sample comparison. *Cyberpsychology and Behavior*, 3(2), 167-178.

Wu, D., Moody, G. D., Zhang, J., & Lowry, P. B. (2020). Effects of the design of mobile security notifications and mobile app usability on users' security perceptions and continued use intention. *Information & Management*, 57(5), 103235.

Appendix A: Instrument – Survey Items

Cognitive absorption (the user's holistic experience with an IT when the user acts with total involvement)

Imagine that you're using the mobile Internet service. Please indicate the extent to which you disagree or agree with the following statements about your use experience with the service. (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither disagree nor agree, 5 = somewhat agree, 6 = agree, 7 = strongly agree)

TD1. Time appears to go by very quickly when I am using the mobile Internet service.
TD2. Sometimes I lose track of time when I am using the mobile Internet service.
TD3. Time flies when I am using the mobile Internet service.
TD4. Most times when I get to use the mobile Internet service, I end up spending more time that I had planned.
TD5. I often spend more time using the mobile Internet service than I had intended.

FI1. While using the mobile Internet service I am able to block out most other distractions.
FI2. While using the mobile Internet service, I am absorbed in what I am doing.
FI3. While using the mobile Internet service, I am immersed in the task I am performing.
FI4. When using the mobile Internet service, I get distracted by other attentions very easily. (Reverse scale)
FI5. While using the mobile Internet service, my attention does not get diverted very easily.

HE1. I have fun interacting with the mobile Internet service.
HE2. Using the mobile Internet service provides me with a lot of enjoyment.
HE3. I enjoy using the mobile Internet service.
HE4. Using the mobile Internet service bores me. (Reverse scale)

CO1. When using the mobile Internet service I feel in control.
CO2. I feel that I have no control over my interaction with the mobile Internet service. (Reverse scale)
CO3. The mobile Internet service allows me to control my interaction with it.

CU1. Using the mobile Internet service excites my curiosity.
CU2. Interacting with the mobile Internet service makes me curious.
CU3. Using the mobile Internet service arouses my imagination.

Utilitarian performance (the performance of an IT in providing useful functionalities) and Hedonic performance (the performance of an IT in providing experiential and emotional values)

Please evaluate the usage of the mobile Internet service. Indicate the degree to which you evaluate the mobile service as follows.

(1 = significantly, 2 = quite, 3 = slightly, 4 = neither, 5 = slightly, 6 = quite, 7 = significantly)

UT1. I evaluate the mobile Internet service as useless … useful
UT2. I evaluate the mobile Internet service as impractical … practical
UT3. I evaluate the mobile Internet service as unnecessary … necessary
UT4. I evaluate the mobile Internet service as unfunctional … functional
UT5. I evaluate the mobile Internet service as unhelpful … helpful
UT6. I evaluate the mobile Internet service as inefficient … efficient
UT7. I evaluate the mobile Internet service as ineffective … effective
UT8. I evaluate the mobile Internet service as harmful … beneficial
UT9. I evaluate the mobile Internet service as unproductive … productive

HED1. I evaluate the mobile Internet service as dull … exciting
HED2. I evaluate the mobile Internet service as disgusting … delightful
HED3. I evaluate the mobile Internet service as uninteresting … fascinating
HED4. I evaluate the mobile Internet service as serious … playful
HED5. I evaluate the mobile Internet service as unthrilling … thrilling

HED6. I evaluate the mobile Internet service as unpleasant … pleasant
HED7. I evaluate the mobile Internet service as unamusing … amusing
HED8. I evaluate the mobile Internet service as cheerless … cheerful

Expectation disconfirmation (the discrepancy or gap between prior expectations and actual performance of an IT)

Please rate how well the mobile Internet service meets your expectations along the following dimensions. (1 = much less than expected, 2 = less than expected, 3 = a little less than expected, 4 = pretty much as expected, 5 = a little greater than expected, 6 = greater than expected, 7 = much greater than expected)

ED1. I rate my experience with using the mobile Internet service as much less than expected … much greater than expected
ED2. I rate the service level provided by the mobile Internet service as much less than expected … much greater than expected
ED3. I rate the benefits provided by the mobile Internet service as much less than expected … much greater than expected
ED4. I rate the overall performance provided by the mobile Internet service as much less than expected … much greater than expected

Satisfaction (the fulfillment response resulting from the evaluation of an IT product)

Please indicate the extent to which you disagree or agree with the following statements about your satisfaction with the mobile Internet service. (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither disagree nor agree, 5 = somewhat agree, 6 = agree, 7 = strongly agree)

SAT1. I think that I made the correct decision to use mobile Internet service.
SAT2. The experience that I have had with mobile Internet service has been satisfactory.
SAT3. In general, I am satisfied with mobile Internet service.

Continuance intention (the intention to continue using an IT)

Please indicate the extent to which you disagree or agree with the following statements about your intention to continue using the mobile Internet service. (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither disagree nor agree, 5 = somewhat agree, 6 = agree, 7 = strongly agree)

CI1. I intend to continue using the mobile Internet service in the future.
CI2. I will always try to use the mobile Internet service in my daily life.
CI3. I will keep using the mobile Internet service as regularly as I do now.
CI4. If I could, I would like to discontinue my use of the mobile Internet service. (Reverse scale)

Attention check question

I am a human being. (Agree or disagree)

Demographic information

1. Please indicate your age.

2. Please indicate your gender.

3. Please indicate your highest educational degree.

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