Exploring Chinese users’ acceptance of instant messaging using the theory of planned behavior, the technology acceptance model, and the flow theory

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ABSTRACT

Instant messaging (IM) is a popular Internet application around the world. In China, the competition in the IM market is very intense and there are over 10 IM products available. We examine the intrinsic and extrinsic motivations that affect Chinese users’ acceptance of IM based on the theory of planned behavior (TPB), the technology acceptance model (TAM), and the flow theory. Results demonstrate that users’ perceived usefulness and perceived enjoyment significantly influence their attitude towards using IM, which in turn impacts their behavioral intention. Furthermore, perceived usefulness, users’ concentration, and two components of the theory of planned behavior (TPB): subjective norm and perceived behavioral control, also have significant impact on the behavioral intention. Users’ intention determines their actual usage behavior.

Article history:
Available online 21 July 2008

Keywords:
TPB
TAM
Instant messaging
Flow theory
Perceived enjoyment
Concentration

1. Background

As a convenient Internet communication technology, instant messaging (IM) has become an indispensable part of cyber users’ lives. Statistics show that in July 2007, the number of Internet users in China has exceeded 162 million (CNNIC, 2007). Among them, 69.8% (over 113 million users) has ever used IM (CNNIC, 2007). Attracted by this great market potential, many vendors have released their products, such as QQ, MSN Messenger, and Yahoo! Messenger, into the IM software market. QQ was developed by Chinese company Tencent and currently occupies about 80.1% of the IM market share in China. It has 647.1 million registered accounts and the number of active accounts is about 273.2 million. During peak time, there are about 28.9 million Internet users using QQ simultaneously (Tencent, 2007). MSN Messenger holds about 7.7% of the market share (iResearch, 2007). IM services are mostly free, making them very affordable and attractive.

2. Research purpose and approach

Even though there are different IM products with some more successful than others, we believe their adoption are driven by the same underlying factors. In this paper, we use the Theory of Planned Behavior (TPB), the Technology Acceptance Model (TAM), and the flow theory to examine Chinese users’ acceptance of IM products, which is a critical factor that can lead to larger installed base of users and market share (Brown, Chervany, & Reinicke, 2007; Wu & Chen, 2005). We combine three theoretical perspectives for the following three reasons. First, although previous research has found TAM to be a parsimonious and robust model, TAM only employs two variables including user attitude and user belief (perceived usefulness) to explain behavioral intention. However, a user’s behavioral intention toward adoption of IM will also be affected by other factors such as the opinions of other important persons (subjective norms) (Fishbein & Ajzen, 1975). Furthermore, even if users have a strong intention to perform a behavior, they will not be able to do so without the necessary resources and skills (perceived behavioral control) (Ajzen, 1991). Second, while TPB provides us the basic theoretical framework in analyzing IM adoption, it does not inform us on what attitudinal beliefs would affect IM’s impact on us what attitudinal beliefs would affect a user’s attitude toward IM (Wu & Chen, 2005). This is where we find TAM and the flow theory useful. Third, adding the flow theory allows us to capture the fun and entertainment motivation toward
IM adoption (Koufaris, 2002). The flow theory has been used to describe a state in which “people are so involved in an activity that nothing else seems to matter” (Csikszentmihalyi, 1977). For example, when users play online games, they are often in a state of flow. Other events occurring in users’ surrounding environment lose significance and their sense of time becomes distorted (Hoffman & Novak, 1996; Novak, Hoffman, & Yung, 2000). When people use IM, they can also experience such a state. A CNNIC (2006) Internet user survey reveals that Chinese IM users not only chat with each other by text, audio (61.6%) and video (68.6%), but also play online games (40.0%), listen to music (38.9%), and watch TV (33.6%). This indicates that IM users are concerned about their satisfaction of intrinsic motivations such as enjoyment and immersion when using IM. Convenient connection and rich entertainment have made many users, especially the young generation, immerse in using IM. Therefore, we will also use flow theory to examine user acceptance of IM.

IM vendors can use the results from the current research to identify the critical factors affecting the adoption of their products and directions of improvement. For example, we find that besides the two components of TAM (perceived usefulness and ease of use), flow experiences (both perceived enjoyment and concentration) are also important factors for IM users. These results point out important entertainment features that IM vendors should focus on to enrich their products and increase their installed base of customers.

The rest of the paper is organized as follows. We present our research model and hypotheses in Section 3. Section 4 proposes the measurement method and scales. We present the research results in Section 5, followed by discussions in Section 6. Finally, limitations and conclusions are presented in Section 7.

3. Research model and hypotheses

We next develop our research model and hypotheses based on the theory of planned behavior, the technology acceptance model, and the flow theory.

3.1. Theory of planned behavior

We use the theory of planned behavior as our main theory for the explanation of IM usage. Both TPB and TAM were developed based on the theory of reasoned action (Fishbein & Ajzen, 1975), which argues that both behavioral attitude and subjective norm affect behavioral intention, which in turn affects the actual behavior. TPB adds to TRA a third factor – perceived behavioral control – that affects behavioral intention and actual behavior (Ajzen, 1991). Fig. 1 shows the TPB. In recent studies, TPB has been used to explain online consumer behavior (Pavlou & Fygenson, 2006; Wu & Chen, 2005).

Attitude is defined as an individual’s overall evaluation of performing a behavior. According to the TPB, attitude impacts users’ behavioral intention, which in turn influences their actual behavior. When individuals form positive attitude towards IM, they will have a stronger intention toward adopting it, thus they are more likely to use it.

\[H_1: \text{Behavioral intention toward using IM is positively related to the actual IM usage.}\]

Subjective norm refers to users’ perception of whether other important people perceive they should engage in the behavior. Many Internet users choose to use one kind of IM only because their friends are the users of this IM and are recommending them to use it. After all, the main purpose of using IM is to communicate with other important people. Hence, we have:

\[H_2: \text{Behavioral attitude toward IM is positively related to the behavioral intention to use IM.}\]

Perceived behavioral control describes users’ perception if they have the necessary resources, capability, and a sense of control in successfully performing the behavior. Although IM is a relatively ease-to-use technology, users still need to have the basic Internet skills to use it. In addition, compared with conventional communication methods such as telephones, IM users mainly chat with others on the Internet – a virtual space. This may arouse their anxiety of control and negatively influence their behavioral intention. In fact, empirical studies have found that video and audio chat can give users more perception of control than text chat (Jiang & Benbasat, 2004). Thus, we posit that:

\[H_3: \text{Subjective norm is positively related to the behavioral intention to use IM.}\]
[H₄]: Perceived behavioral control is positively related to the behavioral intention to use IM.

In addition, perceived behavioral control may have a direct impact on the actual usage behavior (Ajzen, 1991). This means that even if users have a strong intention to use IM, they will not adopt the technology when they lack the necessary resources, skills, and sense of control.

[H₅]: Perceived behavioral control is positively related to the actual IM usage.

3.2. Technology acceptance model and user acceptance of instant messaging

Based on the TRA (Fishbein & Ajzen, 1975), Davis, Bagozzi, and Warshaw (1989) developed TAM and found that it could better explain user’s acceptance of an information technology. Fig. 2 shows the TAM.

TAM has been extensively applied to user acceptance research of various types of technologies including e-mail, word processor, world wide web, enterprise resources planning (ERP) systems, and e-commerce (Amoako-Gyampah & Salam, 2004; Davis, 1989; Davis et al., 1989; Gefen, 2004; Gefen, Karahanna, & Straub, 2003; Pavlou, 2003). TAM has also been used to explain user adoption of IM (Wang, Hsu, & Fang, 2004). Numerous empirical studies have found TAM to be a robust and parsimonious model for the explanation of technology usage (Lee, Kozar, & Larsen, 2003). Recently, TAM has been refined and further developed. Based on eight models including TAM, Venkatesh, Morris, Davis, & Davis (2003) formulated a Unified Theory of Acceptance and Use of Technology (UTAUT) to explain users’ acceptance of an information technology. The UTAUT model included four core constructs: performance expectancy (perceived usefulness), effort expectancy (perceived ease of use), social influence (subjective norm), and facilitating conditions (perceived behavioral control). Altogether they explained about 70% of the variance in behavioral intention. In our study, by using TPB as the basic theoretical foundation and adding the beliefs using TAM and flow theory, we also incorporate all of these four constructs in the UTAUT into our research model.

Two important concepts of TAM are perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness refers to users’ feelings of improved performance when they use the technology. Perceived ease of use is concerned with users’ perceived exerted efforts when using the technology. For IM users to adopt IM, they need first find IM as a useful tool in improving their communication efficiency, enabling them to more conveniently chat with their friends, colleagues and others. In addition, IM users need feel that IM is easy to use. Both perceived usefulness and perceived ease of use are beliefs. According to TRA and TPB, they will affect a user’s attitude. Thus, [H₆]: Perceived usefulness is positively related to behavioral attitude toward IM.

In addition, TAM states that perceived usefulness will have a direct effect on user’s behavioral intention, and perceived ease of use affects behavioral intention indirectly through perceived usefulness (Davis, 1989). That is, perceived usefulness mediates the effect of perceived ease of use on behavioral intention. Many empirical studies have supported this argument (Amoako-Gyampah & Salam, 2004; Moon & Kim, 2001; Wixom & Todd, 2005; Wu & Chen, 2005).

[H₇]: Perceived ease of use is positively related to perceived usefulness of IM.

[H₈]: Perceived usefulness is positively related to behavioral intention to use IM.

3.3. Flow experience and user acceptance of instant messaging

Flow is defined as “the holistic sensation that people feel when they act with total involvement” (Csikszentmihalyi, 1977; Csikszentmihalyi & Csikszentmihalyi, 1988). When people are in the flow state, they become absorbed in their activities: their awareness is focused on the activity itself; they lose self-consciousness, and they feel they have control over their environment (Csikszentmihalyi, 1977). Thus flow theory, developed in the reference discipline of psychology, has been used to address optimal user experiences with personal computers (Finneran & Zhang, 2005). Compared with perceived usefulness, which deals with users’ extrinsic motivation (Davis, Bagozzi, & Warshaw, 1992; Venkatesh et al., 2003), flow experience can be seen as an intrinsic motivation. Extrinsic motivation refers to the desire to perform an activity because it is perceived to lead to distinct and valued outcomes. Intrinsic motivation refers to the desire to engage in an activity for no other reason than the process of performing it (Deci & Ryan, 1985; Teo, Lim, & Lai, 1999). Researchers in Information Systems previously emphasized the role of extrinsic motivation in explaining user behavior. Recently they have gradually realized the importance of intrinsic motivation (Agarwal & Karahanna, 2000).

Flow is a complex concept and researchers often measure it through multiple dimensions. Ghani (1995) measured flow using two constructs: enjoyment and concentration. Huang (2003) included four constructs to address flow, including control, attention focus, curiosity, and intrinsic interest. Li & Browne (2006) suggested that flow experience included four dimensions: focused attention, control, curiosity and temporal dissociation. Moon & Kim (2001) argued that flow included perceived enjoyment, concentration, and curiosity. Koufaris (2002) developed three constructs to measure flow, including perceived enjoyment,
perceived control, and concentration. Fig. 3 shows the flow theory used in Koufaris (2002).

From these proposed dimensions of flow, we find that the measurement of flow includes enjoyment, concentration, perceived control, and curiosity. In this paper, we adopt two dimensions: perceived enjoyment and concentration. Perceived behavioral control in our model is similar to perceived control in the flow theory, so we do not examine perceived control separately. Curiosity refers to the case where an individual remains curious and try to achieve technology competence while engaged in an action (Moon & Kim, 2001). In their research on WWW usage behavior, Moon and Kim examined curiosity. We perceive curiosity to be less relevant in our research. IM users mainly use the software for communication and entertainment purposes, in contrast to web surfing where users can obtain new information and knowledge to satisfy their curiosity. Similarly, Koufaris (2002) only examined perceived enjoyment, perceived control, and concentration without curiosity in the online shopping context. Next, we explain perceived enjoyment and concentration in detail.

Perceived enjoyment is defined as “the extent to which the activity of using a specific system is perceived to be enjoyable in it’s own right, aside from any performance consequences resulting from system use” (Venkatesh, 2000). Perceived enjoyment as an intrinsic motivation has been found to have a significant impact on a user’s technology acceptance, especially for hedonic systems (Davis et al., 1992; Koufaris, 2002; Van der Heijden, 2004). When using a technology can bring them fun and pleasure, users will be intrinsically motivated to adopt it. As noted above, IM often has rich entertainment functions and users can obtain great enjoyment when using it. Thus we expect that perceived enjoyment will improve their affective attitude toward IM and promote their acceptance intention of IM.

[H10]: Perceived enjoyment is positively related to the behavioral attitude toward IM.

[H11]: Perceived enjoyment is positively related to the behavioral intention to use IM.

Concentration is another important component of the flow experience. For users to be in a “flow” state, they must first concentrate on their activities (Koufaris, 2002; Novak et al., 2000). If users perform many tasks simultaneously and cannot focus on a limited field, they will not be able to acquire the flow experience. In contrast, for IM users that focus their attention on chatting or playing games when using IM, it is easier for them to be in a state of flow, which will positively affect their attitude toward and promote their usage of IM. Thus, we posit that:

[H12]: Concentration is positively related to the behavioral attitude toward IM.

[H13]: Concentration is positively related to the behavioral intention to use IM.

Fig. 4 summarizes our research model and hypotheses.
4. Research method

4.1. Questionnaire and constructs

We used a questionnaire survey to test our theoretical model. The questionnaire included three parts. The first part asked our respondents what kinds of IM software they had used and also included three items measuring actual IM usage. The second part had questions measuring the constructs in the research model. The third part had demographic questions about the participants. Each item corresponding to the constructs was measured using a 7-point Likert scale, with answer choices ranging from strongly disagree (1) to strongly agree (7). Most of these items were adapted from the extant literature and translated into Chinese by one researcher. Also the Chinese version of questionnaire was translated back into English by another researcher. Then minor revisions were made to the Chinese version to ensure that the meanings of all items had been reserved during the translation process. We summarize the constructs, their operational definitions, the number of items used to measure each construct, and the sources of the items in Table 2. We also list the items used in our questionnaire in Appendix A.

We adapted the three items Moon & Kim (2001) used to measure actual IM usage along three dimensions including times per week, hours of weekly use, and frequency of usage. The three items measuring behavioral intention were adapted from Moon & Kim (2001).2 The items measuring behavioral attitude, subjective norm, and perceive behavioral control were adapted from Taylor & Todd (1995). Most items measuring perceived usefulness and perceived ease of use were adapted from Davis (1989) to fit the IM technology we were investigating. We also developed a new item (PEOU4) to reflect the functions of IM. The items measuring perceived enjoyment and concentration were adapted from Moon & Kim (2001).

After the questionnaire was drafted, it was first sent to three academic experts on e-commerce and Management Information Systems for their review. Based on their comments and suggestions, we revised the questionnaire to make the wording of the items more precise. Afterwards a pretest was conducted among 60 frequent IM users. We assessed reliability by calculating the Cronbach’s Alpha value of every construct. All Cronbach’s Alpha exceeded the threshold value of 0.7 and indicated good reliability. We also conducted a principal components analysis (PCA) to test the validity of the scale. All items had higher loadings on their related factors and low cross-loadings on other factors, showing good convergent and discriminant validities.

4.2. Sample

The surveyed subjects included high school students, undergraduate students, and working professionals in a high school...
and a national university in central China. We included high school students because they were also an important part of Internet users in China (CNNIC, 2007). The working professionals were part-time MBA students in the national university. Paper questionnaires were distributed among the subjects. Returned questionnaires with incomplete or invalid answers were eliminated. We received 250 valid responses, including 65 from high school students, 121 from undergraduates, and 64 from working professionals. The sample descriptive information and a comparison with the CNNIC (2007) Chinese Internet user survey results are listed in Table 3. Nonparametric chi-square tests showed no significant difference on gender ($p = 0.104$) between our sample and the CNNIC sample, but significant difference existed on age ($p = 0.000$) and weekly hours ($p = 0.000$). With respect to age and education, most of our subjects were between 18 and 24 years old (54.4%) and had Associate’s or Bachelor’s degrees (48.4%). As a result, readers should use caution when interpreting the results of our research. QQ and MSN were two of the most often used IM software.

For all constructs, we conducted one-way analysis of variance (ANOVA) to compare the means of the same construct among high school students, undergraduate students and subjects who had jobs. Except actual IM usage (F(2, 247) = 26.59, $p < 0.01$), no other significant differences were found among the three groups. The follow-up pair-wise comparisons based on Tukey tests revealed that undergraduate students and working professionals had significantly more IM usage than high school students. This was probably because high school students had to complete their heavy school work and did not have much extra time to surf the Internet and use IM. In fact, we found that 83% of surveyed high school students used the Internet for no more than 5 h a week. As a result, in addition to reporting results using pooled data from the three groups, we also divided our dataset into two groups – a high school students group ($N = 65$) and an undergraduates and working professionals group ($N = 185$) and performed a separate analysis on each group. Table 4 lists the mean values of all constructs for three groups.

### 5. Results

Following the two-step approach of structural equation modeling (SEM) analysis (Anderson & Gerbing, 1988), we conducted a confirmatory factor analysis (CFA) to test the measurement model before testing the structural model. As shown in Table 5, all of the composite reliabilities (CRs) and Cronbach’s alphas were over 0.7, indicating the scales had good reliabilities (Bagozzi & Yi, 1998; Nunally, 1978). Most of the standard loadings were over 0.70 and all loadings were significant at the 0.001 level. In addition, the average variance extracted (AVE) for each construct was over 0.5, demonstrating that the scales had good convergent validities (Fornell & Larcker, 1981).

#### Table 4
Mean values of all constructs for three groups

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean value of high school students</th>
<th>Mean value of undergraduate students</th>
<th>Mean value of working professionals</th>
<th>$F(2, 247)$</th>
<th>$P$ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTUSE</td>
<td>2.94</td>
<td>4.67</td>
<td>4.02</td>
<td>26.59</td>
<td>0.00</td>
</tr>
<tr>
<td>BI</td>
<td>4.59</td>
<td>4.81</td>
<td>4.86</td>
<td>1.57</td>
<td>0.21</td>
</tr>
<tr>
<td>ATT</td>
<td>4.97</td>
<td>4.85</td>
<td>4.97</td>
<td>0.55</td>
<td>0.58</td>
</tr>
<tr>
<td>SN</td>
<td>4.05</td>
<td>4.37</td>
<td>4.13</td>
<td>2.07</td>
<td>0.13</td>
</tr>
<tr>
<td>PBC</td>
<td>4.86</td>
<td>4.60</td>
<td>4.65</td>
<td>1.41</td>
<td>0.25</td>
</tr>
<tr>
<td>PU</td>
<td>5.13</td>
<td>5.19</td>
<td>5.20</td>
<td>0.10</td>
<td>0.91</td>
</tr>
<tr>
<td>PE</td>
<td>5.39</td>
<td>5.36</td>
<td>5.25</td>
<td>0.39</td>
<td>0.68</td>
</tr>
<tr>
<td>CON</td>
<td>3.62</td>
<td>3.86</td>
<td>3.46</td>
<td>1.84</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Discriminant validity was tested by comparing the square root of the AVE of each factor and its correlation coefficients with other factors. As shown in Table 6, all square roots of the AVEs were larger than correlation coefficients of the factors, thus showing good discriminant validity.

Some fit indices of the CFA model were listed in Table 7. Most of these fit indices were within the threshold of the recommend values (Gefen, Straub, & Boudreau, 2000).

We also conducted a principal components analysis (PCA) with SPSS to test the convergent and discriminant validities in a second way. The results are shown in Appendix B. All items had higher loadings on their related factors and low cross-loadings, thus showing good convergent and discriminant validities (Hair, Anderson, Tatham, & Black, 1998). Overall, 10 factors were extracted, and they explained 78.82% of the total variance.

To examine the hypotheses, we used LIREL 8.7.2 to test the structural model. The results for the pooled data from all three groups are shown in Fig. 5. We only present the significant paths. Chi-square value was 586.65 with 327 degrees of freedom. RMSEA was 0.056, GFI was 0.856, and CFI was 0.971. The explained variance of perceived usefulness, attitude toward using IM, behavioral intention, and actual IM usage were 28%, 62%, 61%, and 18%, respectively.

We also report in Figs. 6 and 7 the separate analyses for the high school groups and the college students and working professionals groups. Due to the small sample size of each group, we employed PLS Graph to conduct subgroup data analysis.

### 6. Discussion

As shown in Fig. 5, based on our analysis of the pooled data, most of our hypotheses were supported, except H5, H7, H11, and H12. Perceived usefulness was positively related to a user’s behav-
ioral attitude (H6) and intention (H9). In addition, perceived ease of use had a significant impact on perceived usefulness (H8). These results corroborate previous research results on TAM. IM, as a fast and convenient communication tool, has successfully attracted Internet users, especially the younger generation. For our sample (mainly students), using IM might be very easy, thus perceived ease of use had no direct effect on the behavioral attitude and intention (H7). We do not think this result is surprising, as a previous study also found that perceived usefulness mediated the effect of perceived ease of use on other factors (Davis, 1989).

Perceived enjoyment strongly affected the behavioral attitude (H10) and concentration significantly affected behavioral intention (H13). When users log into an IM platform, they not only want to communicate with others, but also look for fun and try to obtain a flow experience. Therefore, perceived enjoyment, as a user’s intrinsic motivation, is as important a consideration as perceived usefulness for IM service providers. Nowadays, most IM products, such as QQ, MSN Messenger, and Yahoo! Messenger, provide similar communication functions. However, they are different in other value-added functions such as entertainment functions. QQ, a Chinese IM software, excels in this aspect. In fact, Tencent, the owner of QQ, has obtained huge profits by charging QQ users for the entertainment services such as the QQ show. However, perceived enjoyment had no obvious effect on the behavioral intention (H11) and concentration had no significant effect on the behavioral attitude (H12). Thus users’ attitude towards IM mediated the relationship between perceived enjoyment and their acceptance intention. Concentration directly affected users’ acceptance intention of IM. If users can concentrate on using IM, it is easier for them to obtain the flow experience. Thus they are more willing to continue using the IM product. However, when concentrating on using IM, a user might not realize it and as a result it does not affect her attitude. It is worth noting that the results of our study were different from that of Koufaris (2002). In his paper, Koufaris did not examine attitude. However, he found that perceived enjoyment, rather than concentration, significantly affected a user’s intention to return to a shopping website. The different results may be attributed to the different technological contexts—one is online shopping and the other is IM. Koufaris (2002) acknowledged that a simple construct such as shopping enjoyment might be better at predicting online consumer behavior than the multidimensional construct of flow. However, in the IM context, it is much easier for users to obtain the flow experience when chatting with others and watching entertainment shows. As a result, we observed a multidimensional construct of flow in our research.

With respect to the three components of TPB, attitude, subjective norm, and perceived behavioral control played significant roles in determining the behavioral intention (H2, H3, and H4). This demonstrates that users’ behavioral intention is not only determined by their attitude, but also by other factors such as peers’

![Hypotheses testing results for the pooled data (N=250; *, p < 0.05; **, p < 0.01; ***, p < 0.001; the bold numbers are the explained variances).](image)
opinions and their own resources and abilities. The effect of subjective norm is similar to that of network externalities. When users find that people around them have adopted one IM, they will be more willing to use it. Perceived behavioral control reflects the ability and resources owned by users. Without these prerequisites, they will have a low intention to use IM. In addition, perceived behavioral control had no direct effect on the actual behavior (H5), thus users mainly adopted IM based on their behavioral intention. Another possible reason for the insignificant result here was our unbalanced sample. We had more undergraduates and working professionals (N = 185) than high school students (N = 65). As our subsequent discussion on the differences in the results between the two groups shows, perceived behavioral control affected actual IM use for high school students but not for college students and working professionals. When the data were pooled together, the results reflected what the case was for the dominant group, thus H5 was not significant.

Behavioral intention was significantly related to actual IM usage, supporting H1 and corroborating results from previous research on the established link between intention and actual behavior.

Our separate analyses for the high school students group and the undergraduates and working professionals group also generated highly consistent results. The hypotheses testing results were the same except the relationship between perceived behavioral control and actual IM usage. For the high school students group, actual IM use was affected by not only behavioral intention but also perceived behavioral control. Chinese high school students face considerable pressure to study hard to get into college and undergo constant monitoring from their parents. They have less control over their actual use of IM even if they intend to. On the other hand, for more independent undergraduate students and working professionals, they do not face such pressure or parental control, so perceived behavioral control becomes less important. This is a unique cultural characteristic of China. In addition, perceived ease of use is a more important predictor of perceived usefulness for undergraduates and professionals than for high school students, suggesting that young adults pay more attention to perceived ease.

Fig. 6. Hypotheses testing results for high school students (N = 65; *, p < 0.05; **, p < 0.01; ***, p < 0.001; the bold numbers are the explained variances).

Fig. 7. Hypotheses testing results for undergraduate students and working professionals (N = 185; *, p < 0.05; **, p < 0.01; ***, p < 0.001; the bold numbers are the explained variances).
of use than the teenage group. Indeed, in China the most technical savvy group is the young generation and teenagers are more skillful at using computers than the older generations. Subjective norm also plays a more important role in affecting high school students’ intention toward using IM than the other group. As high school students are younger, their behaviors are more influenced by their peers, parents or teachers.

7. Conclusions

IM is a popular online communication tool among Internet users because of its high efficiency and low cost. This large market provides great profit potential for e-commerce enterprises. Thus, many Internet companies have developed their IM software. However, many of these products are not well accepted by Internet users and they only have small market shares. These companies are eager to know what factors determine a user’s acceptance of IM service. With this research, we find that besides the two components of TAM (perceived usefulness and ease of use), flow experience (both perceived enjoyment and concentration), subjective norm, and perceived behavioral control are also important factors for IM users. Results illustrate that Internet users want to get a variety of experiences, such as fun and enjoyment, as well as the basic communication function when using IM services.

This study makes three contributions. First, it explores user acceptance of IM in China, where Internet usage is under fast development but researchers have paid little attention to this phenomenon. Second, it integrates TPB, TAM, and flow theory to explain user behavior. Results demonstrate that users accept IM not only because of extrinsic motivation (perceived usefulness), but also because of intrinsic motivation (perceived enjoyment and concentration). Third, we found that sample demographics would moderate user adoption behavior. For example, perceived behavioral control has a relatively larger effect on the actual usage of high school students than that of undergraduates and working professionals.

For researchers, this study demonstrates that IM users are concerned about both extrinsic and intrinsic motivation. They not only expect a useful and easy-to-use IM platform, but also want to have fun and enjoy a flow experience. Additionally, flow as a comprehensive concept deserves more research attention in the Information Systems and e-commerce context.

For practitioners, the research provides some guidelines in improving their products and services to attract and acquire users. They need to offer users a powerful communication and entertainment platform. With respect to usefulness and ease of use, practitioners are expected to provide more efficient and reliable communication services. In addition, IM providers should add rich entertainment functions to their products. This will lead to more enjoyment by the users and possibly a flow experience, which will promote their acceptance of the IM product. At the same time, IM providers may enjoy high profits by charging users for these value-added services.

Our research has the following limitations. First, our sample was mainly composed of undergraduate and high school students. Compared with other IM users (e.g. working professionals), students may be more interested in the enjoyment aspect of IM usage. In addition, a comparison of the age and education of our sample with the results from the CNNIC (2007) Chinese Internet user survey showed that our sample was younger and more educated. Future research may use random sampling to draw individuals as subjects. However, young people, especially young students, without a doubt, are the major users of IM software in China. Therefore, we believe our results can still shed light on the acceptance of IM software in China. Second, both the explained variance of behavioral attitude and behavioral intention were about 60%. This demonstrates that other factors excluded in the model had effects on these two variables. Future studies can include other factors into the model. Third, flow is a complex concept and may include multiple dimensions. In this research, we adopted two constructs to measure the flow experience. Further studies can pay even closer attention to this concept.

Acknowledgements

This work was partially supported by a grant from the National Natural Science Foundation of China (No. 70731001), a grant from the National Social Science Foundation of China (No. 06BJY101) and a grant from the Modern Information Management Research Center at Huazhong University of Science and Technology.

Appendix A. Scales

Perceived ease of use (PEOU) (the first three items were adapted from Davis (1989))

PEOU1: Overall, IM is easy to use.
PEOU2: Learning to operate IM is easy for me.
PEOU3: I find it easy to use IM to chat or obtain entertainment.

Perceived usefulness (PU) (adapted from Davis, 1989)

PU1: IM is useful to me.
PU2: IM allows me to conveniently communicate with others.
PU3: IM improves my efficiency of communication with others.
PU4: IM allows me to more easily communicate with others.

Perceived enjoyment (PE) (adapted from Moon & Kim, 2001)

PE1: Using the IM gives enjoyment to me.
PE2: Using the IM gives fun to me.
PE3: Using the IM keeps me happy.

Concentration (CON) (adapted from Moon & Kim, 2001)

CON1: When using the IM, I do not realize the time elapsed.
CON2: When using the IM, I am not aware of things happening around me.
CON3: When using the IM, I often forget the work I must do.

Behavioral attitude (ATT) (adapted from Taylor & Todd, 1995)

ATT1: Using IM is a good idea.
ATT2: I like using IM.
ATT3: Using IM is a wise idea.

Subjective norm (SN) (adapted from Taylor & Todd, 1995)

SN1: People who are important to me think that I should use IM.
SN2: People who influence me think that I should use IM.

Perceived behavioral control (PBC) (adapted from Taylor & Todd, 1995)

PBC1: Using IM is entirely within my control.
PBC2: I have the knowledge and ability to use IM.
PBC3: I am able to skillfully use IM.
Behavioral intention (BI) (adapted from Moon & Kim, 2001)

BI1: I will frequently use IM.
BI2: I will recommend IM to others.
BI3: I will continue using IM in the future.

Actual IM usage (ACTUSE) (adapted from Moon & Kim, 2001)

ACTUSE1: How many times do you use IM during a week?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>Less than once a week</td>
<td>About once a week</td>
<td>2–3 times a week</td>
<td>4–5 times a week</td>
<td>About once a day</td>
<td>Several times each day</td>
</tr>
</tbody>
</table>

ACTUSE2: How many hours do you use the IM every week?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 h</td>
<td>1–5 h</td>
<td>5–10 h</td>
<td>10–15 h</td>
<td>15–20 h</td>
<td>20–25 h</td>
<td>&gt;25 h</td>
</tr>
</tbody>
</table>

ACTUSE3: How frequently do you use the IM?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely infrequent</td>
<td>Quite infrequent</td>
<td>Slightly infrequent</td>
<td>Neither</td>
<td>Slightly frequent</td>
<td>Quite frequent</td>
<td>Extremely frequent</td>
</tr>
</tbody>
</table>

Appendix B. Principal components analysis with varimax rotation

<table>
<thead>
<tr>
<th>PU</th>
<th>PEOU</th>
<th>ACTUSE</th>
<th>PE</th>
<th>CON</th>
<th>PBC</th>
<th>BI</th>
<th>ATT</th>
<th>SN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTUSE1</td>
<td>.902</td>
<td>ACTUSE2</td>
<td>.896</td>
<td>ACTUSE3</td>
<td>.874</td>
<td>PE1</td>
<td>.826</td>
<td>PE2</td>
</tr>
<tr>
<td>PE1</td>
<td>.753</td>
<td>PE2</td>
<td>.822</td>
<td>PE3</td>
<td>.755</td>
<td>PU1</td>
<td>.714</td>
<td>PEOU1</td>
</tr>
<tr>
<td>ATT1</td>
<td>.728</td>
<td>ATT2</td>
<td>.696</td>
<td>ATT3</td>
<td>.768</td>
<td>BI1</td>
<td>.695</td>
<td>BI2</td>
</tr>
<tr>
<td>SN1</td>
<td>.870</td>
<td>SN2</td>
<td>.868</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

Note: only loadings larger than 0.4 are shown.

References


