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Application Research and Evaluation Methods of Instant Messaging Software

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Abstract

With the rapid development of computer and communication technology, instant messaging software has become more and more important communication platform, but because of the diversity of the instant communication software, there have not unified specification management, lack of evaluation research for the system. Aiming at finding instant messaging software how to affect the use factors of the user, this paper uses the hierarchy analytic process (hap) and Delphi method, established the application evaluation system of instant messaging software, the usage of instant messaging software and services function be researched.

Keywords*: Instant messaging software; Delphi method; Hierarchy Analytic process (hap); Evaluation system*

1. Introduction

Instant messaging (IM) refers to a business that can carry on the Internet information to send and receive instantly, communication instantly [1]. Since 1998, IM obtained the swift and violent development, its function also more and more perfect, such as have blogs, search, music, games, *etc.* IM started only simple chat, now it has developed into a comprehensive information platform, integrated with news and information, communication, electronic commerce, entertainment, search, office collaboration and enterprise customer service, *etc.* all kinds of information. E-mail as a communication tool, but it has its own disadvantages, such as ductility flawed, however IM just make up for the shortcomings, makes the terminal capable of communications at any time, contact at any time to view the status information.

IM initially developed by three of the children of Israel, it was developed in 1996, named as ICQ [2]. In 1998, ICQ user registration number has reached 13 million, and is bought by AQL on price of $300 million. At present, the ICQ number of users has reached more than two hundred million, the main popular in Europe and America, and has become the world's largest instant messaging tool.

Instant messaging is a terminal services, people can through the network do real-time text, voice, documents, and video communication, there mainly exists phone instant messaging, web and video instant messaging. Text message represents mainly mobile instant messaging [3], the representation of website video communications such as MSN, QQ, China mobile fetion application form.

Through decades of development, after the Web and E-mail, the instant messaging has become the third largest Internet applications. Study of the new mode of communication, mainly concentrated on communication research and applied research. Instant messaging is tools for some organizations or individuals to provide free services, the current evaluation studies of instant messaging software applications is very limited. This paper on the basis of summarizing the research results at home and abroad, put forward of the instant messaging software application [4] evaluation index, the influential instant messaging software is practice tested, according to the test results, put forward some

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improvement opinions for instant messaging software provider, and develop effective optimization strategy.

With the continuous development of Internet technology, the instant messaging software has become more and more. So many instant messaging software, however, there is no a standard evaluation system, people according to what index to select the most suitable instant messaging communication platform is a very worth thinking problem.

According to the survey, in China, QQ, with ninety percent of the proportion far ahead of other instant messaging software. This period also emerge some other mainstream instant messenger software, user interface and function of the software are satisfied, but because of the voice chat, video chat, file transfer for the network facilities demand is higher, so the user satisfaction in this respect is reduced. With the rapid development of high-tech, whether the high quality service of IM to meet user demand is a very important problem.

Based on some unsolved problems, this paper mainly to research the existing services of instant messaging software, summarizes the characteristics of instant messaging software, draw lessons from the domestic and foreign scholars about the practice of instant messaging, evaluation theory and related research result, established the evaluation index system about instant messaging software. Through the existing instant messaging software test, found that the existing problems, and provides instant messaging technology innovation with valuable advice, for the future instant messaging service development provides a feasible suggestions [5].

Evaluation theory based on the predecessors' research results, this paper puts forward index and evaluation principles about instant messaging software, using the hierarchy analytic process (hap) to determine the weight of each index, established a relatively perfect evaluation index system of instant messaging software applications. The whole research process and research is very valuable for theoretical significance and practical significance: 1) to help individuals and organizations understand the advantages and disadvantages of instant messaging software, choose the instant messaging software, improve utilization;2) can cause many scholars focus on instant messaging software, for the future research and utilization of IM lay the foundation;3) through the evaluation index and practice verification, found that the problem of instant messaging software, promote its quality improvement;4) through the user experience, people can more comprehensively use of instant messaging services, promote the development of network information and communication;5) found that IM in industry development and the problems in the technical innovation, put forward valuable improvement strategy, improve the efficiency of communication;6) help instant messaging software provider to comprehensive understanding of the needs of users, development a targeted and representative instant messaging software [6].

2. Related Works

The earliest IM a prototype can be traced back to the Dutch Jarkko invented in 1988, a network agreement IRC chat, the protocol only support text chat, and can't support the function of the buddy list. The earliest instant messaging software is ICQ, as IM software architect, IM function and technology is basic molded, the principle has been known. In 1996 ICQ by three of the person of Israel, Weiss, Scott developed. In 1995, however, MSN online service was used in the United States [7], in 1996 users use MSN access Internet has reached 2 million, MSN Messenger service in 1999 references, and 6 days before the opening of the rose 800000 users. In 2005, MSN and yahoo announced two service providers have each function. With the rapid development of instant messaging software, the research also has continuously developed. Instant messaging software research mainly embodied in the following aspects:

First of all, the use of instant communication technology in the colleges and universities, based on the research of the students and education, found IM users are

mainly concentrated on young people with higher education, through this research can provide reference for selecting subjects. For example Maclea and Fong is discussed from the angle of technology that IM provider's lack of interoperability problems. Segerstad through on college students' study, comparing IM with other communication tools, reveals the features of IM online remind, showed the use of online remind, also found that the students often use IM for team, for entertainment or coordinate social relations. Ruppel, through investigating the library user, assume that the user can through the local IM system communicates with the librarian. Although instant messaging system can't completely replace the traditional service, the user can better access to information faster, in turn, increase the satisfaction of the library. Anabel summarizes why IM able to become an important tool of communication, elaborated the IM usage of college students. Olivine against the use of email and IM preferences, found IM multi-function mechanism, improve the relationship between peers, IM make more freedom of speech, improved the use of IM. Reynol research using IM how to affect academic, he found that by using IM able to help deal with multiple tasks, finish the report. In some special cases, IM also may have a negative impact on academic work, so you need to strengthen the management of education [8].

Second, widely used as instant messaging, some organizations also began using IM, such as Doyle explores the IM application in other aspects, and it is concluded that instant messaging has become a wide range of marketing tool, it can communicate with consumer directly. In 2003, Abert through social activities or work reveals the important factors that affect IM users sense perception, can be concluded that the personalized information and friendly development is one of the important factors affecting IM application, and the diversity of information and information in work affect the application of the IM. In 2005, Ann and Jane by visiting IM users in the organization, understand the user how to choose the IM as a communication tool, the study found that the critical mass is a very important factor.IM not only a kind of important medium of communication, but also a kind of communication channels. In 2008, To. P.L studied IM how to application between members of the organization, found that the organization member's attitude is very positive, factors influencing the attitude is the compatibility, ease of use, usefulness, safety, importance, perceptual awareness, safety. Promote environment and self-efficiency, however, can affect the IM application in the organization, and under the perceived behavior control, promote environment more influential than self-efficiency. For the selection of evaluation index, Instant messaging software in the organization provides an important reference

In addition, the influence factor of instant messaging validation studies. Mainly for young people, the technology acceptance model theory, with the help of theory of planned behavior theory and structural equation model, it is concluded that instant messaging is safety, useful, friendly development and ease of use and other factors constituted the important indexes for evaluation application, the research results mainly includes:.

In 2003, Albert in the technology acceptance model and structural equation modeling built IM research process, through the survey of 600 college students. The study of the basic model affects the perceptual of IM, and the characteristics of IM is rich of exchanges and friendly development, information, ease of use and safety. Also found that these factors of social environment and working environment have different weights. In 2003, Li, D.H. use motivation model and the three theory, instant communication and relationship model is established. Among them, the relationship commitment, affiliated motivation and sense of entertaining, critical mass impact of entertaining three factors and sensory perception entertaining mutual influence perceived usefulness, perceived entertainment, perceived criticality and perceived usefulness influence behavior intention. Therefore, perceived entertainment for the use of IM, there is a big advantage for research communication technology, integration of social utility entertaining and usefulness is very important. To P.L. through planned behavior theory to establish the use of instant

messaging model, using structural equation model assumption, investigation have been carried out to verify the use of IM in the tissues of the model. Use IM behavior intention is mainly composed of subjective norms, attitude and perceived behavior control. Subjective rules including peer influence, advantages and business relationship; Attitude mainly includes perceived ease of use, usefulness, criticality, compatibility, security, and perceive online remind; Perceived behavior control including self-promotion and the condition of energy efficiency. The factors given due weight, constitute the organization IM using the standard model.2010, Jeremy based on technology acceptance model and the theory of planned behavior once users of IM, but to give up, found that at first they were attracted by the characteristics of the IM, then under the different background, there are some features to the user caused trouble, so users abandon the use of the software [9].

All in all, researchers study of IM mainly practice, use the theory of the technology acceptance model, structural equation model and the theory of planned behavior. Respondents are mainly young college students, the applied study of IM mainly from colleges and universities, the social organization transfer to the company. From the results of this study can be concluded that IM factors that affect the user friendly development, mainly including the usefulness, ease of use and safety, the factors to lay a solid foundation for the establishment of IM evaluation index. At the same time, the object of empirical study are mainly young college students, which provides reference for the research of this paper. It can be seen from the research achievements of the past, there did not evaluate the specific cases of instant messaging, no investigation on the specific function of IM, but previous studies that used in the process of investigation and survey method will provide a reference for this article.

3. Proposed Scheme

3.1 IM and its Software

Instant messaging (IM) refers to a real-time communication service system on the Internet, people can use instant messaging software to real-time transfer documents, text, video, voice and other information.

At present, there are two terminals can provide instant messaging services: cell phones and computers. Generally, people use instant messaging service at computer terminals. But with the increase of mobile phone users, the so-called mobile instant messaging is user using instant messaging services by mobile terminal. In China, according to the statistics of the development of the Internet, it can be obtained using mobile phones for instant messaging users accounted for 60% of the total number, and the use of computers for instant messaging user accounts for only 40%.

Instant messaging software, and can be called a chat tools, chat software, instant messaging tool, English for Instant messaging software, referred to as IMS, refers to through wireless or wired devices to the Internet, voice, text and video between users of real-time communication software.

Instant messaging software as a kind of instant messaging service platform, not only can real-time exchange of text messages, and have a group chat, group of friends, the online remind, personalized settings, and other functions[10]. With the rapid development of software technology, the function of the instant messaging software increasingly rich, integrates music, blogs, TV, email and search, *etc*. At the same time, also have the spread of news advertising effect, is an entertainment, communication, business office, customer service features such as the integration of information platform. At present, the manifold instant messaging software with MSN, renren, QQ, WeiChat, *etc*.

3.2. Related Evaluation Theory

With the rapid development of Internet, instant messaging software has become an important tool of communication, people its value is mainly manifested in the aspect of its

services. Instant messaging software has three characteristics: network, software and service characteristic. Now, about the software, the evaluation of service quality, network resource research is worthy of reference.

On software evaluation studies, has made quite mature research achievements, the software quality is refers to the software product can meet the demand of a given feature. In 2001, organization established the international standard ISO/IEC9126 standards, the six characteristics of software metrics: functional reliability, maintainability and efficiency, ease of use and portability, as shown in Figure 1.

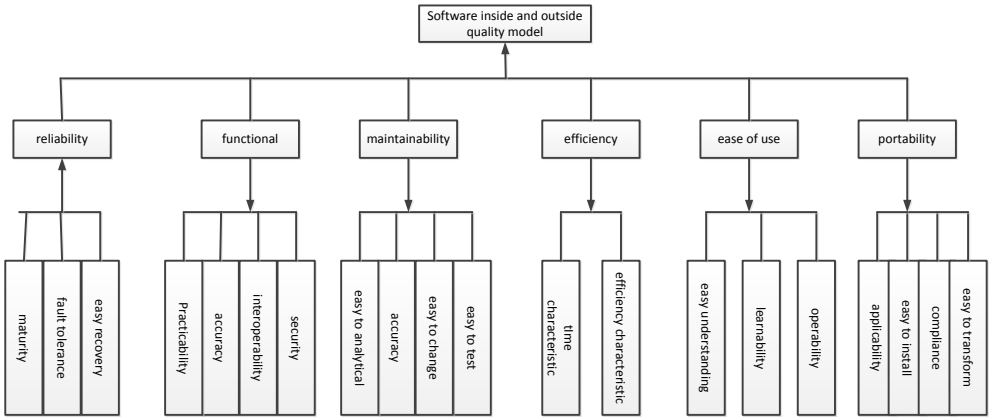

Figure 1. ISO/IEC9126 Software Quality Model

Relative to the different types of software, the established evaluation model is different also, in 2008,GuZhen on the basis of the improved AHP, the multimedia computer aided software evaluation model was set up, mainly from the technical requirements, teaching requirements, capacity requirements and psychological requirements, interface requirements to evaluate at five aspects. Instant messaging software implementation of communication interactive prompt it is applied to an increasing number of reference service, consulting software evaluation results to the text. In 2003, JiangZiLi from software use convenience, software function, the businessman after-sales support three aspects to evaluate real-time software reference. So, software evaluation theory for instant messaging software as a characteristic of index selection provides the reference.

3.3. Instant Messaging Software Evaluation Principle

Establish a scientific and reasonable evaluation system is a complex process, the index system is a complex system, is composed of a series of related evaluation index of organic system. The principle of evaluation index system including the construction principles of index system and evaluation index of optimization and selection principle. Due to the instant messaging software with software, network and service features, current evaluation on instant messaging and no unified standard principle, however, some evaluation principle is really worthy of reference.

1) Completeness. Index system of instant messaging software is a software of quality index, quantitative and qualitative index, service quality indicators and art design indicators such as multi-level system. The completeness evaluation system is to completely reflect the various aspects of the evaluation object, ensure each performance can be instant messaging software evaluation. Both evaluation index in contact all aspects of instant messaging software, and to evaluate the performance of various local indicators.

2) The scientific nature. Scientifically select instant messaging software evaluation indicators, to determine the index weight, can effectively guarantee the practicability of evaluation index system of instant messaging software. According to the fact that, in the process of establishing evaluation system of instant messaging software application,

principle, concept, method to exact and true, to ensure the reliable experimental data and results.

3) Practical. Instant messaging software index system should be practical and feasible. Index and index system level cannot too simple or too complex, instant messaging software should be detailed investigation, selecting evaluation index, the strict hierarchy.

4) Rationality. Rationality is the content of the evaluation index system for the construction of instant messaging software requirements, through a large amount of data research and content analysis, and then to carry on the design, the requirement to establish the evaluation index system can reflect the real-time communication software technology, network, design and function and the value of all levels. Can from different angles reflect IM all entertainment platform as the user communication performance.

5) Advanced. Advanced nature is to point to build an evaluation index system of evaluation system and other relative level, highlight its own characteristics. When constructing evaluation index system of instant messaging software, to understand the characteristics of the existing evaluation index system, find out the insufficient, construct the index system accord with the characteristics of instant messaging software. Instant messaging software as an important communication tool, the user in the evaluation, should reflect its peculiar characteristics.

6) Targeted. In order according to the purpose of this study, a targeted instant messaging software evaluation system is established. Post evaluation system of the selection of indicators at all levels need to be able to effectively organization according to the theme, cannot too generalization, will delete inappropriate evaluation index. The stronger the evaluation index system of targeted, the higher the instant messaging software evaluation.

Therefore, when constructing evaluation index system of instant messaging software, should according to the research purpose, constructed in accordance with specific IM users use evaluation index system, so as to reflect the rationality of the index system, scientific, ensure its reliability, abundance and effectiveness.

3.4. The Determination of Instant Messaging Software Applications Evaluation Index

Instant messaging software has extensive contents, it is not only a communication tool, but also information communication and entertainment tool. Every feature of instant messaging software contains many indicators, so the construction of instant messaging software application evaluation system is complicated. Five level indicators of instant messaging software service, function, design, technology, development from different angles describe the characteristics of the instant messaging software, the instant messaging software can be very comprehensive evaluated. So you can design the overall goal of the architecture, as shown in Figure 2.

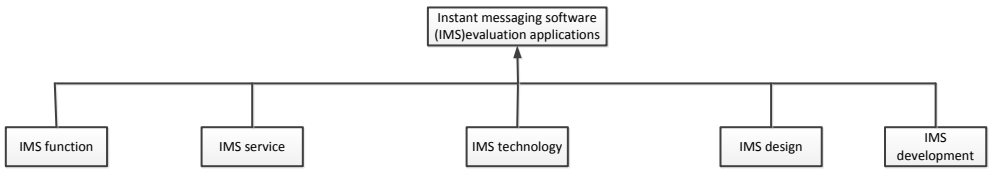

Figure 2. The Evaluation Index System Framework of Instant Messaging Software Application

Through research and summarization of the instant messaging software, according to evaluation criteria, combining with the service quality evaluation, software evaluation, evaluation, assessment of network resources, and user experience theory achievement, instant messaging software service, function, design, technology and development of five

level indicators and the corresponding secondary indexes, and then Delphi method is used to determine the evaluation index.

In this study, on the basis of the analysis of a large number of literature, using Delphi method to determine the evaluation index of instant messaging software, improve the rationality of the evaluation system, scientific and authoritative. The main operation process of application of Delphi method can be summarized as follows:

1) Determine the consultant

According to the research involving knowledge selection, determine the number of experts should not be too much, according to the study to determine the scope of the size, in general, not more than 30 people. This study selected 15 experts, among them, 5 experts engaged in software development research, 5 experts engaged in library information science research field and five senior communications users engaged in scientific research with interdisciplinary backgrounds, and the use of instant messaging for 10 years.

2) Expert advice and feedback

According to the instant messaging software (IMS) application evaluation index of the primary table such as Table 1, each index and per level index can be set up as $H_{ij}(i=1,2;j=1,2,3)$ .This study indicators can be divided into secondary indexes. First introduced in the questionnaire about the background of the instant messaging software application evaluation, relevant information, research purpose, research the main approach to fill in, Table 1 add secondary evaluation index to the questionnaire investigation. Extent of hierarchies of the five point Likert scale, 1-5 respectively influence degree is not big, in general, big, great big, and the survey index excess or deficiency to give advice. Summarize the results of expert evaluation, calculate the upper and lower quartiles and median.

Table 1. The Statistics Result of First Round Expert Consultation

The secondary indicators H_{ij}	The median	Upper quartile	Lower quartile	Top and bottom quartile deviation
H_{11} practical	4	3	5	2
H_{12} ease of use	4	2	5	3
H_{13} convenience	3	3	4	1
H_{21} generality	2.5	1	4	3
H_{22} effectiveness	4	3	4	1
H_{23} interactive	4	3	4	1

3) The analysis of the expert consultation result

According to the existing statistical analysis method, statistical analysis the result of the research of consulting:

With m specialist, n index, the score of the i expert evaluation the j index is C_{ij}, the average of index can be written as follows:

$$M_j = \frac{1}{m_j}\sum_{i=1}^{m_j} C_{ij} \tag{1}$$

Which M_j is the arithmetic mean of the j index, m_j is the number of experts for j index.

Important index to evaluate the size of the relative volatility refers to the variation coefficient of the evaluation results.

First, the calculation of j index evaluation variation degree, can be said with the standard deviation δ_j:

$$\delta_j = \sqrt{\frac{1}{m_j - 1}\sum_{i=1}^{m_j}(C_{ij} - M_j)^2} \tag{2}$$

It reflects experts in the j instant messaging software application evaluation index of variation and standard deviation δ_j as small as possible, and that the smaller the variation degree of expert evaluation opinions.

Second, the variation coefficient of calculating j index, can be written as $W_j = \frac{\delta_j}{M_j}$:

$$W_j = \frac{\delta_j}{M_j} \tag{3}$$

Where W_j is smaller, the experts coordination degree is higher.

Table 2. The Statistical Data of Instant Messaging Software Application Evaluation Index

The secondary indicators H_{ij}	The average M_j	The standard deviation δ_j	The coefficient of variation W_j	The consensus Y_j
H_{11} practical	4.000	0.603	0.151	8
H_{12} ease of use	3.500	0.798	0.228	5
H_{13} convenience	3.750	1.288	0.343	3
H_{21} generality	3.917	0.793	0.202	5
H_{22} effectiveness	3.917	0.669	0.171	7
H_{23} interactive	3.250	0.622	0.191	7

Mark all the coordination coefficient of m expert opinion experts on the degree of coordination all n indicators.

$$G = \frac{15}{m^2\left(n^3 - n\right) - m\sum_{i=1}^{m} T_i}\sum_{j=1}^{n} S_j^2 \tag{4}$$

Among them, T_i is the same level indicators $T_i = \sum_{l=1}^{L}\left(t_l^3 - t_l\right)$, L is the i expert evaluation of each index in the same number of cos group; t_l said the group G included in the same level, S_j is the j index ranks and with all the indicators and the difference between the arithmetic mean; $\sum_{j=1}^{n} S_j^2$ represent index ranks and all indicators and the arithmetic mean of the sum of squared residuals. The coordination coefficient G between 0 and 1, the greater G, then the better all experts to index coordination degree.

4. The Experimental Results and Analysis

Selection of evaluation indexes according to table 1 and Table 2 to determine the weighing values of assessment indexes, the structure belongs to the instant messaging software application level of evaluation standard, adopt the way of centesimal system, the evaluation grade is divided into excellent, good, poor, in four grades, which good for 90-100 (including 90), is 80-90 (including 80), a good medium for 70-80 (including 70), a difference of 70 below, specific see Table 3:

Table 3. Instant Messaging Software Application Evaluation System

Level indicators	The secondary indicators	Rating standard	Rating standard			
			excellent 90~100	good80~90	medium 70~80	poor<70
	C11 Practical 0.4451	Excellent: IMS practical strong, making it easy for users to exchange; Good: IMS practical, convenient communication; Medium: just meet the general requirements; Poor: IMS Solid is very poor				
	C12 comprehensive 0.1431	Excellent: IMS function is very rich, fully meet the requirements; Good: the IMS function more comprehensive, more meet the requirements; Medium: IMS function; Poor: IMS single function				
	C13 Entertaining 0.0805	Excellent: IMS functions fully meet the demand of leisure; Good: Have the most leisure demand; Medium: basically met points and				

		leisure demand; Poor: have individual entertaining				
	C14 ease of use0.2958	Excellent: IMS function is very easy to use; Good: some have to learn to use; Medium: in the most need to learn will use; Poor: don't make part function with				
	C15 convenience 0.0356	Excellent: IMS functions use convenient; Good: some It's not convenient to use; Medium: most is not convenient to use; Poor: most without access to use				

5. Conclusion

Through a lot of literature research, the research results about instant messaging software and its application at home and abroad were summarized. Found that at present the main research contents are divided into instant messaging technology innovation of instant messaging software, instant messaging to the customer, the influence of the present situation of the application of instant messaging software, *etc.*, but the evaluation about instant messaging software and its application research is relatively small. And now IM market increasingly prosperous, there are many different kinds of instant messaging software, lack of unified norms, to IM user effectively select suitable for instant messaging software caused the problem. Therefore, instant messaging software application evaluation is a problem worthy of study, the rapid development of the instant messaging market could satisfy the requirement of the user to create a instant messaging software plays extremely important role. This paper set up the evaluation index system of instant messaging software application, laid the foundation for the research of instant messaging, valid for the user to choose suits own instant messaging software provided valuable references, for instant messaging providers, improvement strategy, provides suggestions for competitive advantage.

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