An empirical research of university students’ handset reading behavior

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Abstract The author carried out an investigative survey by way of random sampling college students’ handset reading behavior at 10 universities in Nanjing. It was hoped that through such an undertaking and accompanied it with a scientific analysis of the collected data, we may gain a better understanding about the present handset reading situation of Chinese college students in general and the characteristics of the students’ handset reading behavior such as their needs of handset reading, their access techniques to handset reading, and their level of sophistication of handset reading utilization, etc. in particular. Based on his research findings, the author concludes his paper with a calling to those handset reading service providers, such as university library administrators and library and information professionals to strive for further professional advancement for their handset based information service delivery operation.

Keywords University student; Handset reading; Handset reading behavior; Universities in Nanjing

1 Introduction

According to “the 28th Statistical Report of Internet Development in China” released by the China Internet Network Information Center (CNNIC) at the end of June 2011, the total number of mobile Internet users in China has reached 318 million, representing nearly 66% of all Internet users in China[1]. This shows that the Internet has been increasingly connected by handheld mobile phones and other mobile devices situated at business offices, study parlors, Internet cafés and at users’ pockets. Mobile reading is one of the main applications of mobile Internet; 23% of 18 to 70 year-old users used the handset reading in 2010 according to “the 8th Investigation Report of National People’s Reading in China” issued by China Research Institute of Publishing Science in 2011[2].

At present, Chinese scholars have done a number of significant theoretical researches on handset reading which includes elements of handset reading[3], influence of handset reading on traditional reading habits and information

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This work is supported by the Foundation for Humanities and Social Sciences of the Chinese Ministry of Education (Grant No.: 10YJA870013).

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dissemination\cite{4}, and characteristics of mobile phone reading as well\cite{3,5}. There are also some other studies about how handset users use their cell phones to read. For instance, Han’s investigation on the present situation of handset reading users (occupation, income, age, education, reading preferences, and questions) in 10 provinces and cities in China such as in Beijing and Shanghai\cite{6}; Huang’s review of distribution of handset reading users from the perspective of age, mobile Internet age, income, education and full-time work according to the survey data of mobile Internet behavior in China’s 34 cities provided by Media and Marketing Research Center of Peking University in 2009\cite{7}; Xiao and Han’s analysis of the correlation between users’ educational level and mobile reading service based on an investigation of mobile reading behavior (frequency of reading, acceptable cost of reading, content and form of reading) of 479 university students\cite{8}. It is noticeable that from above samples of an overall literature survey, we can easily discern that there are relatively fewer published research papers focused on the handset reading from the perspective of users’ information seeking behavior. Such users’ particular information needs and their unique characteristics of information seeking behavior are the basis and premise of this research paper.

In view of the fact that handset reading service providers should ideally construct their *modus operandi* based on the unique characteristics of information seekers’ reading behavior, it is thus necessary for scholars in the similar field of study to further ameliorate the unbalanced treatment of current research literature about mobile device subscribers’ reading needs and information seeking behavior. According to the 8th National Reading Survey issued by China Research Institute of Publishing Science, 63.3% of the handset reading community is among the age group between 18 to 29 years old\cite{2}, and university students are in the bulk part and of the main representatives of the handset reading community. The central aim of this paper was designed to investigate the mobile-device based reading behavior of the university students in Nanjing. Specifically, it aimed to study the handset users’ information needs, their technological means of accessing digital content of mobile phones and their reading and information seeking process. After an analysis of the collected data, a summary of the present handset usage situation in China and the characteristics of university students’ handset reading behavior would be presented as conclusive remarks in the end of this paper.

### 2 Conceptual framework of handset reading behavior

Taking the mobile phone as a reading terminal, users receive and download the information via wireless communications network, and browse or read information on mobile phones. Such kind of activities constitutes handset reading. Handset reading is composed of three parts, i.e. the user, the action of mobile reading and...
the digital information carrier. The user is the subject of mobile reading; the digital information carrier is the object, including both the reading content and the cell phone itself. Handset reading is made up of reading needs, reading information seeking and reading utilization[9].

2.1 Handset reading needs

Handset reading demand is different from reading in a static environment since the time and space often change in the mobile environment. The relevant information demands can be divided into two types: 1) Time-related needs such as emergency/instant processing, accessing real-time information (such as news, market quotation, live sports broadcasts and instant sharing of personal information), and eliminating boredom; 2) space-related needs (such as accessing location-based information).

2.2 Information seeking for handset reading

Handset reading information is made up of mobile phone terminals and digital contents. Handset reading information seeking includes technological means of accessing and cost-effective way of information seeking. Technological means of information accessing denotes that users search, select, and obtain the desired digital content via a combined use of both a wireless/mobile communication network and a mobile phone. At present, such technological aspect of information access includes the use of software such as SMS, MMS, mobile Internet, and client software. The cost-effective way of information seeking means that users obtain the desired reading content for either free of charge or on a fee-based scheme of information access, which involves a process of either an online payment or alternatively, an offline payment.

2.3 Handset reading utilization

Handset reading is to decode and to understand the meaning of written texts and other symbols in handset reading information that is consistent with the traditional paper reading. The traditional reading theory shows that reading is to obtain the original information expressed by the author in either singular or combined use of such visual and illustrative communication formats as textual narrations, symbols, graphics, and/or in a format of audio/video expression. The author encodes his/her subject matter for expression into written texts, symbols, graphics, and/or audio/video, and disseminates the information for readers by way of the media varieties. When the readers read the information, they decode the text, symbols, graphics, and audio/video into the meaningful information or messages, and give their feedback by way of using an appropriate media device. Therefore, handset reading is the process of information exchange between the author and readers.
Reading utilization can be represented by a series of concrete behavior indicators, such as reading manners, reading content, reading methods, reading time, reading places, reading effect evaluation and so on. In contrast with the reading behavior in a static environment, the handset reading behavior is significantly different in terms of reading time, subject matter of reading contents and reading methods.

3 Questionnaire survey

3.1 Questionnaire

Questionnaire is designed for taking into consideration of two different propositions, that is, whether these polled university students have either actually experienced the handset reading or not. For the students who have used their handsets for reading, the fore-mentioned connotation of handset reading behavior is taken as the basis to design the subject contents of the questionnaire, which includes reading purposes, technological access, willingness to pay and their acceptable range of payment scale, the scope and the intellectual depth of the digitized reading contents, reading method, reading time and place, evaluative judgment about mobile reading and so on. For those students who have never used the handset reading, a different survey question is arranged for investigating their reasons for not having used a mobile phone for reading. In order to avoid any misunderstanding of the questionnaire, the concept of handset reading is explained at the beginning of the questionnaire to reduce errors in the surveyed data. After the first draft of questionnaire had been written, the author chose 60 university students in Nanjing Agricultural University to carry out a pre-investigation testing. Subsequently, he made necessary revisions based on the returned survey feedbacks, and then went on consulting a few experts for the further refinement of the questionnaire content and structure according to the feedback opinions. Then the questionnaire was finalized.

3.2 Investigation object and sample

The investigation was launched in Nanjing in March 2011. The target poll of respondents for the investigation included university students from Nanjing University, Southeast University, Nanjing Normal University, Nanjing University of Science and Technology, Nanjing Agricultural University, HoHai University, Nanjing University of Posts and Telecommunications, Nanjing University of Finance and Economics, Nanjing University of Chinese Medicine, and Nanjing University of Information Science & Technology. According to a scheme of hierarchical random sampling, students were selected from freshmen, sophomores, juniors, seniors and graduate students. The distribution of students’ gender was basically balanced. The male students accounted for 54%, and the female 46%. The distribution of grade
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classification was also consistent with the status quo; freshmen accounted for 16%, sophomores 20%, juniors 23%, seniors 20%, and graduate students 21%.

3.3 Issue and collection of questionnaire

The questionnaire survey included both a paper format questionnaire and an online questionnaire. A total of 400 questionnaires were issued, and 370 responses were received, of which 356 questionnaire responses were valid. The online investigation randomly invited university students to fill in the questionnaire online. There were 193 returned questionnaire responses collected altogether. The total number of valid questionnaire responses was 549.

3.4 Reliability and validity of the questionnaire

Reliability mainly verifies the validity of the questionnaire content and the returned questionnaire survey results. Internal consistent reliability is the most commonly used criterion, which can be measured by Cronbach’s Alpha coefficient. This questionnaire’s Cronbach’s Alpha coefficient is 0.847, which shows that the reliability of this questionnaire survey is justified.

Validity mainly verifies the accuracy of the returned questionnaire responses. This article used the method of the factor analysis to examine the construct validity of the questionnaire survey. According to the SPSS analysis, this investigation’s KMO value was 0.879, showing that it was suitable to apply the factor analysis method. The significance level of Bartlett’s spherical test in this case was 0.000, less than 0.05, which showed that the spherical hypothesis had been rejected and the overall correlation matrix contained common factors, and the factor analysis was appropriate. After having taken 57 original variables in the questionnaire as the reduced variables to carry out the factor analysis, the author extracted factors by using the analytic method for principal components and carried out the revolution of the factor axis by applying the Varimax method. The author then extracted those factors whose characteristic value was larger than 1. There were 5 such factors obtained finally. An analysis of the returned questionnaire survey result showed that the variance of accumulated explanations of the five factors after having them rotated was 79.96%. The factor load of each question in the questionnaire was all invariably bigger than 0.4. Thus, it is apparent that this questionnaire has relatively a good showing of validity in its constructional design.

4 Survey data and analysis

4.1 An overview of university students’ handset reading

The handset reading is quite popular in the Chinese university at present. According to my survey statistics, 96% of university students who participated in this survey
have had the experience of using a mobile phone for reading. The students who have never experienced handset reading via mobile phones accounted for 4%. The main reason is “it is useless, because I can easily use a computer and/or do the reading in print format (a)”. Other reasons include “I do not understand handset reading (b)”, “the operation of handset reading is not convenient (c)”, “I am not accustomed to handset reading (d)”, “I am not willing to pay for mobile reading (e)”, and “my mobile phone does not have such mobile reading function (f)”, etc (Fig. 1).

4.2 Purpose of university students’ handset reading

Fig. 2 shows that the main purposes of university students’ handset reading include instant access to real-time information, eliminating boredom and searching for urgently needed information. Some students want to make the best use of their leisure time, or to consult location-based information. In general, the main purpose of students’ handset reading is to meet their time-related information demands.

4.3 University students’ practical concerns about handset reading

As shown in Fig. 3, the main technologies used by Chinese college students in doing handset reading at present is by way of using one of the following mechanisms, which are enlisted in a descending order for their frequency of usage: namely, WAP
or Web browser (a), SMS (b), downloading to the phone from the computer (c), MMS (d), and reading software (e). But most polled university students do not wish to pay for the related cost of handset reading. They hope that their handset reading should be free of charge. Only 16.6% respondents are willing to pay for handset reading and their acceptable price range is 3-5 yuan per month.

4.4 Behavior of university students’ handset reading

4.4.1 Content and forms of reading

Fig. 4 indicates that news and fictions are the main subject contents of college students’ handset reading at present time. Other subject contents include information about life style, blog, casual browsing, financial information, e-mail, subject-specific knowledge, and academic forum articles. The main format for handset reading is presented in textual narration (67.4%), supplemented by multimedia presentations (32.6%, e.g. with images, sound, video, animation, etc.). As for the information resources of handset reading, web pages account for 82.3%, taking the largest proportion, followed by digitized books (50.9%), newspapers (40.6%), and magazines (24.6%), as shown in Fig. 5. About 49.7% respondents like reading succinct and forceful articles, 10.9% like reading lengthy articles, and 39.4% show a similar interest in reading both of them equally.

4.4.2 Manner of reading

According to the data in Fig. 6, the majority of students are reading via their mobile phones in a manner of “speedy browsing or casual browsing”; while for the other student minority, with measured speed and calculated carefulness. Regarding the time and place for reading, a majority of these students would read “before going to bed (a)”, “during break (b)”, “when waiting for other people (c)”, “when waiting in line for or riding on a bus (d)”, or “when waiting in line in some places (e)” (Fig. 7). As shown in Fig. 8, the daily average length of time for these students’
mobile phone reading is as the following: 24% of the students spend no more than 30 minutes, 38.9% of them spend between 30 minutes to one hour, 25.1% of them spend between one hour to two hours, and only 12% of the them spend more than two hours.

4.4.3 Evaluation of handset reading

Fig. 9 indicates the levels of university students’ satisfaction with mobile reading. There were two basic opinions among them: 42.3% students felt “satisfied (b)” while 45.7% of them were “modestly satisfied (c)”. The percentage of other opinions such as “very satisfied (a)”, “not too satisfied (d)”, “very dissatisfied (e)” was not high enough to be remarkable. In terms of these students’ comments about advantages and disadvantages of their mobile phone reading, 92.6% surveyed students thought that the merit of handset reading laid in the fact for its convenience of “reading anytime and anywhere (a)”. 73.7% of them held the opinion that they could make “the best use of their leisure time (b)” by doing their reading via mobile phones. 42.3% claimed that mobile reading can “meet their demand for customized reading (c)” (Fig. 10). 79.4% respondents attributed the disadvantages of handset reading to “making eyes tired and uncomfortable (a)”. In addition, 68% students stated that
the screen of their mobile phone was too “small” for easy reading (b) and 36.6% students were dissatisfied with “inconvenient mechanic operation (c)” (Fig. 11).

5 Characteristics of university students’ handset reading

According to the above statistics and analyses of university students’ handset reading behavior, the main features of students’ handset reading are summarized as follows:

- Using cell phones for reading is quite popular among university students at the present time.
- The main demand of university students’ handset reading is both time-related and space-related, which is closely embedded in a mobile environment that they are situated. The purposes and motivating factors of their handset reading include but not necessarily limited to reading news, eliminating boredom, searching for urgently needed information, making the best use of their leisure time, and searching location-based information.
- At present, the ways in accessing digital contents over the cell phones include the use of a software such as SMS, MMS, mobile Internet, and client reading software. Among them, online reading is the most popular one.
- Most university students are unwilling to pay for the cost associated with handset reading. It would take time for them to become accustomed to the notion of “paying as you read” for using their own mobile phones to read.
- With regard to what subject content that university students would like to read over their mobile phones, it is noted that they decidedly prefer instant information and recreational information. The subject content may appear in various displaying formats, including textual narration and multimedia.
presentation. As for the length of subject contents, students favor succinct and exuberant short-piece writings.

- The main reading method is a quick glance-over. Its characteristics are fast-paced, random, jumping, and fragmented. Most of reading time is scattered and fragmented, such as “before going to bed”, “when waiting for other people”, “during break”, “when waiting for and riding on a bus”, and “when standing in line”. Most students’ reading time length on a daily basis is within an hour.

- Generally speaking, university students are satisfied with handset reading and understand the advantages and disadvantages of mobile reading.

6 Conclusion

To ensure the user to receive the mobile reading content properly is the objective of mobile reading service providers. The user’s information demands and their characteristics of handset reading behavior are the starting point for the development of an effective mobile reading service infrastructure. At present, university students are representatives of young people who are the main part of the mobile user group, whose ages range from 15 to 35 years old. Therefore, the handset reading service organizations, including libraries, should take full account of the actual information needs and the unique characteristics of their clients’ handset reading behavior so as to provide a customized service delivery structure for such user groups. In this paper, handset reading demands and behavior characteristics of university students in Nanjing are investigated and analyzed. It is hoped that the research findings may be of useful reference to library and information professionals and also to other information service organizations.

Handset reading is a new thing in the new century, which is still under rapid change and steady development. According to the forecast of some advisory bodies, mobile Internet users will exceed the scale of PC Internet users in the near future. The wide spread application of the mobile Internet is expected to surpass that of the cable Internet and will become the mainstream communication tool of the Internet. Based on the applicable features of the mobile Internet, handset reading not only brings us convenient reading but also greatly enriches our reading. Reading demands for handset users in a well-equipped mobile environment will derive more joy and satisfaction, which in turn will motivate the users of handset reading to reach a higher plateau of technical sophistication in mobile reading. Moreover, the percentage of mobile readers will also be gradually on the rise in the whole community. With the development of handset reading, the academia in general and the information service providers in particular are expected by the reading public to continuously
deepen their research efforts and also to improve their professional practice by creating a well-equipped mobile reading environment. Suffice it to say that such heightened expectations of the handset reading community calls for much greater research efforts be dedicated to the development of new visions and new missions of academic librarianship in the digital era. More specifically, their continuing research efforts should concentrate on the issues of making the optimal use of the new applicable mobile technologies, on the construction and enrichment of current digital reading contents within the defined scope of safeguarding intellectual property, and on the improvement of the handset reading service delivery mechanism that is solidly based on mobile users’ reading behavior and experience.

References

Appendix 1: Questionnaire
1. Have you used handset reading?
   o Yes  o No
What is your reason of not using handset reading (multiple-choice)?
   o It is useless, because I can easily use a computer and do the reading in print format.
   o I do not understand handset reading.
   o The operation of handset reading is not convenient.
   o I am not accustomed to handset reading.
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- I am not willing to pay reading fee.
- My mobile phone does not have this mobile reading function.

2. What is your main purposes of handset reading (multiple-choice)?
- Emergent access of information
- Instant access of real-time information
- Eliminating boredom
- Learning with fragmented time
- Consulting location-based information

3. Which manner is your handset reading in (multiple-choice)?
- Downloading the reading files to my phone from the computer
- Through SMS
- Through WAP or Web browser
- By reading software

4. Are you willing to pay for handset reading?
- Yes
- No

5. If you are willing to pay for handset reading, what is the price range that you can bear (multiple-choice)?
- Charged by viewing chapters, 0.04-0.12 yuan per chapter
- Charged by viewing a book, about 2 yuan per book
- Charged by viewing a book, about 3 yuan per book
- Charged by viewing a book, about 5 yuan per book
- 3 Yuan per month
- 5 Yuan per month

6. What is the displaying format of your handset reading content?
- Multimedia (with images, sound, video, animation, etc.)
- Text

7. What is the publication category of your handset reading (multiple-choices)?
- Mobile newspaper
- Mobile magazine
- Mobile book
- Web page

8. What is your attitude towards the length of an article?
- I would like reading the succinct and forceful articles
- I would like reading the lengthy articles
- No difference for either one

9. What is the main content of your handset reading (multiple-choice)?
- Subject-specific knowledge
- News
- Fictions
- Financial information
- Blog
- E-mail
- Information about life style
- Casual browsing
- Academic forum articles

10. When you read via mobile phone, you usually
- Read carefully
- Speed browsing and/or casual browsing

11. What is your time/place of handset reading (multiple-choice)?
- During class time
- During break
- Before going to bed
- When waiting for other people
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12. What is the duration of handset reading on a daily basis?
   o Less than 30 minutes
   o Between 30 minutes to 1 hour
   o Between 1 hour to 2 hours
   o More than 2 hours

13. Are you satisfied with handset reading?
   o Very satisfied
   o Satisfied
   o Modestly satisfied
   o Not too satisfied
   o Very dissatisfied

14. Do you think what the merit of handset reading is (multiple choice)?
   o Read anytime and anywhere
   o Meeting personal reading need
   o Multimedia reading
   o Full use of fragmented time

15. What are the demerits of handset reading (multiple choice)?
   o Small screen
   o Inconvenient mechanic operation
   o Making eyes tired and uncomfortable
   o Cost

(Copy editor: Ms. Jing CAO, Language revision: Prof. Charles C. YEN)