

Changes in University Students' Habits of Electronic News Usage on Mobile Devices: A Comparative Survey

**Hoi Yin Yu, Yan Yung Tsoi, Anthony Hae Ryong Rhim,
Dickson K.W. Chiu*, Mavis Man-wai Lung**

Faculty of Education, The University of Hong Kong, Pokfulam Road, Pokfulam, Hong Kong

*Corresponding author

Email: mary10272002@yahoo.com.hk, tsoiyanung@gmail.com, rhim@connect.hku.hk dicksonchiu@ieee.org, mavislung@yahoo.com

ABSTRACT

Purpose

A rising trend has been observed to minimize extraneous cognitive load when reading by enhancing secondary knowledge through technology. For the readers to comprehend information more efficiently in their cognitive architecture, instructional procedures, which is secondary knowledge, should be aligned with the modern technology environment. With continual, rapid technological advances in modern society, people have changed their news reading habits after using mobile devices such as smartphones, tablets, and e-readers.

Methods

This research employed a quantitative survey to compare the changes in the news reading habits of the undergraduate (UG) and postgraduate (PG) students in the Library and Information Management program of a university in Hong Kong after using mobile devices to read electronic news. A total of 102 responses were collected, which comprised 51 UGs and 51 PGs, respectively (the student population for the program was around 100 UGs and 100 PGs).

Findings

Survey results showed that mobile devices had changed the respondents' habit of reading news to read more content on phones, with a variation on news categories. Such changes included the duration and location of news discussion among the respondents that shorter periods were used to read and that more people read while traveling and in restaurants. Notably, reading the news helped respondents in their learning. Most respondents preferred to read electronic news by using mobile devices. The convenience of reading and discussing news may also cause a potential threat that intensifies disputes, arguments, or even bullying on controversial issues.

Originality/Value

This study confirmed that mobile device usage changed the respondents' habit of reading news. This user group constitutes the future generation of information specialists in various disciplines. We fill the research gap of finding students' reading habits when using mobile devices, especially in East Asia.

Educators are encouraged to recommend relevant news content to students to improve their general knowledge base and arouse their interest in reading and discussing related news topics.

Keywords: reading habits, electronic news, mobile devices, reading locations, news discussion, quantitative study

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INTRODUCTION

Due to decades of technological innovation, people have changed their news reading habits from paper to mobile screens of smartphones, tablets, or e-readers to acquire information, and reading habits presumably change continually (Wang et al., 2016, Sung & Chiu, 2021). The population reading newspapers has decreased briskly since the new millennium (Shim et al., 2015), but at the same time, the most popular mobile content is news, which can be easily obtained from mobile devices. With mobile devices, users can quickly attain the latest news and information with Internet accessibility (Leung, Chan, & Chan, 2003). Upon this, Wei et al. (2014) concluded the use of smartphones in reading news facilitates communication through interacting with other users and customizing the feed to each users' preference in China. As a result, there is a contemporary movement to read electronic news through mobile devices.

Deciphering electronic news reading habits have applications not only in news personalization but also in reading engagement enhancements. Thurman (2011) implied that selecting which news content to read is habitually lopsided towards the readers' prior interests, attempting to ignore others. This implies what newsreaders read next depends on what had been read previously (Esiyok et al., 2014). Further, Möller et al. (2020) showed how 302 readers' engagement in the Netherlands for browsing electronic news differed their political involvement, showing more interest in social media news. Thus, further exploring improvements for reading engagement on mobile devices is one of the aims of this research.

Chan-Olmsted et al. (2013) found that over half of smartphone owners had read the news using mobile devices, especially young adults. As most university students worldwide have their own mobile devices (Ko et al., 2015), it is worthwhile to investigate the changes in electronic news reading habits through using mobile devices. There may be different habits and perspectives in reading news with preferences.

The purpose of this research study is to explore the changes of habits in reading electronic news after starting to use mobile devices by the undergraduates (UG) and postgraduates (PG) of the Library and Information Management (LIM) program. The importance of this user group is that they constitute the future generation of information specialists in a wide range of disciplines. Specifically, this study attempts to identify habit changes in reading electronic news on mobile devices based on frequencies, duration, time slots, and places. We investigated the barriers and motivations for reading electronic news by using mobile devices. Further, this research also examines the changes in duration and location in discussing news content after using mobile devices for reading electronic news.

LITERATURE REVIEW

According to Chettri and Rout (2013), the term "reading habit" concerns the volume of materials being read, the reading frequency, and the average time spent on reading. Scant studies focus on the changes in electronic news reading habits after using mobile devices despite some closely related studies. As Mehmood (2012) explained, the news helps inform readers of the events that happened, know and understand the causes that lead to the events, and the influences that the events brought out in the world around them. Therefore, the dependency on reading news to attain information has been high, which is a fundamental medium of reading.

Although reading traditional newspapers is one of the essential habits of people's daily lives, digital media significantly impacts conventional newspapers. For example, Igarza (2010) observed that customers reading printed newspapers had dropped from 78% in 2004 to 63% in 2014. However, in another survey conducted by Two Sides (2015), more than 80% of respondents were willing to read printed news rather than digital ones as they thought printed versions could provide a clearer appearance and an excellent tactile. Thus, while people migrate to read the news digitally and online, they are still willing to read printed news. Greer and Mensing (2004) point out that newspapers are still experimenting with interactive elements for an online news environment.

In the current mobile environment, mobile devices have been expanded into a media-rich platform to deliver news content to readers (Shim et al., 2015). More than six billion people worldwide have been using mobile devices to support daily life events and more significant events worldwide (Westlund, 2013). Aligned with John Sweller's Cognitive Load Theory, learners effectively manipulate data if entitled to either lower information difficulty load or simplification of teaching material (Yeung et al., 1998). The minimal intrinsic load (the information) and extrinsic load (the teaching) designates a higher germane load associated with higher learning capacity. Adjoining reading enhancements through online applications such as a platform-integrated automated dictionary activated upon highlighting strings and links to related content (Wang et al., 2018), readers would have an overall improved learning experience from new information by reducing extrinsic loads instead of conventional text-based information transition (Mayer & Moreno, 2003).

The news available on mobile devices in the "forms of news apps, text messaging, or mobile versions of the news websites" can be defined as mobile news (Wei et al., 2014). Besides, mobile news platforms are sites or applications (apps) designed for accessing news by using mobile devices like smartphones, tablets, and e-readers (Nel & Westlund, 2012). Wang et al. (2016) mentioned that mobile devices include tablets (such as iPad), smartphones, and e-readers (such as Amazon Kindle). Nonetheless, according to Wei et al. (2014), smartphones are the most influential medium among young people within Asian countries. Therefore, the changes of habit in reading electronic news would

be the most significant among young people, especially university students who need to pay close attention to the latest and accurate information from the news.

Previous studies have witnessed unwillingness towards accessing news through mobile unless other more convenient ways are unavailable (Westlund, 2013). However, news content has been released through the Internet since its early days, and this phenomenon has become more prevalent in recent years (Westlund, 2013). Therefore, most people have changed how they access news in daily life, and using mobile devices for obtaining news has become more significant (Westlund & Färdigh, 2015). People are given more choices in selecting platforms for reading news, and the use of mobile devices for reading news would be according to their preferences (Shim et al., 2015).

With the rapid decrease in printed newspaper readership, the news industry needed to look for new ways to increase revenue (Zerba, 2013). Following this, news media worldwide have changed how they provide news content to readers in recent years (Westlund & Färdigh, 2015). News provision on mobile devices can be used to cover the decrease of readership and profits from the traditional platforms to expand the base of readers on reading news in daily life (Westlund & Färdigh, 2015). The ease of news access through mobile devices is increasing the popularity among readers (Shim et al., 2015). The electronically formatted news has better accessibility, convenience, and interactivity than printed newspapers as it can be accessed whenever and wherever with Internet availability on mobile devices (Shim et al., 2015). For example, more than 50 million Americans read electronic news on a typical day (Cassidy, 2007), which showed the influences of reading electronic news in the digital age.

Research Gap

Due to technology development and the globalized economic environment, university students' mobile internet devices increased dramatically (Ko et al., 2015; Lau et al., 2017). Therefore, traditional newspapers face a big challenge that people are now more willing to use mobile devices to read the news. Thus, news applications were developed to attract mobile readers. Although many scholars were concerned about the reading habits of students, they were mainly concerned about the reading of e-books and e-journals. Scant studies explore the reading habit of using news applications, especially in East Asia. Thus, we set out our research questions (RQs) in this study as follows:

RQ1. What are the changes in their news reading habits (such as frequencies, reading durations, time slots, and places) after using mobile devices to read electronic news?

RQ2. What are the changes in duration and location in discussing news content after using mobile devices to read electronic news?

RQ3. What are the barriers and motivations for reading electronic news by using mobile devices?

METHODOLOGY

This research employed a quantitative survey to compare the LIM program's undergraduate and postgraduate students on the changes in their news reading habits after using mobile devices to read electronic news. We adapted the methodology and survey of Ding et al. (2021) on the habit changes of reading e-periodicals. An online-based platform, Google Forms, was used to aggregate primary data for this study on habit changes in reading electronic news by using mobile devices. The survey comprised both open-ended and closed questions and focused mainly on the closed questions to derive efficiency (Silverman, 2010), collecting effective quantitative data with a relatively smaller weight of qualitative data (Robson, 2011). The comments of reading electronic news through mobile devices were specifically directed as the mentioned qualitative data. Principally, the closed questions focused on the news reading habits in terms of preference in mobile devices, reading frequencies, reading duration, reading time slots, reading locations, barriers and motivations, and news discussion duration with its locations. The types of closed questions included checkboxes, multiple choices, and 5-point Likert scales. Pre-testing was also piloted before disseminating the survey, which included five external researchers for the testing phase.

This research target was on the UG and PG students of the LIM program in a university in Hong Kong, who will become future information professionals and instructors. Surveys are used for data collection to conduct through the Internet using Google Form. The participants were invited through emails and social networking site (SNS), one-to-one messaging on Facebook Messenger, WhatsApp, and the Moodle Messaging system.

Quantitative data analysis was used to analyze the data gathered from the survey. All aggregated data was analyzed using Microsoft Excel and SPSS (Statistical Product and Service Solutions) version 26. The data collected from the Google Form surveys are exported to Excel to manage the data systematically. SPSS was used to explore the relationships and differences between data of two groups of participants, and the Mann-Whitney U test was used in this research. Besides, the data of the open-ended questions were summarized for triangulating the quantitative findings. The pre-usage effects of mobile devices from the experiences before the purchase, possession, and utilization were compared with the post-usage of them, defined as "before" and "after" mobile phone usage.

A total of 102 responses were collected, comprising 51 UGs and 51 PGs, respectively, as we stopped recruiting further respondents after each category reached around 50. As the student population was around 100 UGs and 100 PGs, we sampled half of them. Table 1 summarizes the demographic backgrounds of the students participating in this survey. More than half of both UG and PG students were female. A majority of the UG respondents were in the age group of 21 to 25 (84.3%),

and more than half of PG respondents were 21 to 25 (56.9%). All the respondents owned a smartphone (100.0%), and over half of them (59.8%) owned a tablet. They had owned at least one mobile device, and such figures indicated that all the students had adopted mobile technologies. 87 respondents (85.3%) preferred to read electronic news on their smartphones, while 14 respondents (13.7%) preferred to read on tablets.

<Table 1 about here>

DATA ANALYSIS AND FINDINGS

Changes in news reading habits

This study first studied whether the sorts of news contents accessed by the respondents had changed after reading electronic news with mobile devices (see Table 2). As shown in Table 2, all types of news content accessed by the respondents had increased after using mobile devices in reading electronic news, especially the latest news increased rapidly from 3.07 to 4.25. Weather News and Lifestyle News had increased significantly from 2.88 to 3.55 and 2.51 to 3.05, respectively ($p < 0.05$) for other types of news content types. Besides, the Fashion News had also increased significantly, from 2.30 to 2.73 ($p < 0.10$). Although all kinds of news content being read had increased after using electronic news through mobile devices, the changes in other news types were not statistically significant ($p > 0.10$). Notably, there were no statistically significant differences between UG and PG students ($p > 0.10$).

This study also investigated whether the news reading frequencies would increase after using mobile devices to read electronic news. The results showed that there are relatively high differences for both UGs (difference=0.90) and PGs (difference=0.92) before and after the respondents started to read electronic news by using mobile devices, but not statistically significant between the two groups ($p > 0.10$).

<Table 2,3 about here>

Concerning the time spent on reading news and the time slot used, the results showed significant changes in the reading duration before and after the start of using mobile devices for reading news in a typical week ($p < 0.05$, Table 3). Over 80% of respondents only spent 15 minutes to an hour reading the news in a typical week before starting to use mobile devices to read electronic news. After using mobile devices, 42.2% and 46.1% of the respondents spent 15 minutes to 1 hour and over 1 hour to 5 hours, respectively, reading the news. In general, respondents had changed the news reading time slot from morning to anytime available. The results are similar between UG and PG respondents. Therefore, the results show that mobile devices have played an essential role in reading habit changes in reading time slots and duration. Both the UGs and PGs have similar results.

<Table 4 about here>

It was also worth investigating whether the respondents could read electronic news at various places and the difference in locations for reading news before and after reading news online using mobile devices. As shown in Table 4, respondents had more popular locations to read the news, especially in restaurants and transportation (from 2.44 to 3.79 and from 2.46 to 3.99, respectively). Notably, the home remained a popular location for reading the news before and after using mobile devices. The results of UG respondents resembled the PG respondents.

Change in news discussion locations

Unlike electronic books and journals, readers may often start discussions on disputes, arguments, or even bullying on controversial (e.g., political, moral, and religious) issues. Tables 5 and 6 summarize the change of the duration and location for discussing news content on a typical day. The results generally showed that news discussion duration in a typical day had increased significantly, with family members, friends, classmates, and colleagues (Table 5, $p < 0.10$).

<Table 5, 6 about here>

As shown in Table 6, discussing news online (e.g., by SNS, forums) has a relatively high increase (1.25, $p < 0.05$) after starting to read news through mobile devices. Although the differences in other locations for discussing news are small, the results showed that all the locations increase after reading electronic news using mobile devices. Notably, there are no significant differences between the UG and PG respondents after using mobile devices ($p > 0.10$), but before that, UG respondents had significantly less news discussion at home and online than PG.

News reading platforms

Concerning the platforms used to read electronic news, Table 7 shows some significant differences between UG and PG respondents in the software platforms ($p < 0.05$) except for SNS. PG respondents preferred official news websites and second-hand news websites, while UG preferred mobile apps. As for hardware platforms, both UG and PG respondents expressed that smartphones (UG: mean=4.71; PG: mean=4.65) are the most important for reading electronic news, but there are no significant differences in hardware platforms.

<Table 7, 8 about here>

Barriers and motivations of reading news on mobile devices

Apart from the changes of habit in reading electronic news through mobile devices, it was also worth examining the barriers (see Table 8) and motivations (see Table 9). Both the results of barriers and motivations were quite similar between UG and PG respondents. For the barriers, respondents were more concerned about the "short battery life on a single charge" (mean=4.02) and "no cellular signal when needed" (mean=4.11). Besides, the respondents paid fewer concerns on "difficulty using mobile

devices" (mean=2.57). For motivations, nearly all the factors received a mean higher than 4 (out of 5) except the factor "multi-sourcing of news reports" (mean=3.62), which implied that respondents agreed on the factors listed.

<Table 9, 10 about here>

Use of reading news for learning

It is crucial to understand whether reading the news helps student subjects learn (see Table 10). The respondents generally agreed all the seven listed factors as helpful for learning, with the top 4 factors (scoring over 4 out of 5) being "Enriching vocabularies," "Enhancing reading skills," "Earning extra information outside class," and "Obtaining latest information in a related field." There are no statistically significant differences between PG and respondents ($p > 0.10$).

Qualitative comments on reading electronic news

Both UG and PG respondents gave some comments on reading electronic news through mobile devices. Most of them preferred to read electronic news using mobile devices, while a small proportion of them still did not desire it. Both UG and PG respondents dislike using mobile devices to read electronic news provided the following reasons: worry about addiction with mobile devices, hurt their eyes with prolonged reading on mobile devices, and support the newspaper industry. PG respondents further disliked the slow loading time of smartphones. Both UG and PG respondents who preferred to use mobile devices to read electronic news gave similar reasons as follows: anytime, anywhere reading convenience, environmental friendliness by saving paper, quick news updates, a wider range of news types, better use of free time, easy access, and free of charge.

DISCUSSION

Ubiquitous Mobile Device Utilization for Reading (RQ1)

Our findings also showed that mobile device usage was relatively high among the respondents by analyzing their demographic information. Over half of them had owned at least two mobile devices (Table 1). All respondents owned smartphones, which had become a taken-for-granted part of everyday life (Westlund and Färdig, 2015; Wang et al., 2016). Thus, most respondents chose smartphones as their favorite devices to read the news. This finding is in line with the opinions of Shim et al. (2015) and Thorson et al. (2015) that news content can be conveniently circulated on mobile devices and networks, while smartphones can significantly simplify the process of accessing news. Mobile devices are timely and common (Wang et al., 2016; Wai et al., 2018), and therefore respondents can easily develop and maintain habits to read electronic news through mobile devices.

Findings revealed that the time slots and locations for the respondents to read the news considerably changed. Time slots changed “in the morning” to “anytime” after using mobile devices (see Table 3). Evidence showed that people use their mobile devices to access news immediately when they wake up and at night (Westlund & Färdigh, 2015). Plus, respondents read much more news in restaurants and on transportations (Table 4), in which Hongkongers spend a lot of time. This implied that they would read the news with their mobile device in any free time, as they could easily access the news contents using mobile devices without time and location limitations (Shim et al., 2015). Based on the respondents’ comments, we can infer that this change was due to the convenience of using mobile devices for reading news and the effective use of free time to gain the latest and relevant news.

Our findings suggested that the respondents’ news reading frequency increased after using mobile devices. Most people would expect respondents to increase their reading frequency because mobile devices are convenient, which means they could access electronic news without geographic or time limitations (Chan-Olmsted et al., 2013; Wang et al., 2016). They were likely to read more different types of news content. This result inferred a change in the news reading habit of the respondents. The likelihood of using mobile devices to read electronic news when people access them would therefore increase (Thorson, Shoenberger, Karaliova, Kim, & Fidler, 2015). As a result, respondents would spend more time reading news through their mobile devices and adapt this habit to be a part of their everyday lives.

Surge of Universal Opinion Exchanges (RQ2)

Due to the changes in electronic news reading habits on mobile devices, news discussion duration and location were also expanded. The news discussion duration had briefly increased after starting to read the news by mobile devices, and the news discussion location preference shifted from home to online. As mentioned by Park and Choi (2015), people could actively discuss news through SNS. Also, SNS enables people to read and discuss the news simultaneously, changing their news discussion duration and location. Readers can search for their preferences (Shim et al., 2015) anytime, anywhere (Chen, 20), while SNS can also push timely news to readers with artificial intelligence algorithms according to usage history. The changes in news discussion duration and location could also be due to the convenience of discussing news online without time and location limitations. However, such convenience may also cause a potential threat that intensifies arguments, disputes, or even bullying on controversial issues (Au, Ho, & Chiu, 2021a).

Elevated Convenience and Information Gain (RQ3)

As an apparent trend, the growth in reading news by using mobile devices and its impacts would be affecting the future of the news industry (Chan-Olmsted et al., 2013). This research had, upon the trend, examined the barriers and motivations of reading electronic news through mobile devices as well as

the helpfulness in learning. Previous studies described some challenges in using mobile devices, including small screen sizes, limited bandwidth, reliability, and network connection speed (Tang et al., 2001; Dukic et al., 2015; Wang et al., 2016; Lau et al., 2017; Wai et al., 2018). However, our results showed that only “short battery life on a single charge” and “no cellular signal when needed” were the key barriers to reading news through mobile devices. Indeed, battery life and cellular signal quality are essential for using mobile devices for reading. In contrast, other barriers seemed insignificant, probably brought about by the advancement of technology and infrastructure (Ding et al., 2021).

Our respondents also mentioned factors that motivated them to read the news on mobile devices, including convenience, frequent news updates, easy access, and free of charge in accessing news content. Reading news on mobile devices can help students in their learning, and our findings showed that the most noticeable advantage was “to get extra information outside class,” “enriching vocabularies,” “enhancing reading skills,” and “to get the latest information in a related field.” Mehmood (2012) explained that information obtained from the news could provide essential and the latest information about issues worldwide, enabling students to reach extra and timely information to support their learning and research. Thus, educators are encouraged to recommend relevant news content for students as reading materials to widen their knowledge horizon and arouse their interest in reading and discussing related topics. Similarly, libraries need to design innovative mobile information services accordingly (Wójcik, 2019; Pakdaman Naeni et al., 2019).

CONCLUSION

This study has investigated the habit of reading electronic news by using mobile devices among LIM students at the University of Hong Kong. This study confirmed that mobile device usage had changed the respondents’ habit of reading news as mobile devices among the respondents are quite highly utilized. All the respondents had owned smartphones, followed by tablets, and over half of the respondents had held at least one.

Concerning the respondents’ news reading habits, reading frequency, reading duration, time slots for reading news, and reading locations had changed after reading electronic news by using mobile devices. Moreover, habit changes in reading electronic news affected the respondents’ news discussion duration and location. Barriers and motivations for reading electronic news have also been examined to show the respondents’ attitudes towards using mobile devices for reading electronic news. Notably, reading the news helps respondents in their learning. It could be concluded that most of the respondents preferred to read electronic news by using mobile devices.

Limitations and further study

In this exploratory study, we only included LIM students from one university. We plan to include participants from different courses and faculties, as well as those from other countries to improve generalization and application for further research. Administrators and faculties were not included, which we plan for the next research phase. Qualitative studies, such as focus groups can help explore more details in usage trace patterns and their reasons. Supplementary information on the preference of news perceiving file formats is a field to be focused on whether printed news is more preferred and effective than multimedia forms such as customized video clips. Plus, we are interested in whether the current COVID-19 pandemics affect reading behavior (Sung and Chiu, 2021). Also, concrete cognitive measures on the actual effectiveness of information perceivability are interesting issues for ergonomic objectiveness. Besides, we are also investigating the mechanisms of news discussion and the spreading of (fake) news on social media (Au et al., 2021a; 2021b).

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Table 1. Demographic Backgrounds

	UGs (n=51)	PGs (n=51)	Overall (n=102)
Genders			
Female	29 (56.9%)	35 (68.6%)	64 (62.7%)
Male	22 (43.1%)	16 (31.4%)	38 (37.3%)
Total	51	51	102
Age Groups			
21-25	43 (84.3%)	29 (56.9%)	72 (70.6%)
26 or above	8 (15.7%)	22 (43.1%)	30 (29.4%)
Total	51	51	102
Mobile Devices Owned			
Smartphone	51 (100%)	51 (100%)	102 (100%)
Tablet	26 (51%)	35 (68.6%)	61 (59.8%)
E-reader	7 (13.7%)	6 (11.8%)	13 (12.7%)
Others	9 (17.6%)	1 (2.0%)	10 (9.8%)
Mobile Device Preference			
Smartphone	43 (84.3%)	44 (86.3%)	87 (85.3%)
Tablet	8 (15.7%)	6 (11.8%)	14 (13.7%)
E-reader	0 (0%)	1 (2.0%)	1 (1.0%)
Total	51	51	102

Table 2. List of types of news contents being read

Types of News Contents	UG(n=51)	PG(n=51)	Overall(n=102)	p-value
Latest News				
Before	3.02	3.12	3.07	0.906
After	4.25	4.25	4.25	0.988
Difference	1.24	1.14	1.19	0.429
Local News (Community/city you come from)				
Before	3.49	3.67	3.58	0.216
After	4.06	4.18	4.12	0.278
Difference	0.57	0.51	0.54	0.954
China News(Other than the city you come from)				
Before	2.88	3.06	2.97	0.358
After	3.45	3.51	3.48	0.834
Difference	0.57	0.45	0.51	0.313
International News				
Before	2.96	3.14	3.05	0.411
After	3.55	3.51	3.53	0.792
Difference	0.59	0.37	0.48	0.190
Political News				
Before	2.75	2.59	2.67	0.320
After	3.02	2.80	2.91	0.314
Difference	0.27	0.22	0.25	0.651
Finance News				
Before	2.02	2.31	2.17	0.128
After	2.25	2.49	2.37	0.439
Difference	0.24	0.18	0.21	0.438
Sports News				
Before	2.31	2.39	2.35	0.877
After	2.67	2.57	2.62	0.792
Difference	0.35	0.18	0.26	0.102
Entertainment News				
Before	2.29	2.61	2.45	0.170
After	2.53	2.82	2.68	0.304
Difference	0.24	0.22	0.23	0.606
Weather News				
Before	2.65	3.12	2.88	0.019
After	3.35	3.75	3.55	0.023
Difference	0.71	0.63	0.67	0.667
Lifestyle News				
Before	2.27	2.75	2.51	0.025
After	2.80	3.29	3.05	0.032
Difference	0.53	0.55	0.54	0.670
Fashion News				
Before	2.10	2.51	2.30	0.022
After	2.51	2.94	2.73	0.084
Difference	0.41	0.43	0.42	0.667
ALL News types				
Before	3.10	3.02	3.06	0.600
After	4.00	3.94	3.97	0.460
Difference	0.90	0.92	0.91	0.968

Scale: Never=1, Rarely=2, Sometimes=3, Often=4, Very Often=5

Table 3. Change of time slot and duration of reading electronic news with the use of mobile devices

	BEFORE			AFTER		
	UGs (n=51)	PGs (n=51)	Overall (n=102)	UGs (n=51)	PGs (n=51)	Overall (n=102)
Duration (p-value)			0.019			0.007
Zero minute	0 (0%)	0 (0%)	0 (0%)	1 (2.0%)	0 (0%)	1 (1.0%)
< 15 minutes	7 (13.7%)	5 (9.8%)	12 (11.8%)	2 (3.9%)	2 (3.9%)	4 (3.9%)
15 minutes – 1 hour	41 (80.4%)	44 (86.3%)	85 (83.3%)	20 (39.2%)	23 (45.1%)	43 (42.2%)
>1 hour – 5 hours	2 (3.9%)	1 (2.0%)	3 (2.9%)	25 (49.0%)	22 (43.1%)	47 (46.1%)
>5 hours – 10 hours	1 (2.0%)	0 (0%)	1 (1.0%)	3 (5.9%)	4 (7.8%)	7 (6.9%)
More than 30 hours	0 (0%)	1 (2.0%)	1 (1.0%)	0 (0%)	0 (0%)	0 (0%)
Time slot (p-value)			0.000			0.029
In the morning	32 (62.7%)	33 (64.7%)	65 (63.7%)	6 (11.8%)	6 (11.8%)	12 (11.8%)
In the afternoon	3 (5.9%)	2 (3.9%)	5 (4.9%)	2 (3.9%)	3 (5.9%)	5 (4.9%)
In the evening	1 (2.0%)	9 (17.6%)	10 (9.8%)	2 (3.9%)	2 (3.9%)	4 (3.9%)
Anytime	15 (29.4%)	7 (13.7%)	22 (21.6%)	41 (80.4%)	40 (78.4%)	81 (79.4%)

Table 4. Reading locations after starting to read electronic news through mobile devices

	UGs	PGs	Overall	p-value
Home				
Before	3.65 (n=51)	3.59 (n=51)	3.62 (n=102)	0.668
After	3.67 (n=51)	3.76 (n=51)	3.72 (n=102)	0.531
Difference	0.02 (n=51)	0.18 (n=51)	0.10 (n=102)	0.377
School				
Before	2.65 (n=48)	2.61 (n=49)	2.63 (n=97)	0.619
After	3.25 (n=48)	3.35 (n=48)	3.30 (n=96)	0.462
Difference	0.60 (n=48)	0.77 (n=48)	0.69 (n=96)	0.367
Office				
Before	2.26 (n=34)	2.48 (n=40)	2.38 (n=74)	0.363
After	3.23 (n=35)	3.12 (n=41)	3.17 (n=76)	0.523
Difference	0.91 (n=34)	0.63 (n=40)	0.76 (n=74)	0.255
Restaurant				
Before	2.45 (n=49)	2.43 (n=51)	2.44 (n=100)	0.910
After	3.86 (n=50)	3.73 (n=51)	3.79 (n=101)	0.292
Difference	1.39 (n=49)	1.29 (n=51)	1.34 (n=100)	0.491
Park				
Before	1.84 (n=49)	1.86 (n=51)	1.85 (n=100)	0.929
After	2.16 (n=49)	2.27 (n=51)	2.22 (n=100)	0.475
Difference	0.33 (n=49)	0.41 (n=51)	0.37 (n=100)	0.709
During class				
Before	1.69 (n=49)	1.54 (n=50)	1.62 (n=99)	0.263
After	2.50 (n=48)	2.55 (n=49)	2.53 (n=97)	0.689
Difference	0.85 (n=48)	1.00 (n=49)	0.93 (n=97)	0.299
On transportation				
Before	2.51 (n=49)	2.41 (n=51)	2.46 (n=100)	0.749
After	3.96 (n=51)	4.02 (n=51)	3.99 (n=102)	0.717
Difference	1.47 (n=49)	1.61 (n=51)	1.54 (n=100)	0.559

Note: Scale: Never=1, Rarely=2, Sometimes=3, Often=4, Very Often=5

Table 5. News discussion duration after starting to use mobile devices to read electronic news in a typical day

	BEFORE			AFTER		
	UG	PG	Overall	UG	PG	Overall
Family members	(n=51)	(n=51)	(n=102)	(n=51)	(n=51)	(n=102)
Zero minute	2 (3.9%)	1 (2.0%)	3 (2.9%)	1 (2.0%)	1 (2.0%)	2 (2.0%)
Less than 15 minutes	13 (25.5%)	9 (17.6%)	22 (21.6%)	9 (17.6%)	4 (7.8%)	13 (12.7%)
15 minutes – 30 minutes	22 (43.1%)	16 (31.4%)	38 (37.3%)	18 (35.3%)	17 (33.3%)	35 (34.3%)
>30 minutes – 1 hour	13 (25.5%)	17 (33.3%)	30 (29.4%)	23 (45.1%)	21 (41.2%)	44 (43.1%)
>1 hour – 2 hours	1 (2.0%)	7 (13.7%)	8 (7.8%)	0 (0%)	7 (13.7%)	7 (6.9%)
More than 2 hours	0 (0%)	1 (2.0%)	1 (1.0%)	0 (0%)	1 (2.0%)	1 (1.0%)
p-value		0.018			0.043	
Friends	(n=51)	(n=51)	(n=102)	(n=51)	(n=51)	(n=102)
Zero minute	2 (3.9%)	1 (2.0%)	3 (2.9%)	1 (2.0%)	1 (2.0%)	2 (2.0%)
Less than 15 minutes	11 (21.6%)	9 (17.6%)	20 (19.6%)	5 (9.8%)	5 (9.8%)	10 (9.8%)
15 minutes – 30 minutes	29 (56.9%)	22 (43.1%)	51 (50.5%)	16 (31.4%)	10 (19.6%)	26 (25.5%)
>30 minutes – 1 hour	9 (17.6%)	12 (23.5%)	21 (20.6%)	25 (49.0%)	24 (47.1%)	49 (48.0%)
>1 hour – 2 hours	0 (0%)	7 (13.7%)	7 (6.9%)	4 (7.8%)	6 (11.8%)	10 (9.8%)
More than 2 hours	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5 (9.8%)	5 (4.9%)
p-value		0.037			0.093	
Classmates	(n=50)	(n=48)	(n=98)	(n=49)	(n=48)	(n=97)
Zero minute	1 (2.0%)	3 (6.3%)	4 (4.1%)	1 (2.0%)	3 (6.3%)	4 (4.1%)
Less than 15 minutes	19 (38.0%)	14 (29.2%)	33 (33.7%)	12 (24.5%)	7 (14.6%)	19 (19.6%)
15 minutes – 30 minutes	29 (58.0%)	22 (45.8%)	51 (52.0%)	30 (61.2%)	17 (35.4%)	47 (48.5%)
>30 minutes – 1 hour	1 (2.0%)	9 (18.8%)	10 (10.2%)	5 (10.2%)	19 (39.6%)	24 (24.7%)
>1 hour – 2 hours	0 (0%)	0 (0%)	0 (0%)	1 (2.0%)	2 (4.2%)	3 (3.1%)
p-value		0.230			0.015	
Colleagues	(n=35)	(n=41)	(n=76)	(n=35)	(n=41)	(n=76)
Zero minute	4 (11.4%)	1 (2.4%)	5 (6.6%)	1 (2.9%)	1 (2.4%)	2 (2.6%)
Less than 15 minutes	16 (45.7%)	17 (41.5%)	33 (43.4%)	13 (37.1%)	12 (29.3%)	25 (32.9%)
15 minutes – 30 minutes	10 (28.6%)	13 (31.7%)	23 (30.3%)	13 (37.1%)	9 (22.0%)	22 (28.9%)
>30 minutes – 1 hour	5 (14.3%)	7 (17.1%)	12 (15.8%)	7 (20.0%)	15 (36.6%)	22 (28.9%)
>1 hour – 2 hours	0 (0%)	2 (4.9%)	2 (2.6%)	1 (2.9%)	2 (4.9%)	3 (3.9%)
More than 2 hours	0 (0%)	1 (2.4%)	1 (1.3%)	0 (0%)	2 (4.9%)	2 (2.6%)
p-value		0.106			0.094	
Strangers	(n=17)	(n=18)	(n=35)	(n=17)	(n=19)	(n=36)
Zero minute	14 (82.4%)	16 (88.9%)	30 (85.7%)	14 (82.4%)	14 (73.7%)	28 (77.8%)
Less than 15 minutes	2 (11.8%)	1 (5.6%)	3 (8.6%)	3 (17.6%)	2 (10.5%)	5 (13.9%)
15 minutes – 30 minutes	1 (5.9%)	0 (0%)	1 (2.9%)	0 (0%)	2 (10.5%)	2 (5.6%)
>30 minutes – 1 hour	0 (0%)	1 (5.6%)	1 (2.9%)	0 (0%)	0 (0%)	0 (0%)
>1 hour – 2 hours	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5.3%)	1 (2.8%)
p-value		0.625			0.419	

Table 6. News discussion locations after using mobile devices to read electronic news

		UGs	PGs	Overall	p-value
Home	Before	3.29 (n=51)	3.64 (n=50)	3.47 (n=101)	0.035
	After	3.45 (n=51)	3.61 (n=51)	3.53 (n=102)	0.542
	Difference	0.16 (n=51)	0.20 (n=50)	0.09 (n=101)	0.322
School	Before	2.73 (n=49)	2.85 (n=47)	2.79 (n=96)	0.363
	After	3.02 (n=49)	3.23 (n=48)	3.12 (n=97)	0.103
	Difference	0.29 (n=49)	0.43 (n=47)	0.35 (n=96)	0.263
Office	Before	2.57 (n=35)	2.90 (n=40)	2.75 (n=75)	0.120
	After	2.94 (n=35)	3.24 (n=41)	3.11 (n=76)	0.158
	Difference	0.37 (n=35)	0.40 (n=40)	0.39 (n=75)	0.905
Restaurant	Before	2.94 (n=50)	3.12 (n=50)	3.03 (n=100)	0.427
	After	3.62 (n=50)	3.63 (n=51)	3.62 (n=101)	0.833
	Difference	0.68 (n=50)	0.56 (n=50)	0.62 (n=100)	0.588
Park	Before	1.86 (n=50)	1.94 (n=49)	1.90 (n=99)	0.746
	After	2.06 (n=50)	2.22 (n=51)	2.14 (n=101)	0.402
	Difference	0.20 (n=50)	0.33 (n=49)	0.26 (n=99)	0.355
During class	Before	1.78 (n=49)	1.83 (n=48)	1.80 (n=97)	0.633
	After	2.00 (n=49)	2.04 (n=50)	2.02 (n=99)	0.878
	Difference	0.22 (n=49)	0.25 (n=48)	0.24 (n=97)	1.000
On transportation	Before	2.36 (n=50)	2.44 (n=50)	2.40 (n=100)	0.783
	After	3.08 (n=50)	3.14 (n=51)	3.11 (n=101)	0.659
	Difference	0.72 (n=50)	0.74 (n=50)	0.73 (n=100)	0.512
Online (e.g., SNS tools, forums)	Before	2.76 (n=50)	2.52 (n=50)	2.64 (n=100)	0.059
	After	3.86 (n=51)	3.84 (n=51)	3.85 (n=102)	0.813
	Difference	1.12 (n=50)	1.38 (n=50)	1.25 (n=100)	0.030

Scale: Never=1, Rarely=2, Sometimes=3, Often=4, Very Often=5

Table 7. Platform preference for reading electronic news

	UGs (n=51)	PGs (n=51)	Overall (n=102)	p- value
Hardware Platforms				
Smartphone (e.g. iPhone, Android phone)	4.71	4.65	4.68	0.532
Tablet (e.g. iPad, Samsung Galaxy Tab)	3.71	3.71	3.71	0.971
E-reader (e.g. Amazon Kindle, Sony Reader)	2.24	2.37	2.30	0.460
Other handheld devices (e.g. iPod, iPod Touch, PDA)	2.10	2.20	2.15	0.439
Software Platforms				
Social networking sites (e.g. Facebook, Weibo)	3.96	3.82	3.89	0.567
Official new websites (those operated by papers, e.g., SCMP)	3.04	3.47	3.25	0.023
Second-hand news website (e.g., Yahoo News, Baidu News)	2.98	3.59	3.28	0.001
Mobile Apps (e.g. Apple Daily)	3.24	2.55	2.89	0.006
Scale: Never=1, Rarely=2, Sometimes=3, Often=4, Very Often=5				

Table 8. Barriers on reading electronic news by using mobile devices

	UG (n=51)	PG (n=51)	Overall (n=102)	p-value
Unreliable sources of news	3.78	3.90	3.84	0.522
Small screen size	3.37	3.25	3.31	0.426
Slow loading time	3.84	3.90	3.87	0.620
Short battery life on a single charge	4.10	3.94	4.02	0.246
No Wi-Fi signal where needed	3.76	3.59	3.68	0.338
No cellular signal when needed	4.14	4.08	4.11	0.524
Difficulty using mobile devices	2.61	2.53	2.57	0.735
Reading habit tracked by news providers	3.35	3.20	3.27	0.438
Embedded / pop-up advertisements	3.39	3.47	3.43	0.560
Registration of personal information required	3.71	3.65	3.68	0.938
Scale: Strongly Disagree=1, Strongly Agree=5				

Table 9. Motivations on reading electronic news by using mobile devices

	UG (n=51)	PG (n=51)	Overall (n=102)	p-value
Reliable sources of news	4.10	3.98	4.04	0.528
Convenient	4.67	4.76	4.72	0.351
User-friendly	4.29	4.27	4.28	0.912
Free of charge	4.25	4.45	4.35	0.126
Receive latest news anytime	4.16	4.33	4.25	0.270
Multi-sourcing of news reports	3.55	3.69	3.62	0.414
Scale: Strongly Disagree=1, Strongly Agree=5				

Table 10. Use of reading news for learning

	UGs	PGs	Overall	p-value
Enriching vocabularies	4.18 (n=51)	4.29 (n=51)	4.24 (n=102)	0.279
Enhancing writing skills	3.61 (n=51)	3.90 (n=51)	3.75 (n=102)	0.056
Enhancing reading skills	4.02 (n=51)	4.27 (n=51)	4.15 (n=102)	0.101
Getting extra information outside class	4.22 (n=51)	4.30 (n=50)	4.26 (n=101)	0.650
Getting latest information in a related field	3.94 (n=51)	4.27 (n=51)	4.11 (n=102)	0.012
Required / recommended by teachers	3.20 (n=50)	3.60 (n=47)	3.39 (n=97)	0.023
Need news contents for doing course assignments/projects	3.48 (n=50)	3.71 (n=48)	3.59 (n=98)	0.186

Scale: Strongly Disagree=1, Strongly Agree=5