

USE OF SMARTPHONES FOR STUDY AND RESEARCH ACTIVITIES AMONG PHD STUDENTS OF THE NATIONAL UNIVERSITY OF KYIV-MOHYLA ACADEMY

Abstract. This paper presents an analysis of survey results of first-year graduate students of the Juchymenko Family Doctoral School at the National University of Kyiv-Mohyla Academy, how they using smartphones for study and conduct research activities. The survey was conducted via an online questionnaire and it was attended by 49 graduate students in a variety of scientific disciplines. The results show that the social apps, such as Facebook, VK, Twitter, and Instagram, are most popular among PhD students. The graduate students use smartphones mainly for Internet search and communication, and they use it for specialized research and educational applications are quite rarely. Typically, the graduate students use common smartphone apps to perform educational or scientific tasks. Despite the popularity of the reference manager Mendeley, the graduate students used smartphones for reading the full text of scientific documents rarely – they prefer laptops and PCs for working with academic texts.

Keywords: PhD students' learning, smartphone apps, educational technology; academic e-book reading.

1. Introduction

Modern Web tools are actively used to study and conduct scientific activities, and many scientists, teachers, and students from different countries continue to seek opportunities for their effective use. A intense interest of the academic community in specialized web tools has led to the appearance of such phenomenon as, for example, Ubiquitous Learning – learning in an environment where all participants are in the educational process with immediate online access to educational resources and devices (Park, 2011), or Science 2.0 – scientists use modern Internet technology to conduct and present research results (Burgelman, Osimo, & Bogdanowicz, 2010).

One of the most popular devices for providing a stable connection to the Internet is a smartphone – pocket PC, which complement the functionality of a mobile phone. Modern smartphone applications enables users to perform a large number of tasks simultaneously: s Web surfing, using e-mail, reading e-books, listening to audio, or watching videos. In addition, smartphones are using operating systems that are open for 3rd party software application developers that allows everyone to create specialized educational and scientific applications.

Online app stores offer a variety of free and commercial education and science applications to help in searching, viewing, managing research documents and academic databases, also online dictionaries, encyclopedias, official applications from reputable publishers, scientific conferences, specialized social services for scientists, instruments for specific scientific disciplines etc. Also, there are many common applications available for smartphone users, which can be used for research and education. Separately, it should be noted that there are many f applications for storage and reading e-books in different formats. So the electronic educational and scientific literature is always available to the user at any time and in any place.

Considering wide variety of specialized smartphone apps and the rapid growth in the number of smartphone users, there is a need for a research on mobile learning practices and research. The most previous research was examining the behavior of students groups because young people are active users of the Internet and smartphones. Many recent studies have shown that specialized apps for smartphones and

tablets proven to be useful for future specialists in medicine and nursing (George & DeCristofaro, 2016; Lau & Kolli, 2017; Sandholzer, Deutsch, Frese, & Winter, 2015). Meanwhile, smartphones successfully used to solve individual problems in other scientific disciplines, including physics (Shi, Sun, Xu, & Huan, 2016).

However, the results were not so optimistic when the research focused on smartphones use for study and research activities in general. It is known that students frequently use smartphones for communication, including the use of email and popular social networking applications such as Facebook or Twitter, and they rarely use smartphones for educational or scientific purposes (Mansour, 2016). In addition, despite the powerful educational potential of smartphones, it was found that smartphones can distract students, and therefore they do more harm than benefit in the educational process (Tossell, Kortum, Shepard, Rahmati, & Zhong, 2015).

Despite the rapid growth of the number of smartphone users, reading e-books for education and academic purpose via apps for smartphones remains unexamined in the social sciences. The advent of e-books not just changed a format of documents – from paper to electronic. The e-books made significant changes to the process of study and research (Raynard, 2017). Thus, now we can observe a unique combination of readers' tastes – when e-Books and printed books are used simultaneously and often complement each other (Staiger, 2012).

The results of previous studies show that there is a substantial difference between using of educational and scientific e-books, and, for example, fiction e-books. For example, students usually prefer paper textbooks but they read e-books at their leisure. Graduate students frequently use smartphones and computers for academic e-books reading, but at the same time, they often print out and read scientific papers (Wang & Bai, 2015). The results of other studies have also claimed that, despite the opportunity to get quick access to additional content and other related opportunities, students are more likely to use printed textbooks than e-books (Woody, Daniel, & Baker, 2010).

The preference for print over digital are revealed only at reading scientific texts – young researchers regularly use smartphones for immediate search of scientific information but they rarely use it for reading full-text science papers (Nicholas et al., 2017). So, these studies are not enough to make global conclusions, but one can assume that e-books require some improvements to be more comfortable for education and scientific purposes.

2. Method

The main aim of this study is to investigate the smartphone use in class and research activities among first-year PhD students of the Juchymenko Family Doctoral School at the National University of Kyiv-Mohyla Academy. Results of the study will help better understanding the intentions for smartphone apps usage in educational and scientific activities of modern graduate students.

The Juchymenko Family Doctoral School is an educational and research unit of the National University of Kyiv-Mohyla Academy, which provides educational activities through structured PhD programs. In accordance with the fundamental principles of the organic combination of teaching and research in higher education by the National University of Kyiv-Mohyla Academy – all graduate students are involved in research activities at the university. Therefore, the PhD students of the National University of Kyiv-Mohyla Academy are the optimal group to study the using of smartphones in the educational and scientific process, because they take a number of educational courses and simultaneously perform their own original scientific research.

The online survey was conducted among first-year PhD students of the Juchymenko Family Doctoral School at the National University of Kyiv-Mohyla Academy during January 2017. To discover possible features of

smartphone apps using for different scientific fields, the graduate students were conditionally divided into 3 groups according to their specialties: Natural science (15 PhD students), Social science (21 PhD students), Humanities (13 PhD students).

3. Results

The 85.9% of first-year PhD students of the Juchymenko Family Doctoral School at the National University of Kyiv-Mohyla Academy were involved in the survey (49 of 57 PhD students). One PhD student said he does not use a smartphone, a few refused to participate in the survey. 29 women and 20 men, aged 22-48 years (average age of the participants – 26 years) were among survey respondents.

The majority of the PhD students were experienced smartphone users, 33% of the respondents using smartphones over 5 years, 27% – 4-5 years, 22% – 2-3 years, and only 18% use a smartphone for less than 1 year. The 57% of the PhD students turning to smartphones every hour, 41% – daily and 2% of the PhD students use a smartphone not every day. Most PhD students (73%) use smartphones equipped with operating system Android, 22% – iOS, 6% – Windows, 2% – BlackBerry (multiple answers were allowed).

The most popular places where PhD students often use a smartphone: public transport – 59%, home – 59%, university – 47%, restaurants – 14%. The most of the graduate students use social networks on their smartphones – 90%, searching the Internet – 88% and exchange e-mail messages – 80%. Also, the PhD students often use educational and research applications – 60% and browsing news – 57%. Much less often they use smartphones to monitoring the financial situation and currency exchange rates – 27%, browsing photos, audio and video – 22%, play games – 16% and use apps for sport and exercise – 10% (Fig. 1).

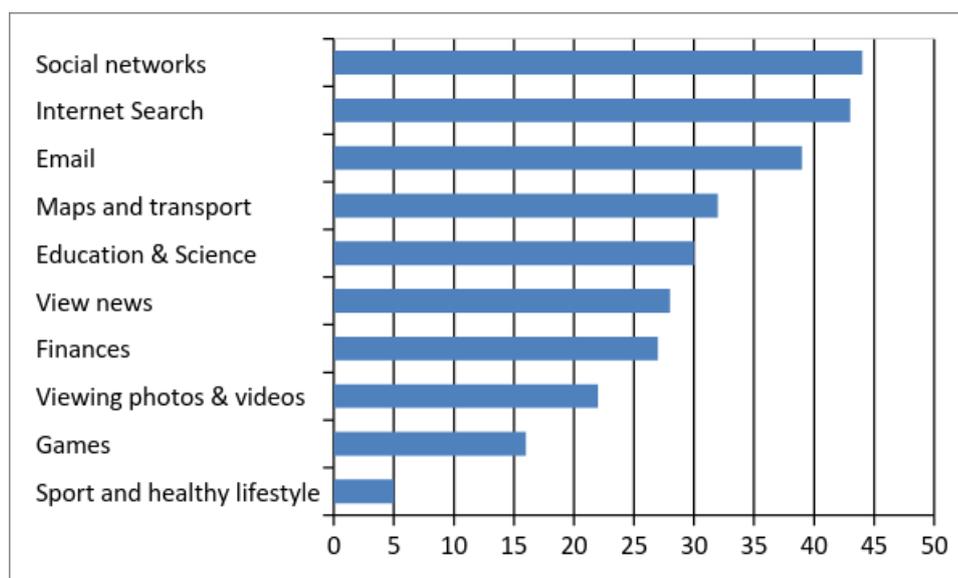


Fig. 1

The subjects of the most popular smartphone apps among the first-year PhD students of the National University of Kyiv-Mohyla Academy

Most often the PhD students installed on their smartphones the apps: web browsers (Chrome, Safari, Opera), social services (Facebook, VK, Twitter, Instagram), email (Gmail, Outlook), messengers (Viber, Messenger, Telegram), book readers (iBooks, FBReader, Adobe Acrobat, Moon+ Reader), the cloud storage Google Drive, the Ukrainian banking client Privat24, Google Translate, Google Maps and Google Search.

Most frequently PhD students find out about new useful apps for smartphones through information from various media channels (41%) and from their colleagues (41%). Much fewer teachers help in a search of apps (18%). And only 4% of graduate students said that they spend independent purposeful finding relevant applications for smartphones.

There are no significant differences between specialties in the PhD student's answers to preliminary questions. But specifics were registered in using apps for educational and research purposes (Tables 1-3). Most using apps are not highly specialized but common, which the PhD students adapted for their teaching and research tasks.

The graduate students of all groups evaluated the effectiveness of the smartphone apps, which they use in studying and research. The PhD students rated the usability of applications for smartphones in average by 4 points on a five-point scale (1 – very inconvenient, 5 – very convenient). Moreover, the least satisfied are the users representing the Humanities science: Natural science – 4,3; Social science – 4,1; Humanities – 3,8.

Table 1

The smartphone apps used the first-year PhD students of the National University of Kyiv-Mohyla Academy in learning and research (Natural science)

Category	Apps name
Databases and reference collection	ChemSpider
Dictionaries and Translators	Google Translate
E-book Readers	PDF Reader, FBReader, AdobeAcrobate, PDF Viewer, Moon+ Reader, EBookDroid
Email	Gmail
Office suite	WPS Office, Polaris Office, Microsoft Office Mobile
Online courses and presentations	edX, Coursera, TED
Reference managers	Mendeley
RSS-readers	Feedly, Digg Reader
Web Browser	Chrome, Safari, Opera

Table 2

The smartphone apps used the first-year PhD students of the National University of Kyiv-Mohyla Academy in learning and research (Social science)

Category	Apps name
Audio and Video	SoundCloud, Youtube
Cloud storage	Dropbox, OneDrive, Google Drive
Dictionaries and Translators	Google Translate, Word of the Day, Phrasal Verbs Dictionary, English Synonyms Dictionary, Offline Dictionary, Multitran
E-book Readers	Adobe Acrobat, EBookDroid, Amazon Kindle, Cool Reader, iBooks
Email	Outlook, Gmail
Messengers	Viber, Messenger
Office suite	Microsoft Office Mobile, WPS Office, OfficeSuite
Online courses and presentations	Coursera, TED, CFA Program Study, iTunes U, TOEIC Test Practice
Reference managers	Mendeley, REfMe
RSS-readers	Inoreader, RSS Reader, Digg Reader, Feedly
Social networks	Google+, Facebook
Tools	CamScanner
Web Browser	Chrome, Safari

Table 3

The smartphone apps used the first-year PhD students of the National University of Kyiv-Mohyla Academy in learning and research (Humanities)

Category	Apps name
Dictionaries and Translators	Offline Dictionary, Google Translate
E-book Readers	Adobe Acrobat
Office suite	Polaris Office
Online courses and presentations	Coursera, TED, Duolinguo, Memrise
Productivity software	Trello, Evernote
Reading and publishing platform	Scribd
Reference managers	Mendeley
RSS-readers	Feedly, RSS Reader, FeedLab
Web Browser	Chrome

The most PhD students read electronic scientific articles and e-books mainly through laptops and PCs – 76%, only 12% of the graduate students read using smartphones and same 12% read using e-book readers. PDF is the most popular format of electronic documents among the PhD students (94%), much less they read documents in formats FB2 – 29%, EPUB – 10%, and other formats (MOBI, TXT, DOC, DJVU, HTML) – 14%.

However, more than half of the graduate students (55%) also occasionally use smartphone apps to read scientific and educational documents. The representatives of the natural sciences use e-books on smartphones more than PhD students who study social sciences: Natural science – 80%; Humanities – 46%; Social science – 43%.

In general, the PhD students have not a good opinion about the convenience of reading scientific documents with smartphone apps – in average 2,7 points by a five-point scale (1 – very inconvenient, 5 – very convenient). The PhD students of Social science (2,3) and Humanities (2,5) are most dissatisfied. And the convenience of smartphone apps for reading academic documents was rated higher by the graduate students of Natural science – 3,3.

4. Discussion and Conclusion

According to research results, the most popular apps among the first-year PhD students were various social applications (Facebook, VK, Twitter, and Instagram), web-browsers and the Google Search app. Therefore, graduate students rather use smartphones to communicate, search and view various consumer information on the Internet than for educational or scientific goals.

The graduate students indicated that they use mostly not specialized and common apps, including social programs such as Facebook and Google+, to perform educational and scientific tasks. A research shows that applications for smartphones allow users to accumulate social capital (Cho, 2015). Accordingly, the graduate students can use social apps to develop their own electronic image, expanding the contact network and effective presentation of their scientific works. Also, RSS-readers can be used not only for operational tracking of the popular news media but also for the rapid alert about new papers appearing in selected journals.

Among the scientific applications mentioned the PhD students we can separate the reference manager Mendeley, the app for chemists ChemSpider, and among educational – applications from famous platforms

of online courses, including the Coursera and the edX. Overall, PhD students indicated only a few specialized educational applications and scientific instruments. Since the majority of the smartphone users use a very simple practice in finding and installing applications (Dogruel, Joeckel, & Bowman, 2015), the graduate students may not know about the existence of relevant useful applications.

An important role in informing of the graduate students about new instruments should play teachers, but the research shows that it is yet an unreliable channel to obtain information about educational and scientific applications for smartphones. Using smartphones among the teachers requires a additional study.

Because the low activity of using specialized smartphone apps, we can also assume that the users need more advanced applications, especially in the fields of social sciences and humanities.

Despite the fact that graduate students are the mostly satisfied by the functionality of smartphones to perform educational and scientific goals, most graduate students do not read scientific papers with smartphones and prefer laptops and personal computer. The reason for this seems to be a high popularity of documents in PDF format among the graduate students. It is well known that there is a need for special tools with responsive design to make the process of reading PDF documents most user-friendly (Moustafa, 2016). However, the leading scientific publishers usually offer users to download the publication in PDF. Also, most scientists self-archived their preprints in this format. It can be concluded that it is easier for the PhD students to work with devices, which are more convenient to viewing PDF-files, rather than further convert files into a format that would be better suited for reading via smartphone apps.

Accordingly, the continued success of smartphone apps in the reading process of scientific documents will depend on the improvement of programs for viewing and working with PDF-documents, which would take into account the needs of researchers. Also, it needs applying of alternative formats of documents on the websites of academic publishers or the appearance of fast and reliable converters that will easily translate specific academic texts in different formats.

Further research should identify the relationship between using these smartphone apps and the PhD students' productivity. The study focuses exclusively on first-year graduate students of the Juchymenko Family Doctoral School. Therefore, any findings and conclusions arising from this study apply only to graduate students of the National University of Kyiv-Mohyla Academy. The following study should include a much larger sample of graduate students from different universities of Ukraine for far-reaching conclusions.

Despite these limitations, the study provides valuable information about the practice of using specialized scientific and educational smartphone apps among graduate students, so it may be useful to researchers, teachers, librarians, developers who are interested in studying the prospects of using modern Internet technologies in science and education.

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