How mathematics postgraduate students use mobile e-book?

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Introduction

In the academic world, learning materials play a major role. The learning materials could be books, journal articles, lecture notes or magazines. These learning materials are used for various purposes, such as research, as textbooks and as reference materials. Advancements of technologies made these materials available in electronic formats as well. According to Massis (2010), most of the students nowadays use technology for studying and preparation. The e-book is one of the most promising technologies in education and in libraries. E-books can be read via computer, laptop and handheld mobile devices such as e-readers, tablets and smartphones. Reading e-books via handheld mobile devices is considered a new trend in the e-book environment and is mostly adopted to support mobile learning activities in higher-learning institutions.

Very limited studies have been conducted on reading e-books via tablets and smartphones. In terms of pure science courses such as mathematics, which involves tables, figures, graphs, formulas and equations, e-books are not highly used. Most of the research has been on arts and science. The aim of this research is to understand how mathematics students use e-books on mobile devices for their learning activities.

This pilot study was conducted using a qualitative approach. Two mathematics students participated in this pilot study. The participants were mostly using mobile e-books that are freely available on the university library's website and elsewhere on the internet. The participants were interviewed and observed several times. The interview protocol was validated by an expert in educational technology and was screened by the supervisory committee members. In addition to that, the mobile e-book reading activities were also recorded with screen capture software. The data of this study were analyzed using constant comparative methods suggested by Merriam (2009, p. 175). This method allowed the researcher to analyze the data in a deductive and comparative manner, without necessarily generating a new theory. NVivo 10 software was used to analyze the data.

Findings

The transcribed and analyzed data were sent to the participants for a member check process. Table I shows the background of the participants in terms of their demographic details and mobile e-book use. The result shows that Student 1 reads the mobile e-book from the beginning. Sometimes, he tends to scan for related materials. This student also uses the table of contents and search functionality to look for related materials. Student 1 claimed that by using the search functions, he is able to search for needed information faster. He reported that he does not highlight or bookmark the e-book, nor alter the look and the format. He opts to take notes on a different sheet of paper. The mobile e-book is used only for reading and recalling important points that he had come across in the e-book. He frequently uses the zoom-in and zoom-out function to read the equations and mathematics notations.

Student 2 would normally scan the mobile e-book for related materials. He does not read the mobile e-book from the beginning. He will use the search function to look for the keyword and read only related information. He uses the table of contents and index to look for specific information. He frequently highlights and bookmarks pages in the e-book to be referred to later or to show it to colleagues. This student would type notes in the e-book, and frequently use the zoom-in and zoom-out function to read mathematical notations.

Both students added that mobile e-books helped them in knowing and understanding the mathematical concepts, combining existing equations to produce some new equations or solutions for their research problems (synthesis) and evaluating the accuracy of the calculations that they have derived for their research (evaluation).

Both participants use the e-book as a reference tool for research. As the e-book is readily available, the participants can easily find relevant information for their research activities. They use the e-book to write literature reviews and to look for specific information for their research. They would normally use e-books to comprehend facts, understand concepts, produce new equations and solutions and evaluate findings. The participants felt that e-books are more suitably used as reference materials as opposed to a textbook. They felt that it could be used for group discussions and class activities such as assignments because of the difficulties of participants reading long content via small mobile device screens.

The result of this pilot study shows that participants use mobile e-books primarily for research activities rather than as textbooks. This is in line with Romero-Otero *et al.*'s (2014) findings, where they argued that predoctoral university students and researchers are using e-books mostly to find information for their research activities. Hwang *et al.* (2014) stated that this is the popular method of reading academic e-books among university students. In our brief study, both the participants use different active learning methods, where only the first participant likes to use the search and zoom-in and zoom-out features. However, the second participant opted to use more features such as search,

Table I.
Demographic details and mobile e-book use background

Demographic details	Student 2	Student 1
Age	26	27
Place of residence	Urban	Suburban
Program	PhD	Master's
Field of study	Algebra	Theoretical physics
Mode of study	Part-time	Full-time
Financial aid	MyBrain 15	Supervisor grant
Working experience	Production executive (5 months)	Industrial training and sales assistant (6 months)
Type of mobile device	Smartphone (Samsung)	Tablet (Windows RT 8.1)
Years of experience with mobile e-books	2-3 years	2 years
Frequency of using mobile e-books in a week	2-3 times	3-4 times
Duration of reading mobile e-books	30 min per use	20-30 min per use
Individual/Group use	Individual	Individual

highlight, bookmark and zoom-in and zoom-out features. It is reported that many university students rated the ability to search as the most important function in e-books because it assists them in finding relevant information (Schomisch *et al.*, 2012). Both the participants have different reading patterns, but use it to obtain the same benefits.

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FURTHER READING

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