

Interactive E-Book for Remote Learning

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Article History

Received: 24/12/2022

Accepted: 27/12/2022

Published: 31/12/2022

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Abstract

The e-book facilitates the process of disseminating knowledge in teaching and learning. The e-book can be a quick solution during information searching and reduces the cost of book printing. Since it is digital, the e-book can be used to study media anywhere and anytime without having to carry a lot of heavy books. It helps greatly in facilitating students and lecturers during remote learning. The goal of this paper is to investigate the intended features of smart communication networks' built-in e-books. The Design Thinking model was used to create an e-book for remote learning among Generation Z students. The cognitive Theory of Multimedia Learning was used to guide the instructional design of the interactive e-book. An interview session was held and recorded for insight. Interview data were gathered to develop the questionnaire. A close-ended survey given was given to selected students to evaluate the intended features of e-books for remote learning. Interactive visuals were included as part of the notes and task stimuli in the e-book were the highest features favored by students. The embedded stimuli for input and notes created desired attention for students' learning. The result supported the theory that interactive visuals and portability in e-books did capture Generation Z students' reading interest and attention.

Keywords: e-book, Design Thinking Model.

1.0.INTRODUCTION

Academic libraries are facilities that provide access and help to spread knowledge to students. As the world becomes digital, e-books became popular for individual use and library service. It is a simple way to access resources in the digital age (Tri-Agif, Noorhidawati & Ghalebandi, 2016). It is convenient and available in digital form, consisting of text, images, or both. It is readable on the flat panel display of computers or other electronic devices (Attwell, 2019). The e-book is always accessible on computers, e-readers, tablets, mobile phones, and other devices (Binas, Stancel, Novak & Michalko, 2012). E-books are usually available as downloadable files that can be read offline, live web pages that must be read online, or cached web pages that can be read offline over the Internet (Attwell, 2019).

Many academic libraries, now have e-books in their collection. This has prompted researchers to dig deeper into user-intended

features, acceptability, and perceptions of e-books for reading and referencing, as well as a study on the usage of e-books. Through innovative technology, electronic resources have firmly proven their effective resources for libraries and their users (Vassiliou, & Rowley, 2008).

Lately, book publishing has expanded, with some appealing e-book packages to enhance more users. However, publishers and libraries are unsure about the future features of e-books that would appeal to the market. New electronic features such as browsing, keyword searching within a book and across a collection of books, customizable search interfaces, extracting, comparing, and evaluating the relevance and quality of information presented. Other capabilities include hyperlinks, bookmarks, annotations, highlighting, underlining, connection to other portions of the book or other resources like dictionaries and thesaurus, and linking of complex multimedia elements like movie files and simulations.

The enhancement of commenting and talking facilities can let users interact with one another.

Online book services global market report stated that the global online book services are expected to grow from 19 billion in 2021 to 20.05 billion in 2022 at a compound annual growth rate (CAGR) of 5.51% (Mordor Intelligence, 2020). By the year 2026, it is expected to grow to about 24.85 billion at a compound annual growth rate (CAGR) of 5.2% (Mordor Intelligence, 2020). Hence, technological advancements are the key success of e-books. However, a gap remains among Generation Z students who have limited internet access. For that reason, this paper would like to identify the intended features of e-books among students in developing countries for remote learning.

2.0.LITERATURE

Cognitive Theory of Multimedia Learning

Automation and flexibility are desired aspects in the design of a successful e-learning system. It unleashes the system-tapped potential learning experience and improves learning outcomes. The cognitive Theory of Multimedia Learning (CTML) (Mayer, 2002) is used to guide the instructional design of the interactive e-book. In this paper, we investigate smart communication networks with built-in capabilities using the Design Thinking model (Stanford University, 2009) to create e-books for remote learning. These models demonstrate how to motivate students to study using specific instructional designs. The model examines the motivational aspect among readers and combines cognitive aspects of learning for students to comprehend their lessons. The model emphasizes the learning contents for readers using the e-book. E-book material must capture the reader's attention to enhance concentration in learning. To generate reading interest, discussion and visuals are included as part of the notes and task stimuli. To keep readers interested, the e-book tool must contain a range of stimuli for input and notes.

Interactive E-Book

The E-book must evolve using new features of technical development and sophistication of the reading device. As technology advances, e-books must have multiple ways of interacting with readers such as texting and images. This will capture readers' interest to have a higher experience of reading actual books. This feature is the most important element that drives the global e-book market. The rising adoption of smartphones, tablets, computers, and multilingual features of e-books is an advantage that will elevate the global challenge for the e-book market. An increase in overall reader engagement was observed with students and teachers across the world being locked down in their homes and switching to e-books for teaching and learning.

Furthermore, the environmental protection campaigns for saving trees and paperless have also increased the demand for e-books in schools. Besides, the growing influence of technology with the inclination toward digitization mostly among the generation Z which influences the growth of the educational e-book market (Szymkowiak, Melović, Dabić, Jeganathan, & Kundi, 2021;

Azman, (2021). They are colloquially known as Zoomers. They highly value diversity and finding their own unique identities. They are the demographic cohort that succeeds millennials and precedes the Alpha generation. These generations are tech-savvy and mobile-first. They spend their time online everywhere. They are the first generation never to know the world without the internet. They capture learning insights using e-books and audiobooks.

Systems such as digital education and immersive learning are also expected to drive the market growth of e-books among Generation Z students. The enormous expansion in education content creating an immersive environment to provide readers with a real-time experience has pushed the interest of e-book publishers to expand the new concepts of e-books for the education market (An-Nisa, Astika, & Suwartono, 2021). The top major industry players in the e-book market are Amazon.com, Inc., Rakuten Kobo Inc., Apple Inc., Barnes & Noble, Inc., and Smashwords Inc. (Mordor Intelligence, 2020).

E-books began to be embraced in traditional classroom instruction, distance education, online learning, or e-learning when a simple version in PDF format was integrated with audio, video, animation, and simulation (Louis & Konstantinou, 2014). Some of the interactive media features in the e-book are audio, video, animation, and simulation have created excitement among learners (Xu, Yau & Reich, 2021). These learning videos are provided to help students understand abstract ideas and interactive exercises. These features are important to blend in with the character of Generation Z to develop a better learning attitude towards learning such as answering questions and retrieving the actual answers confidently (Kumbhar & Rajendra, 2018) using online and interactive features.

Thus, the use of e-books in the classroom can assist teachers remarkably in improving teaching aids and creating teaching approaches livelier and more joyfully (Areerachakul, 2015), especially among Generation Z (Azman, 2021). Some of the new interactive e-book features consist of *animation*, hypertext, image carousel, video; graphics interchange format, audio, popup message box, questionnaire, widgets, bookmark, navigation, feedback, dictionary, engaging visuals, imaginative narrations, and many more. Recently, in September 2021, Amazon launched its new generation device product - Kindle Paperwhite. This device has a new user interface to cater to readers who prefer an enjoyable reading experience. Based on the above discussion, this study examines the intended features of interactive e-books among students at Politeknik Sultan Idris Shah.

3.0.METHODOLOGY

This research employs the Stanford Hasso-Plattner Institute of Design's five-stage Design Thinking (Stanford University, 2009) methodology. It consists of five steps namely, a) empathy, b) define, c) ideate, d) prototype, and e) tests to guide the development and design of the e-book. A group of students was chosen for a structured interview to gather their opinion on the intended features of the e-book for their learning purposes. The

answers were recorded. Based on the interview result and literature search, statements using a close-ended survey were developed. The questions were also adopted and adapted from Askar, (2014). This instrument utilized a 5-point Likert scale ranging from 1 = very poor, 2 = poor, 3 = fair, 4 = good and 5 = very good. The developed questionnaires were distributed to 250 students at Politeknik Sultan Idris Shah in the Department of Tourism and Hospitality. The survey was held in September 2021 during the national recovery plan imposed in Malaysia. Only 174 usable questionnaires were returned by the students with a response rate of 70%. The reliability test was run to ensure the instrument was consistent with the investigation. The Cronbach Alpha Coefficient for each item was above $\alpha = 0.75$ indicating that the items were reliable. A descriptive analysis was employed for this research. All the respondents were selected specifically from Generation Z.

4.0.FINDINGS

Demographic Profiles

Descriptive analysis was utilised to analyze the quantitative data. Table 1 displays the mean score and standard deviation of respondents between items. All respondents aged 18 – 21 years old were categorized as generation Z. All students had some experience using the e-book. The results below showed that the mean score of all items about the e-book features was in the range between $m = 3.93$ to $m = 3.93$ with a standard deviation of less than 1.0. All items were ranked to determine the most important features of e-books that students prioritized based on their needs while they were on campus during remote learning.

Table 1: Descriptive Analysis

No	Item	Mean	SD	Rank
A1	<i>Bookmark</i> : Bookmarks store page or section information of the e-book for the future.	3.82	.96	4
A2	<i>Local and web search</i> : Users can search for information within the e-book.	3.86	.96	2
A3	<i>Table of Content</i> : It is an Index of the e-book that allows the user to open a specific one.	3.78	.94	9
A4	<i>Portable</i> : The user can download it and easily carry it anywhere anytime.	3.93	.93	1
A5	<i>Interactive Images</i> : It is a graphical image that provides additional information.	3.88	.91	2
A6	<i>Multimedia</i> : Audiovisual content or Multimedia based content, in an e-book, allows the user.	3.80	.94	6
A7	<i>Highlighting and note-taking</i> : The user can highlight the content or take notes.	3.83	.96	3
A8	<i>Content Sharing</i> : Sharing allows users to exchange knowledge of an e-book.	3.83	.90	3
A9	<i>Image Gallery</i> : It is a set of related Graphical Images of a certain topic.	3.80	.97	7
A10	<i>Interactive 3D virtual graphics</i> .	3.78	.91	8
A11	<i>Word Wrap</i> : It allows the e-book to rearrange its content according to the device.	3.78	.92	8
A12	<i>Assessment</i> : Users can assess and evaluate their learning process by using interactive.	3.83	.92	3
A13	Dictionary Integration.	3.81	.94	5
A14	<i>Flexibility</i> : e-books are flexible enough of Updating & Appending the learning content.	3.83	.89	3
A15	<i>Interactive</i> : Provides interactive learning objects such as games, image galleries, 3D	3.78	.92	8
A16	<i>Text to Speech</i> : It allows users to listen to the selected text through the device's speakers.	3.82	.93	4
A17	<i>Simulator</i> : Simulators in e-books recreate the real-time environment to provide hands-on.	3.78	.96	8
A18	<i>Feedback</i> : Users can participate in online feedback, and surveys in the e-books.	3.77	.98	10

n= 174

The highest ranked items favored by students were *portability* ($m=3.93$, $sd= .93$); second was *interactive images* ($m= 3.88$, $sd= .91$); third, *local and web search* ($m=3.86$, $sd= .96$); *highlighting and note-taking* ($m=3.83$, $sd= .96$); *assessment* ($m=3.83$, $sd=.92$); and *flexibility* ($m=3.83$, $sd= .89$); fourth was *text to speech* ($m=3.82$, $sd= .93$), and *bookmark* ($m=3.82$, $sd= .96$), fifth was *dictionary integration* ($m=3.82$, $sd= .96$); sixth was *multimedia* ($s=3.81$, $sd= .94$), seventh was *image gallery* ($m=3.80$, $sd= .97$); eighth was *interactive 3D* ($m=3.78$, $sd=.91$); *word wrap* ($m=3.78$, $sd=.92$) and *simulator* ($m=3.78$, $sd=.96$); ninth was the *table of content* ($m= 3.78$, $sd= .94$) and tenth was *feedback* ($m=3.77$, $sd= .98$). Table 2 indicated responses made by students individually according to the Likert Scale. Item portability scored the highest with 44 responses (25.3%) followed by the second position with *interactive images* and the third position was shared by four items equally which were *local and web search*; *highlighting and note-taking*; *assessment* and *flexibility*. These were the main features that were required by the polytechnic students for remote learning during the lockdown period. Thus, lecturers must aim for these features to be included in e-books for remote learning among generation Z students in higher education institutions at present.

Table 2: Intended features of the e-book by respondents

No.	Items	1	2	3	4	5
A1	<i>Bookmarks</i> : stores page or section information of the e-books for the future.	7(4%)	8(4.6%)	32(18.4%)	89(51.1%)	38(21.8%)
A2	<i>Local and web search</i> : Users can search for information within the e-book.	8(4.6%)	5(2.9%)	32(18.4%)	87(50%)	42(24.1%)

A3	<i>Table of Content:</i> It is an Index of the e-book that allows the user to open a specific one.	8(4.6%)	6(3.4%)	34(19.5%)	93(53.4%)	33(19%)
A4	<i>Portable:</i> The user can download it and easily carry it anywhere anytime.	7(4%)	5(2.9)	24(13.8%)	94(54%)	44(25.3%)
A5	<i>Interactive Images:</i> It is a graphical image that provides additional information.	7(4%)	5(2.9%)	27(15.5%)	97(55.7%)	38(21.8%)
A6	<i>Multimedia:</i> Audiovisual content or Multimedia based content, in an e-book, allows the user.	7(4%)	7(4%)	34(19.5%)	91(52.3%)	35(20.1%)
A7	<i>Highlighting and note-taking:</i> The user can highlight the content or take notes.	7(4%)	7(4%)	34(19.5%)	85(48.9%)	41(23.6%)
A8	<i>Content Sharing:</i> Sharing allows users to exchange knowledge of an e-book.	8(4.6%)	4(2.3%)	28(16.1%)	103(59.2%)	31(17.8%)
A9	<i>Image Gallery:</i> It is a set of related Graphical Images of a certain topic.	9(5.2%)	7(4%)	28(16.1%)	95(54.6%)	35(20.1%)
A10	<i>Interactive:</i> 3D virtual graphics.	7(4%)	4(2.3%)	41(23.6%)	89(51.1%)	33(19%)
A11	<i>Word Wrap:</i> It allows the e-book to rearrange its content according to the device.	7(4%)	6(3.4%)	37(21.3%)	92(52.9%)	32(18.4%)
A12	<i>Assessment:</i> Users can assess and evaluate their learning process by using interactive.	7(4%)	6(3.4%)	30(17.2%)	96(55.2%)	35(20.1%)
A13	Dictionary Integration.	7(4%)	8(4.6%)	30(17.2%)	94(54%)	35(20.1%)
A14	<i>Flexibility:</i> e-books are flexible enough of Updating & Appending the learning content.	7(4%)	4(2.3%)	32(18.4%)	99(56.9%)	32(18.4%)
A15	<i>Interactive:</i> Provides interactive learning objects such as games, image galleries, and 3D.	7(4%)	5(2.9%)	39(22.4%)	90(51.7%)	33(19%)
A16	<i>Text to Speech:</i> It allows users to listen to the selected text through the device's speakers.	8(4.6%)	4(2.3%)	34(19.5%)	92(52.9%)	36(20.7%)
A17	<i>Simulator:</i> Simulators in e-books recreates real-time environment to provide hands-on.	8(4.6%)	7(4%)	34(19.5%)	91(52.3%)	34(19.5%)
A18	<i>Feedback:</i> Users can participate in online feedback, and surveys in the e-books.	9(5.2%)	7(4%)	32(18.4%)	92(52.9%)	34(19.5%)

n = 174

5.0.DISCUSSION

The use of educational technology for remote learning is crucial in developing countries. This investigation has proven that students in developed countries are also in need of e-books because of their features in helping students learn. Portability feature is the most desirable element students were looking for. The availability of online and offline access during remote learning would be a unique advantage due to the unreliable internet coverage in a certain part of the region in developing countries. The focus on learning instruction using synchronous and asynchronous online communication has transformed the learning style and closed the gap in transactional remote learning. Students in Generation Z and Generation Alpha are soon to enter higher institutions, and teachers welcome the use of interactive e-books to assist these students.

These digital books should be utilized by students and educators to provide information and knowledge. Integrating e-books into the classroom makes learning fun, and energetic creates a more engaging experience for students, and improves the quality of teaching. The usage of e-books improves value in teaching. Students can access multiple learning materials for remote learning. Furthermore, students can actively participate in the learning process before class, during class, and after class. The

process makes them more prepared for learning. This ensures that learning never becomes boring.

The presence of e-books is not intended to replace traditional books. E-books are meant as an option for easier reading. Additionally, students do not have to buy a new textbook every time the book is updated. Online e-books will make it easy for you to share and distribute book files to friends and family. E-books are practical and easy to carry, which digital book users appreciate the most. Traditional books tend to take up a lot of space in the bag. The e-book is enjoyable and convenient for pupils because of its portability. Many e-books are free, and students only need an internet connection to download the notes.

In addition, e-books, which are classified as digital materials are more evident in the aspect of updating information. For example, updating a technical document is easier if the document is in digital form. It does not need to be printed repeatedly, thus being able to save costs. Meanwhile, the e-book shelf, which offers navigation and keyword or phrase searches to enable material searches to be done faster and more correctly, saves time for students while they are looking for information for e-books. The digital text from e-books can also be used to supplement the book collection by providing translations in a variety of languages. The process of

translating is made easier and faster-using translation software. Kleiman (2002) claims that the development of e-books has not yet reached a point where they can truly compete with traditional books. Although the physical characteristics of e-books developed by publishing companies are dynamic which makes them attractive, teachers in developing countries need to develop their own learning materials for their students to ensure effective learning. Purchasing e-books from open sources might that comes from mostly develop countries might not be suitable because of different curriculum. Further e-book features might be slightly different between countries due to cost and functional aspect of the content.

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