Conceptual: Digital Book in the Era of Digital Learning Approaches (DLA)

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Abstract. Nowadays, the advancement of ICT has been reached all over the world with tremendous influences, particularly in an educational world. In this digital age, for instance, there is an innovation of learning resources based on technology. They are electronic books (e-books) or digital books. The features of digital books such as multimodal components (text, audio, animation, and video) become more desirable than the printed books, although the current research often shows the constraint toward the effectiveness of the electronic books in reading comprehension. The digital books provide an interactive aspect of self-regulated learning in the context of distance learning. This article proposes a literature review of the existing studies around digital books in an educational environment. The result of review revealed that the effectiveness of the digital book for learning purposes depends on several factors that are the curriculum development appropriateness, students' prior knowledge of technology, and adults' role as facilitators in a learning activity.

1. Introduction

The development of ICT has several impacts, particularly on education. Technology has removed huge barriers to raise the knowledge through technology incorporating learning environment and curriculum. Its efficiency to enhance learning activity has increased teachers' interest in technology. Consequently, teachers have to improve their capability in implementing technology to facilitate learning [1] and apply the appropriate strategy to accommodate students' needs [2], particularly in digital era [3]. Digital era expands students' capability to gather various information through online information, for example via internet. In line with the development of electronic-based learning, the internet becomes an option in accessing information related to the subject content [4]. Students and teachers could download Google books, video, pdf text and other material forms. Web-based learning is one of the learning approaches which is related to use social media as learning resources. There is a transformation of learning environments such as distance study and self-regulated learning [5]. Currently, students are involved in virtual learning [1]. For instance, Edmodo allows teaching and learning through the internet. Teacher easily proposes a lot of learning materials and tasks, and then controls the spending time of students in finishing the task. Next, students download and upload their tasks and the score will be shown immediately, especially for multiple choice questions. The development of the digital learning environment raises the research on how students' ability to operate

and use digital devices [6]; accommodate, select, organize and analyze overflow of information for problem-solving and critical thinking [7]; communication, networking, and awareness of ethics [8]. According to some studies, the digital book has potential and weakness on education practice.

This mobile tool which includes strategy or syntax to develop higher levels of thinking more than learning materials could rise the role of the digital book in an educational context [5]. The features of ebook such as multimodal components [9] (text, audio, animation, and video) become more attractive to children than printed books and provide choices according to the needs of students. On the contrary, research shows the constraint toward the effectiveness of reading comprehension through the digital book [10]. Incorrect addition of multimodal contents such as video and explanatory text on the screen may disrupt the ability of students to retain memory in their working memory and retain it in depth or as meaningful learning, although the video affects students' motivation to engage in learning [11].

There are a lot of kinds of digital readers such as iPad, notebook, kindle, Cybook OPUS, Nook, iLiad, and Sony reader [10] which are increasingly used in academic environment in order to enhance the effective learning through using a digital tool that does not only include text-based learning, but also includes a wide range of visual and audio media options [12]. Also, children in a developed country commonly utilize the mobile phone as one of the electronic readers for another purpose such as to enjoy the game or video. As a result, it decreases the reading frequency [13]. People even have the difficulty of making additional notes or explanations as well as marking the most important part of the text like in the paper or traditional book. They argue that the using of eReaders is highly time-consuming. Thus, the facilities contained in electronic readers do not always provide convenience to users regarding making notes that are usually made on the edge of the text [14]. Moreover, it improves the issues that ICT does not always enhance the learning achievement compared to traditional learning [15]. Therefore, the development of electronic readers should consider the main factor namely the carrying capacity to improve the quality and the purpose of reading.

2. Method

The article intends to review the literature based on recent studies about digital books in education. This review includes: a) the characteristic of the digital book, b) the factor which influences the preference of digital book in a learning context, c) the excess and deficiency of digital book in a learning context, d) digital literacy in the digital learning, and e) the effectiveness of digital books in a learning context.

3. The result of a literature review

3.1. Characteristics of digital book

The sophistication of technology needs to take into account the convenience of the user to access information in relatively short time [16]. Nevertheless, utilization of the printed book is still recommended to several people particularly for reading and writing needs in education or work environment [14]. Consequently, the content of the digital book has to consider the various aspects in satisfying the people needs.

3.1.1. The basic component of the digital book

Digital book comprises the general components of the printed books such as text, picture or graph. These components are equipped with audio, animation, video and hyperlink so that the information conveyed in digital books is richer than using printed books [17]. In today society, students especially access digital book through their smartphone or any portable devices so its accessible supports the mobile learning [18].

The ease in making a note and marking the important point of reading become a major support to prefer this book. Annotation are often made by readers to make it easier for readers to remember the important topics in a reading. However, the involvement of readers to make digital annotation is less than making motes using traditional books. It means that the e-readers have to satisfy the need of digital marginalia tools [14] .

3.1.2. Multimodal component of the digital book
The availability of video, game, audio, and animation content as an interactive and interest component of digital book is one step ahead of the printed books [19]. This component is vital to deepen understanding of the abstract materials such as plant and human physiology, natural phenomenon, etc. Using visual and verbal information within video provides dual coding, contributes to organize the knowledge, and then transmits it into work at the short-term memory as the theory proposes [20]. The cognitive interpretation would be an increase in line with more than one stimulus toward sensory register [9].

3.1.3. Interactive learning space
Digital book serves a space and time which facilitates collaborative [21] and interactive learning through chatting and discussion board [22]. This flexibility removes the barrier among students to communicate and debate through interesting media. Some learning resources such as hypertext link, relevant books, activity book, and dictionaries arise the usefulness of ebook in individual learning and distance learning [16,18] and self-assessment [23]. This feature addresses student to be the active learner in selecting, gathering and organizing several waves of peace of information to overcome the problem, and then constructing his or her knowledge and insight [19].

3.2 Factor that influences the preference of digital book
There are several factors which are taken into account in using the digital books. According to the Theory of Reasoned Action [24], there are two factors related to choosing a digital book (benefit aspects and peoples' attitude) [25].

3.2.1. Digital book proposes various benefits
Firstly; it comprises several kinds of contents such as the web-based information and the excellence of latest information. Multimedia components enhance the student attention and encourage the student to involve in-depth learning. Secondly, it accommodates user needs to get interaction with others, make a note and mark the passage. Thirdly, it is easy to access and to work with numerous formats. Fourth, its different kinds of content and its efficiency lead to cost saving [26]. Fifth, digital book allows people to its access without any limitation of space and time. Sixth, the ease of storing digital books into archives [27]. Furthermore, the existence of book drives the student to use book continuously.

3.2.2. Peoples' attitude towards the digital book
Someone who believes that the use of digital books is an action of maintaining environmental balance will prefer digital books than printed books [28]. The higher printed book demand, the larger needs of raw materials of paper. Consequently, there is a long-term effect on the environmental balance. Conversely, the utilization of digital book needs only electric power and internet connection. In addition to environmental concern, reading habit in digital era increases the usage of the digital books because of its accessible without any barriers in time and space. Since people consider the ICT superiority in their daily activities, it means their behaviors have been changed by information literacy to be more selective people toward any news or issues and digital competence to get its efficiency in their activities [29].

3.2.3. Users' prior knowledge of technology
Since eReaders have been developed and distributed in the developed country; there are high opportunities for student and teacher to use these tools. Unfortunately, the digital books could not as maximal as possible to facilitate learning activity because there is the inability to operate and less awareness of digital literacy [30]. Experience in using technology influences the selection of digital books in learning. Difficulty in operating digital readers can reduce student motivation in learning. On the other hand, these difficulties stimulate students to actively seek information about the operation of digital devices. Thus, the teacher or facilitator needs to provide guidance first before starting learning using digital books [31].

3.3. Excess and weakness of digital book in a learning context

Interactive learning can be facilitated by a multimedia component through using the digital book. Table 1 describes five types of interactivity with descriptions and examples [9]. First, dialoguing while student engages in-depth searching the information through the hyperlink. Second, controlling when a student has to understand the meaning or recognize new word within the video, she or he could replay or pause immediately through tapping the button. Third, manipulating parameters to explore the impact resulted within simulation or game. Fourth, searching is very easy since the digital book comprises various materials related to the internet access. Fifth, navigating occurs when the student looks for another information from the number of learning materials in the digital book.

Table 1: Five Types of Interactivity

Type of Interactivity	Description	Example
Dialoguing	Student rensponses toward questions or answers from the others	Searching the information through the hyperlink
Controlling	Student determines the speed or repetition of video or animation playback to understand the information presented	Student could replay or pause immediately through tapping the button
Manipulating	Student set the variables parameter of simulation	Exploring the impact resulted within simulation or game
Searching	Student looks for additional information	Looking for provided information in the form of hyperlink or through internet search
Navigating	Student moves to another information from the number of learning materials in the digital book	Student selects the option or click the button to move from one page to another

In language literacy, students at kindergarten and at four grade prefer printed text than digital text [32]. The research shows that student activity in depth talking or discussing with classmates about learning vocabulary from printed text is more frequent than the digital. In contrast, student less engages with others when she or he uses the electronic tools to play an animation and listen the audio. This condition may lead to over cognitive processing [9]. Sometimes, the eReaders cannot be operated better such as suddenly stuck and troubled, turn off, and it takes a long time to turn on the particular page. In sum, the digital book is less effective than the printed books in reading comprehension [33].
Based on the above studies, there is a relationship between less useful of digital book in reading comprehension and the pleasure when using this book. Digital book needs a tool completed with a screen. Accordingly, student who has exposure to the screen light for a long time often suffers eye tiredness. Such condition is possible for a student to decrease the excitement toward the digital book, particularly in reading comprehension purposes. Thus, student prefers to the printed books rather than the digital book [33].

3.4 Digital book to empower the digital literacy on the 21st-century skills

Development of technology is in line with the advancement of information and academic literacy to face the 21st century challenge. The student needs to prepare various skills for straightforward facing the complex global economy and society. Digital literacy is an important skill to select, gather, organize, manage and assess billion information while using technological media and internet [6]. Thus, involving digital literacy in technology integrated learning and curriculum is an appropriate strategy [2]. Facing 21st-century skills, the student needs to enhance the higher level of thinking skills and digital literacy through practical activity and experiment. Design based learning which includes digital toolkit trains students of primary and secondary school actively to engage in solving the problem [34].

There are four indicators of digital literacy such as operation, thinking, collaboration and awareness skills [6]. Information literacy is closely related to digital literacy which is indicated by cognitive and

technology skill, and then it fosters academic literacy and determines student capability into job market competition [35]. Academic intelligence is not enough for people to get success in the development of the world globally. Thereby, inappropriate usage of technology affected miss understanding of information. In other words, lack of prior knowledge about technology will inhibit student to analyze and organize information sources. Furthermore, it produces divergent thinking to overcome the problem of society through networking with considering the technological ethics. Teamworking is established by self-confidence of every student in giving his or her contribution [2].
In recent years, the parent has facilitated their children with smartphone, iPad and other mobile electronic tools which are connected to the internet in their daily activities for several purposes. The first aim is for watching interesting video and playing fun game; particularly it is very dominant for young children (3^{rd}-4^{rd} grade). Second, as children getting older (5^{th}-6^{th} grade), they have recognized virtual communication through various social media. Social network connects children with plentiful information across culture and ages [36]. Consequently, preventing action is needed to avoid the cybercrime and negative impacts on behavior for further, and guarantee the privacy [37]. Parent and teacher have to be involved in managing the use of mobile devices and internet, and have to teach digital literacy since early ages [36,38].

Considering the awareness skills within digital literacy and addressing mobile devices and internet to children must be followed by recognizing the technological security and identity protection. Multimedia component and parent-child discussion enable primary school student to construct the meaning of virtual privacy when communicating through social media [36]. Furthermore, this strategy allows the student in transferring and reflecting knowledge to the real world.

3.5 The effectiveness digital book in a learning context

The effectiveness of digital books in a learning context is related to several aspects. It depends on the teachers' capability to develop the curriculum which integrates the using of technology [39], for example determine the teaching goals and intended learning outcomes, construct the learning scenario and process-based assessment, built student-centered learning atmosphere, and integration of multimodal or digital tools to support students' activity [22]. At the beginning of and throughout teaching and learning, the teacher should periodically control the strategy implementation and students' ability to operate the digital devices [40]. Student requires longer experience to recognize the new technology for learning [41]. In addition, learning objectives and academic style of student need to be considered into constructing learning material of digital book [34]. For example, the teacher can design the beginning of learning material with some case studies of problem identification. Hence, this component addresses pupil toward problem-based learning to empower self-regulated learning [42]. In sum, the effectiveness of digital books in reading and communication purposive hinges on various factors such as the accessible to do interactive activity, understanding text, evaluating learning progress and self-assessment, appropriateness in integrating multimedia, and crucial role of adult including parent and teacher to give direction and guide step by step of using digital books [43].
The little engagement between parent and child while using this book and the particular characteristic of the digital book are two essential factors that affect the unproductive reading. Otherwise, reading printed books raise relationship between parent and child through the intensive scaffolding. This research is also supported by [31] the concept that children learning is not as simple as adult learning. Video-mediated learning itself within digital book content is insufficient to produce analogical skills or mental representation to the real world without an adult or parent interaction. Exploration of nature and interactive communication drive children into meaningful learning, to deep understanding, and to the real objects [44]. Immediate feedback and responses from an adult are crucial strategies to obtain the benefits through digital learning such as recognize and learning attitude, retain the significant information, increase the capability to convey, accept and analyze the message or information and build knowledge about the simulated learning environment [45].

4. Conclusion

Education as a target for sustainable development is expected to be able to utilize the ICT efficiently in enhancing the quality of learning process. Internet and mobile devices become the first option to design and implement learning resources which are packaged into a digital book. A multimodal component as the excellent interactive and interesting material and accessible information has been

affected by the preference of digital book. However, this excess does not always guarantee the success and productivity in learning experience and achievement without appropriate infrastructure and content toward learning goals and academic style, appropriateness of instructional strategy, the insight of digital tools, and the parent or adults' guidance. A further contribution of digital learning approaches is empowering student with digital literacy to get self-confidence in future competition and become active problem solver.

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