

## *The Roles of Electronic Books in the Transformation of Learning and Instruction*

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### I. INTRODUCTION

As students become increasingly more reliant and absorbed in technology, the new technology roles in their lives have affected many aspects of their learning traits. Some researchers have confirmed that the learning habits of today's youngsters are very different from that of their parents and teachers. The educational demands of this new century require new ways of thinking, teaching and learning for digital generation. So it is widely appealed that teaching and learning is more challenging than ever to help improve the digital generation students' learning experience, and to help them become more engaged in the learning activities.

For hundreds of years, textbooks have put a world of knowledge in the hands of students. While the traditional textbooks cannot meet the demand of the new generation of students due to slow updating and the solo medium of paper textbooks. The integration of eBooks with classroom instruction is appealing.

Actually, eBooks, as being expected to change the traditional instruction and meet the students' learning requirements, have been under development in many developed countries such as Singapore, USA, and South Korea. In Chinese context, E-Textbook was defined as a special kind of eBook developed according to curriculum standards, which meets the students' reading habits, facilitates organizing learning activities, and presents its contents in accordance with paper book style. While the emergence of utilizing eBooks initiatives are on the rise, it is important to understand the roles of eBooks in the transformation of learning and instruction.

### II. FUNCTIONS OF ETEXTBOOKS

Previous researchers have mentioned different aspects of functions of eTextbooks, involving structure and layout, interactive media, note-taking tools, assignment tools and management tools, etc. Henke [1] and 17 other experts have proposed the 35 required functions of eReaders' software as well as the evaluation of these functions at the International Symposium for Standards and Technology of eTextbooks. They listed the top 5 functions as follows: search, annotations, audio, bookmarks, chapter, and headings. eTextbooks have several distinct characteristics, such as the

(a) digital design and organization (e.g., font type, font size, color scheme, text color correlated with background color, display of illustrations, graphics, images, charts, tables); (b) command features, navigation format tools, and guidelines; (c) search field features and functions; (d) built-in dictionaries; (e) student locus of control (i.e., capability to highlight text and/or take notes); and (f) ability to customize content by combining several different books or information sources, to add specificity to the course content [2] E-books also provide the capability of transforming digital narratives into learning via multimedia by combining "text, audio, video, special effects, and gaming to explore a form of storytelling in which the reader is converted into an active participant"[3].

Eric J. Simon (2001) found four important features after using eTextbook for a semester, including glossary lookup (87.3%), bookmarking (84.4%), highlighting (71.7%), annotation(64.5%) [4]. Piret Luik, Jaan Mikk (2008) selected thirty-five units from electronic textbooks and identified 131 characteristics for all the units including five dimensions: features of text, graphics, self-assessment, navigation and design [5]. Mihye Kim, Kwan-Hee Yoo, Chan Park, and Jae-Soo Yoo (2010) proposed 34 dimensions about the functions of eTextbooks in Korea, such as Memo, Note, Underline, Highlight, Voice, Memo, Textbox, Bookmark, Glossary, Formula, Additional Menus [6]. Yu Taizan (2012) showed that Japanese digital textbooks have many functions should be used in classes, including six categories: "Showing textbook", "Editing functions", "Showing teaching materials", "Training basics", "Sharing information", and "Student support" to help teachers to make their classes. For Korean digital textbooks, including nine common categories; "Showing textbook contents", "Editing function", "Showing teaching materials", "Sharing information", "Authoring teaching materials" and "student support", "Portfolio", "Self learning" and "Teacher Support" [7]. John Cristy and Joseph G. Tront (2012) pointed out that the e-Textbook add-ons includes features grouped into four key categories: Textbook Importation, Window Manipulation, Web Search, and Quizzing [8].

So, the layouts, interactive media, note-taking tools, assignment tools and management tools are the main functions when identifying functions for eTextbooks in K-12 classes.

### III. STRATEGIES TO INITIATE USING ELECTRONIC TEXTBOOKS IN K-12 CLASSROOM

Sufficient preparation before class is the prerequisite of a successful class. New challenges will emerge in preparing classes to use eTextbooks in the classroom. Sung Moo Jung (2009) stated that contents and digital environments were the two key factors that teachers needed to consider before class, such as contents development, advanced information and communications infrastructure, and the capacity to appropriately utilize the digital environment, etc [9].

According to the literature on eBook design [10] [11], considerations about eBook design should include the following: (1) multimedia design for presentation of words and pictures, (2) interface design for format and control, and (3) learning design for purpose, content, and feedback. Specifically, each constructed digital features provides a specific type of support for an emerging readers. Educators should consider the content and function of eBook features before assigning books to young readers.

Mitchell Weisberg (2011) explored the relationship among learning performance, learning materials and reading devices, indicating that well integrated materials and devices could enhance students learning before class [12]. Robert C. Meurant (2010) introduced how to carry out ubiquitous learning process with the help of iPad for English as foreign language (EFL) students, it was apparent that the devices configuration had influenced the quality of learning activities [13]. Geist Eugene (2011) discovered that the efficient teacher prepared the electronic materials for the students before class, the better they felt how iPad worked in class. When students did not have the access to electronic materials via learning management system (LMS) such as Blackboard, they were less motivated in class with iPad and tended to get off track [14].

From the initiating e-textbook in K12 classroom pilot study in Beijing, we tried to identify the potential issues when utilizing eTextbooks in K-12 classrooms initiatively. Through the experiment of initial 14 piloting classes, with 9 teachers and 203 students being involved, from two elementary schools in Beijing, we carried out this study by using a mix-method design of lecture video coding, interviews and questionnaires. We found: (1) Technical Issues, such as failure of devices and software, delay of systems response and switching among systems delay would be crucial for using eTextbooks in the classrooms; (2) A high quality of user experiences from both teachers' and students' would bring a positive attitude and motivation for teaching and learning with eTextbooks; (3) Teaching and learning habits, students' curiosity, information literacy would contribute to whether a classroom could run smoothly when using eTextbooks initiatively; (4) If teachers had more experiences in instructional design, they would perform better class preparation when using eTextbooks in K-12 classrooms..

### IV. SUPPORTING RESPONSIVE TEACHING THROUGH EBOOKS: A CALL TO ACTION

To be effective, instruction should be tailored to individual needs and strengths of diverse learners, whereby teachers have to adapt teaching style from students' feedback, and teachers should learn more about what variations in instruction can respond most effectively to what variations in students' learning style" [15]. This is the essence of *responsive teaching*, a notion that draws on concepts of formative assessment [16] and differentiated instruction (Tomlinson, 1999). There is consistent evidence that such approaches have a positive effect on the students learning [16][17][18][19][20], and also that differentiated instruction can be difficult for teachers. However, formative information is not useful if teachers do not know what to *do* with it. Responsive teaching requires a great deal of pedagogical content knowledge and classroom management skills [21] as well as assessment expertise [22]. Furthermore, the burden of customization typically resides with the teacher, which places incredible demands on teacher time [23], pedagogical knowledge [24], and assessment abilities [22]. The role of curriculum and textbook development in supporting formative assessment and responsive teaching has been largely neglected [25]. The recent introduction of Ebooks offers an opportunity to incorporate formative assessment tools into the curriculum in ways that can powerfully support teachers. Ebooks have the potential to: (1) include formative assessments that can be administered through the book interface; (2) adjust themselves based on learner needs; (3) send real-time assessment data to a teachers interface for immediate or delayed use; and (4) offer pedagogical "what to do next" recommendations to teachers – all in ways which are well-aligned with the rationale and vision of the textbook. This presentation takes the stance that curriculum developers in general and Ebook designers in particular must play a larger role in rendering the burden of customization manageable for teachers. This is an extension of the concept of educative curriculum [24][26] and capitalizes on the affordances of technological tools to make the process of data collection, analysis, and presentation of curricular options more feasible [27].

### V. CONCLUSIONS

In order to better meet the needs of classes with Ebooks being involved in, Ebooks must be designed with a lot of special functions, which is called eTextbooks by the authors. The functions of eTextbooks, the class preparations and responsive teaching by incorporating formative assessment would help to transforming learning and instruction.

Note-taking, bookmarking, annotating, and highlighting, working on assignments are the key functions of eTextbooks to follow students' study habits and to meet the requirement of instruction. The relevant management is the key issues to keep eTextbook running smoothly in class. Such as assignment distribution, note management, assignment management, searching, dictionary, synchronizing functions, copy contents or notes, print contents or notes, Internet connection, communicating with parents via Internet,

eTextbook control by teachers, and contents transmission between teachers and students.

If the teachers had more experiences with instructional design, they would be able to conduct better class preparation. Through integrating materials, devices and software compositely, learning outcomes would optimally meet the instructional objectives.

Responsive teaching through Ebooks/eTextbooks, which meet the individual needs and strengths of diverse learners, takes the stance that curriculum developers in general and Ebook designers in particular must play a larger role in rendering the burden of customization manageable for teachers.

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