

# The roles of electronic books in the transformation of learning and instruction

Citation for published version (APA):

Huang, R., Chen, N.-S., Kang, M., McKenney, S., & Churchill, D. (2013). The roles of electronic books in the transformation of learning and instruction. In *ICALT 2013: 13th IEEE International Conference on Advanced Learning Technologies, 15-18 July 2013, Beijing, China* (pp. 516-518). IEEE.  
<https://doi.org/10.1109/ICALT.2013.180>

**DOI:**

[10.1109/ICALT.2013.180](https://doi.org/10.1109/ICALT.2013.180)

**Document status and date:**

Published: 01/01/2013

**Document Version:**

Peer reviewed version

**Please check the document version of this publication:**

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

**General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

<https://www.ou.nl/taverne-agreement>

**Take down policy**

If you believe that this document breaches copyright please contact us at:

[pure-support@ou.nl](mailto:pure-support@ou.nl)

providing details and we will investigate your claim.

Downloaded from <https://research.ou.nl/> on date: 15 Jun. 2024

**Open Universiteit**  
[www.ou.nl](http://www.ou.nl)



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

Ronghuai Huang<sup>1</sup>, Nian-Shing Chen<sup>2</sup>, Myunghee Kang<sup>3</sup>, Susan McKenney<sup>4</sup>, Daniel Churchill<sup>5</sup>  
1 Beijing Normal University, China

2 National Sun Yat-Sen University, Taiwan  
3 Ewha Womans University, Korea  
4 Twente University, Open University, The Netherlands  
5 Hong Kong University, China

**Keywords-Ebooks, functions, assessment for learning**

## 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 participate learning activities more engagement.

For hundreds of years, textbooks have put a world of knowledge in the hands of students. While the traditional textbooks cannot meet the appeal of the new generation of students due to slow updating and 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. With the emergence of utilizing eBooks initiatives 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 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 to 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. Educators can use this information. 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 revealed that the devices configuration had influenced the quality of learning activities [13]. Geist Eugene (2011) found out that the better teacher prepared the electronically materials for students before the class, the better they felt how iPad worked in the 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 easily [14].

From the initiating e-textbook in K12 classroom pilot study in Beijing, we try 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 adapt “in response to students’ progress and need, in the process learning more about what variations in instruction respond most effectively to common variations in students’ learning” [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 positive effects on student 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 teacher interface for immediate or delayed use; and (4) offer pedagogical “what to do next” recommendations to teachers – all in ways which stand to be particularly 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 larger roles 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 feasible [27].

#### V. CONCLUSIONS

In order to better meet all the needs of the teachers and students in Ebook classes, the functions of Ebooks, the class preparations and the assessment methods must be taken into consideration.

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 in routine classes smoothly and sustainably. 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 have more experiences with instructional design, they would be able to conduct better class preparation. Through integrating materials, devices and software compositely, learning outcomes would meet the instructional objectives optimally.

.The eTextbooks should have the similar structure and layouts as paperback books to follow the students' reading habits, such as indicating page numbers and thickness, page turning, index, chapter headlines, table of contents. The interaction with students is more important than media rich contents, such as interactive functions, graphic zooming, video/audio playing control, matching exercises, etc. In some language classes, functions of speaking out, spelling , dictionary should be added.

## VI. ACKNOWLEDGEMENT

Thanks Junfeng YANG, Guangde XIAO and Yongbin HU for providing insights into the functions of eTextbooks; thanks Chaohua GONG and Guan CHEN for their contribution in strategies to initiate using electronic textbooks in k-12 classroom; thanks Suzanna Loper, Jacqueline Barber, and Barry Fishman for their contribution to supporting responsive teaching through ebooks.

## REFERENCES

- [1] Henke, H. *Electronic Books and ePublishing*[M].Springer-Verlag, 2001.
- [2] Byun, H., Cho, W., Kim, N., Ryu, J., Lee, G., Song, J.: A Study on the effectiveness measurement on Electronic Textbook, Korean Education & Research Information Service, Research Report CR 2006-38, Republic of Korea (2006).
- [3] Warren, J. W. (2010). *The progression of digital publishing: Innovation and the evolution*
- [4] Eric J. Simon (2001) *Electronic textbooks : A pilot study of students reading habits.* <http://www.futureprint.kent.edu/articles/simon01.htm>
- [5] Piret Luik, Jaan Mikk: What is important in electronic textbooks for students of different achievement levels? *Computers & Education* 50(4): 1483-1494 (2008)
- [6] Mihye Kim, Kwan-Hee Yoo, Chan Park, Jae-Soo Yoo: Development of a Digital Textbook Standard Format Based on XML. *AST/UCMA/ISA/ACN 2010*: 363-377
- [7] Taizan, Y., et al., A Comparison of Functions and the Effect of Digital Textbook in Japan and Korea. *International Journal*, 2012. 6(1): p. 85-93.
- [8] John Cristy, Joseph G. Tront (2012). Developing a plug-in tool to make OneNote an E-textbook. *Developing Tools as Plug-ins (TOPI)*, 2012 2nd Workshop, p. 84 – 85.
- [9] Sung-Moo JUN. *Leading Future Education: Development of Digital Textbooks in Korea*[C].12th UNESCO-APEID International Conference Quality Innovations for Teaching and Learning, 24 - 26 March 2009, Bangkok, Thailand
- [10] DeJong, M.T. & Bus, A.G. (2003) 'How well suited are electronic books to supporting literacy?', *Journal of Early Childhood Literacy* 3: 147-164.
- [11] Amelia K. Moody. *Using Electronic Books in the Classroom to Enhance Emergent Literacy Skills in Young Children.* *Journal of Literacy and Technology* V(11):22-51,2010.
- [12] Mitchell Weisberg(2011). *Student Attitudes and Behaviors Towards Digital Textbooks*, *Publishing Research Quarterly*, Volume 27, Issue 2 , pp 188-196.
- [13] RC Meurant. *The iPad and EFL Digital Literacy*[J]. *Multimedia, Computer Graphics and Broadcasting*, 2010 : 224-234.
- [14] Geist, E. (2011) *The Game Changer: Using iPads in College Teacher Education Classes.* *Education*
- [15] Corcoran, T., & Siladner, M. (2009). *Instruction in high schools: The evidence and the challenge.* *The Future of Children*, 19(1), 157-183.
- [16] Black, P., & Wiliam, D. (1998). *Assessment and classroom learning.* *Assessment in Education*, 5(1), 7-72.
- [17] Black, P., Harrison, C., Lee, C., Marshall, B., & Wiliam, D. (2004). *Working inside the Black Box: Assessment for Learning in the Classroom.* *Phi Delta Kappan*, 86(1), 8.
- [18] Connor, C. D., Piasta, S. B., Fishman, B., Glasney, S., Schatschneider, C., Crowe, E., et al. (2009). *Individualizing student instruction precisely: Effects of child x instruction interactions on first graders' literacy development.* *Child Development*, 80(1), 77-100.
- [19] Hattie, J. A. C. (2009). *Visible learning: A synthesis of over 800 meta-analyses related to achievement.* New York: Routledge.
- [20] Marzano, R. J. (2004). *Building background knowledge for academic achievement: Research on what works in schools.* Alexandria, VA: Association for Supervision and Curriculum Development.
- [21] Magnusson, S., Krajcik, J., & Borko, H. (1999). *Nature, sources and development of pedagogical content knowledge for science teaching.* In J. Gess-Newsome & N. G. Lederman (Eds.), *PCK and Science Education* (pp. 95-123). The Netherlands: Kluwer.
- [22] Lukin, L. E., Bandalos, D. L., Eckhout, T. J., & Mickelson, K. (2004). *Facilitating the development of assessment literacy.* *Educational Measurement: Issues and Practice*, 26-32.
- [23] Holloway, J. H. (2000). *How to differentiate instruction.* *Educational Leadership*.
- [24] Ball, D. & Cohen, D. (1996). *Reform by the book: What is, or might be, the role of curriculum materials in teacher learning and instructional reform?* *Educational Researcher*, 25(9), 6-8, 14.
- [25] Shepard, L. A. (2009). *Commentary: Evaluating the validity of formative and interim assessment.* *Educational Measurement: Issues and Practice*, 28(3), 32-37.
- [26] Davis, E. A. & Krajcik, J. S. (2005). *Designing educative curriculum materials to promote teacher learning.* *Educational Researcher*, 34(3), 2-14.
- [27] Lin, H. T., & Fishman, B. (2004). *Supporting the scaling of innovations: guiding teacher adaptation of materials by making implicit structures explicit.* Paper presented at the 6th international conference on learning sciences, Santa Monica, CA.