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# Electronic Textbooks and Learning Styles: Approaching New Ways of Educating Students

Belinda Shipps

North Carolina A&T State University, [bpshipps@ncat.edu](mailto:bpshipps@ncat.edu)

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## **ELECTRONIC TEXTBOOKS AND LEARNING STYLES: APPROACHING NEW WAYS OF EDUCATING STUDENTS**

Department of Management  
North Carolina A&T State University  
bpshipps@ncat.edu

### **Abstract:**

There is a spiraling wave of interest surrounding electronic readers, electronic books in general and electronic textbooks (e-textbooks) in particular as the popularity of the e-textbook continues to grow.

The Forrester research firm predicts sales of electronic books (e-books) will exceed \$500 million in 2010 in the United States [Epps, 2009]. They further predict e-textbook sales growth will be small in comparison, but will continue to grow as interest and changes are made.

Recognizing the need to be agile as educators, and the importance of continually seeking new, up-to-date materials, content and technology to present to learners, many potential adopters of new technology are faced with the dilemma of deciding whether to move toward the digital e-textbooks or continue with the older technology (printed textbooks) [Lane, 2007]. Part of the dilemma stems from trying to weigh whether to invest and if so, how to get the most value from the technology [Lane, 2007]. This research posits that the use of learning styles with the e-textbook may enhance the learning experience for the student. This study evaluates the association between learning style and e-textbooks and perceptions of the user regarding performance, ease of use, usefulness and usability. This research study will use Kolb's learning styles model [Kolb, 1984] and the technology acceptance model [Davis et al., 1989].

**Keywords:** Learning Style, electronic textbooks, TAM, Kolb's Learning Style Model, e-books

### **I. Introduction**

There is a spiraling wave of interest surrounding electronic readers, electronic books in general and electronic textbooks (e-textbooks) in particular as the popularity of the e-textbook continues to grow.

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The e-textbook provides a new way of learning. Students can interactively use different types of information presented in various formats such as visual, audio and tactile. Students are able to access rich multi-media-based text online. There are many resources available to assist them in learning the material such as: note-taking and highlighting of the text; supplemental audio and video clips; pre, post and practice quizzes; supplemental puzzles and vocabulary quizzes; related hands-on labs and case studies.

Even though there are many positives given for selecting the e-textbook over the printed copy such as lower costs, anywhere accessibility, portability, searchability and an array of multimedia functions, the educational value gained from considering the student, their preferences, and teaching and learning techniques should not be ignored. The success and value in using e-textbooks may not be realized if students' views and learning styles are not considered.

For example, in one study addressing students' assessment of e-textbooks it was found that many students prefer the printed book over the digital books [Obradovic, 2003]. Some things students did not like about e-textbooks included: issues of accessibility and ease in reading the material [Nicholas et al., 2010].

In reviewing the literature, there was limited research on e-textbooks and learning styles. The research questions in this study focus on the following questions: Can a more student-centered approach to the use of e-textbooks focusing on pairing learning style with e-textbook resources improve student perceptions of enjoyment and performance? Specifically is there an association between perceptions of usefulness in terms of performance and enjoyment and perceptions of ease of use and usability and learning style-focused, e-textbook usage?

Previous research indicates that when students are taught in ways that take into account their learning style, they tend to be more successful [Gershkoff, 2005]. The paper is organized as follows: section 2 presents a discussion of e-textbooks, section 3 and 4 discuss learning styles. Section 5 introduces the Technology Acceptance Model followed by a discussion of methodology and finishing with a discussion of implications and conclusion.

## **II. E-textbooks: Adding value in teaching and learning**

As the popularity, knowledge, and use of e-books and e-readers continue to evolve, there is much discussion about the attractive features and benefits surrounding e-books, such as cost, portability, accessibility, searchability, and multimedia capabilities such as use of podcasts, interactive flashcards and quizzes.

However, looking further at learning potential, the e-textbook, as a new and growing phenomenon, provides an opportunity to re-evaluate and adapt the teaching and learning techniques of educators in relation to e-textbooks, students and their learning preferences.

For one, many of the current students are millennial students (born after 1980 and graduating from high school after year 2000). Many of these students are very familiar with digital technology and over time, may readily adapt and enjoy using the e-textbooks if they feel they fit their perceptions and learning behavior [Lancaster and Stillman, 2010]. E-textbooks may provide an opportunity to customize learning to the student by determining their learning style preferences and adapting the learning techniques and materials accordingly [Lancaster and Stillman, 2010]. New software is available from publishers like Macmillan which allow professors to edit the digital textbooks where they can change or delete chapters

or upload additional information (which may relate better to their particular students) such as text, graphs, pictures, audio clips, and video clips [Motokorich, 2010].

Academic discipline may be another factor associated with e-textbook and learning. There may be students in certain disciplines that are more adaptable than others in using e-textbooks in terms of acquiring and processing information. In this study the focus is on management information system courses (MIS) and e-textbooks. A previous study labeled business students as “super users” (age ranging from 22-35) [Nicholas et al., 2010]. Super users were found to read longer and a greater number of books and information using the e-book [Nicholas et al., 2010].

In this study, I define electronic textbooks as digital versions of printed textbooks that are assigned for courses and have additional electronic resources associated with the book. The e-textbook may have many electronic resources such as interactive cases, online quizzes, tutorials, podcasts and puzzles and vocabulary flashcards.

### **III. Learning Style**

Learning style theory focuses on the idea that there are different ways of learning for different individuals [Sims and Sims, 1995].

Previous research indicates that there is an association between learning style and student learning [Sims and Sims, 1995]. “With a better understanding of individual differences, learning opportunities can be designed that match the student’s learning strengths and weaknesses with the learning objectives.” [Sims and Sims, 1995, pg. 119]. Goldman and Casey [2010] argue that individual differences such as learning style play a part in acquiring knowledge.

Along with different learning styles, there is a need for a variety of learning materials when teaching a course [Hayes and Allinson, 1996, 1994; Moreno and Mayer, 2000; Plass et al., 1998; Thomas and McKay, 2010].

This research focuses on information processing learning style. Kolb’s model has been widely used and tested for validity and internal consistency in several other research studies [Mitchell, 1995].

Kolb’s Learning Style Inventory instrument was developed to support his experiential learning theory. The experiential learning theory argues that there are four basic modes of learning but that most people develop a preference for using two of the four [Kolb, 1984].

The Kolb learning style model consists of four learning styles based upon how a person receives knowledge and how they process that knowledge once it is taken in. The four styles are: Accommodator, Diverger, Converger and Assimilator [Kolb, 1984].

### **IV. Four Learning Styles**

The learning styles are based upon two opposing sets of dimensions (perception and processing) [Kolb, 1984].

1. **Perception dimension** (*focuses on how you envision things*)
  - a. Concrete Experience (**CE**) - Perceive things as they are; look at the raw facts/data
  - b. Abstract Conceptualization (**AC**) Thinkers – perceive things based on ideas and concepts
2. **Processing dimension** (*focuses on processing the results of the learner's perceptions*)
  - a. Active Experimentation (**AE**) – Take their conclusions and try to prove that they work; Hands-on learners
  - b. Reflective Observation (**RO**) take their perceptions and watch and ponder to see if they work

## V. Technology Acceptance Model (TAM)

TAM will be used in this study to evaluate: perceived ease of use, perceived usefulness and usability in relation to e-textbooks and learning style. TAM has been used in previous studies to examine electronic-learning. TAM was used previously by Selim [2003] to evaluate course websites for ease of use and usefulness. Ease of use was determined to be significant. Brown [2002] found significance for ease of understanding, ease of finding and computer anxiety in a study using TAM constructs to examine WebCT which is a web-based learning technology.

## VI. Methodology

The research methodology used in this study is based on Structural Equation Modeling (SEM). SEM was chosen because of its focus on evaluating relationships with multiple variables. The research will focus on evaluating the relationships between learning style and directed e-textbook resources, perceptions of ease of use and usability and usefulness.

Survey analysis will be used to assess perceived ease of use, perceived usefulness, usability and learning style in association with a Management Information System (MIS) e-textbook.

### ***Participants***

The subjects for the study are undergraduate students enrolled in an introductory Management Information Systems course. The students range in age from 18- 24. The study will evaluate approximately 150 undergraduate students.

The students will be surveyed twice during the semester. Once at the beginning of the semester without knowing their learning style and targeted e-textbook tools and again at the end of the semester after their learning styles have been identified (mid-semester).

In order to validate the associations between the four learning styles and the various e-textbook resources, 6 MIS instructors will be asked to evaluate which learning styles relate to which e-textbook tools.

### ***Instrument***

A survey instrument will be used based upon previous instruments used for TAM and learning style. The learning style inventory instrument developed by (Kolb, 1984) will be used to collect data. A learning style survey will be administered half-way into the semester. An assessment survey based upon TAM constructs will be given at the beginning and end of the semester focusing on perceptions of the e-textbook. A card sort method will be used to help in the identification of the e-textbook resources and the association of learning style with e-textbook resources based upon input by educators using a card sort

procedure. This research focuses on evaluating the association between learning style and usage of e-textbook s and their e-textbook resources.

This study will use two models: The Technology acceptance model (TAM) and the Kolb learning style model

## VII. Implications:

The identification and use of learning style may impact many including, publishers, educators and students in terms of adoption, development of e-textbooks and courses and methods of learning and teaching. Publishers are adapting to the demands for e-textbooks by addressing various issues. In deciding on the e-textbook, educators are considering the value versus the cost. Educators struggle with the textbook cost issue as well as the knowledge acquisition issue. Students complain of high costs of books as reasons for not purchasing, reading and completing textbook assignments. If students and educators perceive the e-textbook as a more efficient and effective learning method/ tool when used in conjunction with learning styles this may lead to an increased demand for e-textbooks in general and MIS textbooks in particular. The combined learning value and reduced cost may make the e-textbook alternative more attractive when comparing cost with benefits.

## VIII. Conclusion

In conclusion, this research seeks to evaluate e-textbooks and its associated tools/materials to provide insight into e-textbooks and the impact on students when learning style is considered. This study examines a continuously growing topic which can have potential implications for publishers, students, parents and educators.

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