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TEXTBOOKS VS. TECHBOOKS: EFFECTIVENESS OF DIGITAL TEXTBOOKS ON ELEMENTARY STUDENT MOTIVATION FOR LEARNING

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TEXTBOOKS VS. TECHBOOKS: EFFECTIVENESS OF DIGITAL TEXTBOOKS ON
ELEMENTARY STUDENT MOTIVATION FOR LEARNING

By

Auna Oman

THESIS

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ABSTRACT

TEXTBOOKS VS. TECHBOOKS: EFFECTIVENESS OF DIGITAL TEXTBOOKS ON ELEMENTARY STUDENT MOTIVATION FOR LEARNING

By

Auna L. Oman

This action research project investigated fourth grade students' motivation to learn science using a digital science techbook. Participants in the study included 29 fourth grade students in two different classrooms. One classroom of 16 students used a digital science techbook to learn science while the other classroom of 13 students used a traditional paper science textbook to learn science. Students in both classrooms answered five sets of questions regarding their experience using a digital science techbook and a paper science techbook to understand science, find science information, solve science problems, learn science, and assess learning science was fun. Results were compiled and coded based on positive and negative responses to conditions. A chi-square was used to analyze the ordinal data. Overall differences between techbooks vs. textbook were significant, $\chi^2(1, N = 29) = 23.84, p = .000$, justifying further examination of individual survey items. Three items had statistically significant difference for finding science information, solving science problems, and learning science. A gender difference was also found in one item. Females preferred to use paper science textbooks to understand science, while males preferred digital techbooks to learn science. The fourth graders in this study indicated that digital techbooks were a powerful learning tool for increasing interest, excitement and learning science. Even though students reported paper science textbooks

as easy to use, they found using digital science techbooks a far more appealing way to learn science.

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Chapter 1: Introduction

Traditional classroom settings might find students sitting at their desks with their science textbooks all open to the same page. The class reads the section together, periodically stopping to write important information in science notebooks. Students are likely lethargic and not engaged or following along with the reading. Enter a contemporary classroom and you may find a very different format for learning science. Gone are the old paper textbooks. Replacing the textbooks are modern, digital textbooks. Instead of reading together from a book, text is accessed online via the use of a laptop, I-pad, interactive whiteboard or other technological device.

Science stations are set up around the classroom and students rotate through the stations in cooperative groups to complete a variety of tasks. Examples of these tasks are reading passages on an I-pad, which can be modified to fit individual reading levels and have the option of being digitally read to students, completing a virtual experiment, creating a vocabulary log using the interactive glossary with an animation, video and explanation of each term, watching a video relating to the topic, etc. At every station, students are engaged in science instruction and using technology to learn.

The United States Department of Education views the integration of technology in education so important the department issued the 'Enhancing Education through Technology Act of 2001' (USDE, 2001). The primary goal of this act was to improve students' achievement through the development and use of technology in the classroom. Since the approval of this act, schools have been taking steps to weave technology into their curriculums. One such way technology is being integrated is with digital textbooks. Digital textbooks are putting the printed word into a format students can interact with and manipulate.

Students today live in a digital world. They do not know of a world without Internet and an instant digital connection to anyone, anywhere. The majority of children use technological devices on a daily basis for social and leisure purposes. This ever-increasing daily use has changed the way children think, learn, and receive information. Digital textbooks contain text enhancements, such as interactive glossaries and background information, as well as illustrations to accompany the text. Hypermedia allow students to move around the page and click on links to access additional information with links to text, data, graphics, or videos. Digital textbooks provide easy access to embedded speech and support struggling readers with a digitized reading of text, highlighting each word being read. The mixture of visual, tactile, and auditory options give students the opportunity to learn in the same way they live their daily lives outside of school.

In an action research project, educators study a particular teaching method to explore the kind of effect the method has on students' learning. The results from an action research project help improve the educator's teaching practice (Sagor, 2000). In this action research project, I look at whether digital textbooks motivate students to learn science using Pintrich and DeGroot's (1990) expectancy-value model of motivation as a guide. Motivation to learn is based on how much the student's value what they are learning, how much confidence they have in their ability to learn and student's emotional reaction to the material being learned. When using a medium that students are connected to, students are more likely to be motivated to learn new information.

Background

Teachers have been using traditional printed textbooks in their classroom as a means for gaining new knowledge in schools across the country for years. These informational texts have been the core of many curriculums. The problem with textbooks in today's informational age is

updating the information inside cannot occur without purchasing a brand-new edition. Once schools purchase the new textbooks, schools then have to decide what to do with the old textbooks.

Enter today's digital world and modern classrooms and you are likely to see students engaged in learning via some technological device. Schools are beginning to embrace digital textbooks to match our digital world. The interactive and engaging applications of digital textbooks are transforming the way students learn to meet the way students live in their daily lives (Weisberg, 2011).

Statement of the Problem

Students in the 21st century live in a digital world. Students use electronic devices daily for networking, socializing and staying connected to the world. On average, by the age of five, 27% of American children independently use the computer on a daily basis for about 50 minutes a day (Korat, Shamir, & Arbiv, 2011). Students age 8-18, spend an average of 7.5 hours per day using the Internet as their primary source for accessing TV shows, video games, music, e-books, social media, and popular culture websites (Rideout, Foehr, & Roberts, 2010). Technological devices easily capture the attention of students. A traditional textbook classroom then goes against the grain of how students are living. Teachers must transform their classrooms into a place where technology can be just as much a part of learning inside the school as digital media is in children's lives outside of school so students will continue to be motivated to learn.

Theoretical Framework

The motivation to learn can be defined as a student's tendency to find academic activities important and worthwhile, and thus try to get the most learning benefits from the activities (Brophy, 1983). The purpose of motivational theory is to explain student behaviors and to

influence future behavior. A student's motivation is based largely on expectancy beliefs and task values of the content according to the expectancy-value model of motivation (Eccles et al., 1983). Motivation depends on three variables: value, confidence, and emotions (Pintrich & Degroot, 1990).

The first variable, the value variable, speculates the engagement a student has in a task depends on the value a student places on the task. Both the nature of the task and the interest of the student in the task determine how motivated he/she will be to complete the work. If a student finds an activity or assignment to be boring or too difficult, the student will be less likely to engage in the activity. However, if the activity is interactive, at his/her interest level, and developmentally appropriate, the child is more likely to value the activity and thus be willing to engage in the activity, as with a digital textbook.

The second confidence variable relates to how confident a student is in his/her ability and skill level to complete a task inviting the student to ask the question, "Can I complete this task?" A student who feels he/she is capable of successfully completing a task is more willing and motivated to complete the task. Building a positive classroom atmosphere, and ensuring the student has adequate background knowledge along with the skills he/she needs to complete the task, are key to keeping the student confident in his/her ability to learn new information.

The final component, the emotional variable, relates to the student's emotional reaction to a task (Pintrich & Degroot, 1990). How a student feels about a task is an important issue. If a student views an activity as beyond his/her current ability level, he/she is likely to feel anxious about it. If it is something the student finds fun and interesting, he/she is more likely to be motivated to learn about it.

Value, confidence, and emotions influence students' motivation to learn. Improved motivation increases the likelihood students will put in the time and effort necessary to achieve the intended learning objectives. Students' value technology and most students are confident in their ability to navigate any device put in front of them. Students get excited to use new technological devices and thus are more emotionally involved when using them. Motivation is an important part of the learning process. Teachers should consider motivation when planning successful lessons. Since children regard computers as a natural part of their life, educators can take advantage of this tool to promote learning and motivation (Korat, Shamir, & Arbiv, 2011).

Research Question

One possible way to increase students' motivation to learn is by incorporating the use of digital textbooks. Growing up with technology should make contemporary students more likely to be confident in their ability and skills to navigate technological devices. Consequently, students should be more motivated to learn when digital textbooks are available. The current research focuses on the effectiveness of digital textbooks on the motivation of elementary students' learning. The research question is, "Are digital textbooks an effective way to increase elementary student's motivation to learn new content?"

Definition of Terms

The following terms are used frequently in the literature review. The definitions are provided to ensure that the reader has a clear understanding of the meaning of each term.

Digital techbook (i.e., digital textbook). Digital copies of textbooks or other books obtained online. (Martinez-Estrada & Conaway, 2012).

E-books (i.e. electronic books) Picture books or novels that can be read electronically. E-books can be read on many electronic devices, including computers, tablets, and phones (Martinez-Estrada & Conaway, 2012).

Interactive. Engaging audience participation and contribution (Atkinson & Swaggerty, 2011).

Motivation to learn. An enduring disposition to value learning for its own sake and take pride in the process of gaining new knowledge and skills (Brophy, 1983). For the purpose of this study, I am defining motivation using what students enjoyed doing (e.g., playing games, looking at pictures, being read to, and easily looking up words they did not know.)

Reading Comprehension. A process by which readers construct meaning from the text (Lamb & Johnson, 2011).

Tablet computers. Multifunctional devices not only for reading books online (Martinez-Estrada & Conaway, 2012). Examples include Amazon Kindle, Sony eReader Touch, Apple iPad, and enTourage eDGe.

Summary

In conjunction with the Enhancing Education through Technology Act of 2001, schools have been finding ways to incorporate effectively technology into their curriculums. Schools are enhancing education most recently using digital textbooks in the classroom. Very little research exists on how digital textbooks influence learning and student's motivation to learn because digital textbooks are a relatively new phenomenon in classrooms. This thesis attempts to bridge this gap and provide suggestions for future research.

Chapter 2: Literature Review

Digital textbooks are a new technology available to students across the country. Many studies have been undertaken to understand how digital textbooks are used in the classroom (Connell, Bayliss & Farmer, 2012; Greenhow, Robelia & Hughes, 2009; Gensing-Pophal, 2010; Grimshaw, Dungworth, McKnight, & Morris, 2007; Martinez-Estrada & Conaway, 2012; McFadden, 2012; Moody, Justice & Cabell, 2010; Nelson, Arthur, Jensen & Van Horn, 2011; Sun & Flores, 2012; Weisberg, 2011; Zucker & Hug, 2008), but few researchers have investigated how using digital textbooks influence students' learning experiences and motivation to learn. The purpose of this literature review is to compile the results of previous studies with digital textbooks to highlight the pros and cons of using digital textbooks in the classroom and what affect, if any, digital textbooks have on student learning and motivation to learn.

Digital Textbooks and Student Learning

Digital textbooks have been helpful in monitoring students' learning outcomes (Sun & Flores, 2012). Students in a post-secondary statistics class were randomly assigned either an e-textbook or a regular statistics textbook and then assessed on their involvement in the course. Digital textbooks influence the learning experiences of college students differently depending on how students are involved in using e-textbooks during the instruction. For students who used e-textbooks in class, the use of e-textbooks improved their learning and involvement in class. For those who did not use e-textbooks in class, their learning depended on how helpful e-textbooks were perceived to be. Using e-textbooks in class provided students the opportunity to engage with the text and the interactive format improved learning outcomes.

Other studies at the college level garnered similar results. A two-year experimental study with senior undergraduate students, examined student attitudes and behaviors towards digital

textbooks (Weisberg, 2011). The students in this study were randomly divided into six teams. Five teams were given a different digital device to access the digital textbook and the one team used a traditional paper textbook. The textbook devices used in this study were Amazon Kindle, Sony eReader Touch, Apple iPad, enTourage eDGe, and CourseSmart. The Kindle, eReader, iPad and eDGe all serve the same basic function, allowing readers to access a digital textbook electronically. Over the two-year study, student attitudes and behaviors evolved and changed as the technology itself evolved and changed. In the beginning of the study, the digital textbooks available were very much like regular textbooks, but new features such as highlighting and note taking abilities increased positive attitudes towards these digital textbook devices. Students were responding positively to the portability, efficiency and sharing provided by the digital devices and preferred digital textbooks to traditional textbooks by the end of the study. However, through his research Weisberg found no impact on students' learning using digital textbooks versus traditional textbooks. Learning of the course content neither increased nor decreased.

Digital Textbooks and Reading Comprehension

Digital textbooks and storybooks have been targeted as a source to help improve children's literacy and comprehension (Connell, Bayliss, & Farmer, 2012; Grimshaw et al., 2006; Korat & Shamir, 2007; Lacina & Mathews, 2012; Larson, 2008; Moody, Justice, & Cabell, 2010). In a comparative study between reading a storybook with and without a computer (Grimshaw et al., 2006), interactive features such as word pronunciation, narration, instant access to word definitions, sound effects and animation that support the text helped 9-11 year old students focus less on decoding words and more on the meaning of the story. Students who read the electronic version of the story were able to complete the comprehension assessment in less

time than students who read the print version; students were also able to make more inferences from the text.

Other Benefits of Digital Textbooks

Digital textbooks support young children's language development and other emergent literacy skills in a study done with kindergartners (Korat & Shamir, 2007). Using digital textbooks, students are able to interact with peers and their teachers by sharing notes and insights (Atkinson & Swaggerty, 2011; McFadden, 2012). Videos, simulations, experiments and other embedded enhancements make digital textbooks more appealing to students (Grensing-Pophal, 2010; Weisberg, 2011). College students and schools with budget concerns have found that purchasing digital textbooks is a cheaper way to access curriculum materials (Carney, 2011; Grensing-Pophal, 2010; Laskowski, 2007; Weisberg, 2011). With a shift towards greener living, digital textbooks have been hailed as green technology for classrooms (Gurnsey, 2011; Hill, 2010). The convenience, efficiency, ability to have more than one book on your device and the online accessibility have all been found as added benefits in the shift to digital textbooks (Jamali, Nicholas, & Rowlands, 2009; Weisberg, 2011).

Drawbacks of Digital Textbooks

Digital textbooks do not have to replace traditional textbooks. Traditional textbooks and digital textbooks can coexist in the classroom and supplement each other. The use of digital textbooks in the classroom does not come without drawbacks. In several studies, students reported an increase in eyestrain and fatigue when using digital textbooks because the lighting on the screen sometimes makes reading from a screen difficult (Jamali, Nicholas, & Rowlands, 2009; Vernon, 2005).

Many digital textbooks are read on tablet computers that are also connected to the internet. Students find themselves checking emails, engaging in social media, or otherwise surfing the internet instead of reading the digital textbook. A traditional textbook has fewer distractions so some students prefer traditional textbooks to digital textbooks (Vernon, 2005; Weisberg, 2011; Woody, Daniel, & Baker, 2010).

Impact of Digital Textbooks on Student Motivation

As the technology and enhancements continue to evolve in the digital textbook world each year, student attitudes and behaviors towards digital textbooks are becoming more receptive and accepting (Weisberg, 2011). Recent studies show students are more willing to learn with, and are more excited and motivated to interact with, digital textbooks to learn new skills. In a pilot study with undergraduate students in an educational history class, researchers compared digital textbooks to traditional textbooks in their impact on students' motivation to learn (Rockinson-Szapkiw, Holder, & Dunn, 2011). Students who volunteered to participate were assigned randomly to either the treatment group (using a digital textbook) or the control group (using a traditional textbook.) Both large groups were split into smaller groups and each small group was given a learning task related to civics. The content of the learning tasks were the same, the only difference was the type of textbook used to access the content. At the end of the learning task, the participants were asked to complete an Instructional Materials Motivational Survey (IMMS). The IMMS has good reliability. Cronbach's alpha for this instrument is 0.96. When the results of the survey were analyzed quantitatively, the mean scores of the digital textbook group were statistically significantly higher than the mean scores of the traditional textbook group, suggesting digital textbooks may increase students' motivation to learn instructional material. In discussing student impressions of digital textbooks, researchers

observed that students appreciated the ease of navigation, search features and overall usability of the digital textbook when compared to a traditional textbook. A pilot study with a small sample should be carefully analyzed before generalizing to a larger population of students.

Summary of the Research

Digital textbooks are continually being adopted in classrooms across the country. Several studies have been conducted with undergraduate students and have found that as the technology improves, students' attitudes and behaviors towards digital textbooks have also improved (Sun & Flores, 2012; Weisberg, 2011). Some drawbacks of digital textbook use exist, namely screen lighting and internet distractions, but students have reported many favorable qualities of digital textbooks that make these textbooks more appealing than traditional textbooks. Some advantages include decreased cost, interactive tools for sharing and simulations, convenience and portability. Digital textbooks improved reading comprehension and helped upper elementary students decode unfamiliar words so students could focus on the meaning of the story (Grimshaw et al., 2006). Finally, results of an undergraduate pilot study suggest digital textbooks have assisted in motivating learners (Rockinson-Szapkiw, Holder, & Dunn, 2011).

Some students in high school and post-secondary school viewed digital textbooks more favorably than textbooks, but no studies have examined fourth grade students' views. Gaps in the literature indicate a need for more researchers in K-12 classrooms. My research is posed to fill gap and make a contribution to teachers in upper elementary classrooms by answering the question of whether digital textbooks increase motivation of fourth grade students to learn science.

Chapter 3: Methods

Action research is a type of research used by educators to help improve instruction in their own classroom (Sagor, 2000). Through systemic observation and data collections, teachers are able to take an objective look at their classroom to discover the most effective instructional strategies. Classroom teachers want their classroom environment to promote maximum learning. Action research is one way to assess the effectiveness of the teaching for learning process.

Action research is different from traditional research because the emphasis of action research is collecting data using a relatively small sample size to help improve teaching practices in the researcher's own classroom. A researcher who investigates an action research project is exploring ways to improve and develop the researcher's own teaching practice. A traditional researcher emphasizes collecting data from a random sample with results that can be generalized among a larger population. The results of traditional research tend to be theoretical in nature and can be applied to any classroom, not just a localized situation, as is the case with action research and the current study.

The purpose of this action research project was to evaluate students' opinions of learning with digital science techbooks compared to traditional paper science textbooks. As an action researcher in an elementary classroom, I used a case study approach to determine whether students are more motivated to learn using a digital techbook or a paper textbook. In a case study, the researcher studies a group or event for a predetermined amount of time. The following qualitative study was conducted in two different fourth grade classrooms, at two different Catholic schools, to capture the experience of students as they used a digital textbook to learn science compared to a paper science textbook.

Participants

The sample for this research project included 29 students in two classrooms. All students were fourth graders at two different rural Catholic elementary schools in Upper Michigan. The digital techbook classroom included 16 students, ages 9-10. The sample of convenience included eight males and eight females. The sample in the classroom that used a traditional paper textbook to learn science included 13 students, ages 9-10. The sample of convenience in the paper textbook classroom included six males and seven females.

Access and Permissions

Permission was obtained from the superintendent, principal, and parents of the students prior to conducting this case study. The research was completed during the regular science block to not take away from any classroom instructional time.

Research Procedure

Students had been using the digital science techbook for approximately seven months before being asked to reflect on their experiences and participate in this research study. The research was conducted during the beginning of the fourth marking period. Students were engaged in their final full unit of study using the digital science techbook. The focus of the unit was on the earth, sun, and moon. Students in the other fourth grade classroom, using a traditional paper textbook, were studying the same unit. The Grade Level Content Expectations (GLCEs) covered in both classroom units during the research were as follows:

- E.ST.04.11 Identify the sun and moon as common objects in the sky.
- E.ST.04.12 Compare and contrast the characteristics of the sun, moon, and Earth, including relative distances and abilities to support life.
- E.ST.04.21 Describe the orbit of the Earth around the sun as it defines a year.
- E.ST.04.22 Explain that the spin of the Earth creates day and night.
- E.ST.04.23 Describe the motion of the moon around the Earth.

- E.ST.04.24 Explain how the visible shape of the moon follows a predictable cycle, which takes approximately a month.
- E.ST.04.25 Describe the apparent movement of the sun and moon across the sky through day/night and the seasons.

The school using digital textbooks adopted a brand new science techbook program through Discovery Education for the 2012-2013 school year. The students were asked to reflect on their opinions and experiences of using Discovery Education’s digital techbook to learn science compared to their previous experience of using a paper science textbook. The students accessed their digital techbooks in the school’s computer lab during science instructional time 3-4 times per week. Each student had a unique username and password. The techbooks could be accessed from any computer with internet connection, including home computers. The digital science techbook was the sole means of learning science in fourth grade, the paper science textbook was not used at all.

Discovery Education’s science techbook is organized with a separate tab for each unit. Every unit sub-topic is arranged into 5 E’s: Engage, Explain, Explore, Elaborate and Evaluate (Discovery Education, 2013). Features such as videos, simulations, readings, and animations help students engage and learn science in an interactive format. The readings on the digital textbook are offered in both a print format and an e-book format. In the e-book version of the reading, students have the option of having the information read to them. The e-book also allows students to highlight important information and take notes on what they are learning. The interactive glossary has all the terms listed in alphabetical order. The interactive glossary has the definition, a video, and an animation to demonstrate each term. Dual-coding theory posits information that is represented both visually and verbally is easier to remember and is stored more efficiently in long-term memory than is information described only verbally (Sternberg, 2003). An example of dual-coding theory is the concept of *sun* as a star is easier to remember

with pictures and words than a concept such as *democracy* (Mayer & Sims, 1994). The ease of learning (encoding information to long-term memory) should help to increase students' motivation to learn, as measured in this research by students' comparative responses to learning with textbooks vs. techbooks.

Students in the traditional paper textbook class were using the science textbooks from McMillan/McGraw-Hill Science grade 4 textbook (Daniel, Vasquez, Moyer & Hackett, 2005). These students have never used a digital textbook. The answers they gave to the questions for this research study were what they perceived learning would be like while using a digital textbook compared to the experience they know and are familiar, a traditional paper textbook as the primary source of science information and learning.

Research Design

The digital science techbook was a brand new learning tool for both the researcher and the students who participated in this action research project. To introduce students to all the features of the techbook, the majority of the first science unit of the school year was completed whole class using the interactive whiteboard in the classroom. The teacher-researcher logged into the techbook using a student's username and password. Students were then able to experience all the interactive features together and became comfortable with the format before using the techbook independently. Before any graded work was assigned, students were taken into the computer lab and given time to explore the techbook.

The data for this project were collected during the last science unit of the school year when a routine had been established for techbook usage. After the anticipatory set introducing students to the day's lesson and essential questions, students using the digital textbooks were taken to the computer lab to log into their techbook. Students worked with teacher-selected

partners throughout the unit to complete a series of six stations. Examples of daily tasks completed on their techbook for the stations included finding glossary definitions, engaging in an exploration about the earth-sun-moon system, playing an online simulation game or watching videos about the earth, sun and moon. After returning to the classroom, students were given a worksheet to complete in response to the day's activity. Attached to this worksheet were two questions asking students to reflect on their experience using the digital science techbook and to compare that experience with doing the same work with a traditional paper science textbook. The questions were all completed during classroom time and were asked over a period of three weeks.

In the other classroom that uses a traditional paper textbook, the same material was covered, only instead of using a digital textbook, students used a traditional paper textbook. The class read each section about the earth, sun and moon together and answered questions from a worksheet at the end of each section. The research questions were attached to the worksheet for students to fill out and reflect on their motivation to learn using a paper science textbook versus what it might be like to learn the same material using a digital textbook. In total, students from both classrooms wrote responses to ten questions. Students were encouraged to be honest in their answers and assured that their opinions would not affect their science grade. Students in both classrooms answered the following questions:

Part 1

My digital science techbook helps me understand science because

My paper science textbook helps me understand science because

Part 2

Finding science information with my digital science techbook is

Finding science information with my paper science textbook is

Part 3

Solving science problems with my digital science techbook is

Solving science problems with my paper science textbook is

Part 4

Learning science with a digital science techbook is

Learning science with a paper science textbook is

Part 5

Is learning science with a digital science techbook fun? Why?

Is learning science with a paper science textbook fun? Why?

Data Collection

Student responses to the above questions were compiled in an excel file. The researcher examined the data to search for common themes. The data were then coded based on positive and negative responses towards both digital science techbooks and paper science textbooks. A chi-square was used to analyze the data to evaluate the differences between two or more groups of participants (Santorini, 2008), i.e., in this case, students who used digital science techbooks and students who used paper science textbooks. This study examined the relationship between the two variables and asked the question: Does a significant difference exist between students who learn science using a digital science techbook and students who use a paper science techbook, and what effect do these two conditions have on students' responses toward motivation to learn science content using techbooks vs. textbooks?

Chapter 4: Results

Participants

The results presented in the following chapter are exploratory and are an analysis of student responses from two different fourth grade classrooms. Overall, 29 students participated in the study. Sixteen participants were in the digital textbook classroom using a digital science techbook to learn science, and 13 participants were in the paper science textbook classroom using a paper science textbook to learn science.

Instrument

Participants answered 10 survey items that provided participants an opportunity to reflect on experiences learning science using a digital science techbook versus a paper science textbook. Two coders coded the responses from the participants in the study. The teacher-researcher coded the 290 fourth grade student responses. An undergraduate research scholar also rated the same data. Coders were trained by the thesis chair on two measures:

1 = negative towards techbooks

1 = negative towards textbooks

2 = positive towards techbooks

2 = positive towards textbooks

The coding had good internal consistency, with Cronbach's alpha = .925.

Survey Results

Overall, highly significant differences were found between conditions. The participants differed by condition (Techbooks vs. Textbooks) across the five items in each condition for use

of techbooks vs. textbooks, $\chi^2(1, N = 290) = 23.842, p = .000$, thus justifying the further examination of individual survey results. The four items with statistically significant differences are reported below, along with the gender difference found in one item.

Finding Science Information

The percentage of participants differed by condition (Techbooks vs. Textbooks) for finding science information with their techbook, $\chi^2(1, N = 29) = 7.64, p = .006$. Table 1 reflects the positive and negative responses of participants. Typical positive responses towards finding science information using a digital techbook in the digital textbook classroom were that a digital techbook was “like having a little help from someone” and “easy because it is faster than a book. You type it in and it is there.” The paper science textbook classroom had more negative responses to finding information using a digital science techbook. Responses included concerns about “the power going out and not having a computer at home.”

Table 1
Finding Science Information with a Digital Science Techbook

Responses	Digital Science Techbook Classroom	Paper Science Textbook Classroom	Total
Positive	14	5	19
Negative	2	8	10
Total	16	13	29

Note. $\chi^2(1, N = 29) = 7.64, p = .006$.

The percentage of participants differed by condition (Techbooks vs. Textbooks) for finding science information with a paper science textbook, $\chi^2(1, N = 29) = 5.58, p = .018$. Table 2 reflects the positive and negative responses of participants. A science textbook made finding science information easier for students in the textbook classroom. “When using a science

textbook, you could always look in the glossary and back in your book to find answers to questions.” In the digital science techbook classroom, participants responded that finding science information with a paper textbook was “boring because the books are nice but outdated. Computers are holding more memory than 10 books.”

Table 2
Finding Science Information with a Paper Science Textbook

Responses	Digital Science Techbook Classroom	Paper Science Textbook Classroom	Total
Positive	3	8	11
Negative	13	5	18
Total	16	13	29

Note. $\chi^2(1, N = 29) = 5.58, p = .018$.

Solving Science Problems

The percentage of participants differed by condition (Techbooks vs. Textbooks) for solving science problems using a digital science techbook, $\chi^2(1, N = 29) = 9.81, p = .002$. Table 3 reflects the positive and negative responses of participants. Students in the digital science techbook classroom responded that solving problems using a digital science techbook was “awesome because I like solving problems and it's easier with the videos. It helps me focus too.” Students in the paper science textbook classroom felt solving science problems using a digital science techbook was “not fun because if your computer broke down or is in for repairs, you can't do your homework. Books don't break down or usually need repairs. It's good for your brain to just sit down and read a book.”

Table 3
Solving Science Problems with a Digital Science Techbook

Responses	Digital Science Techbook Classroom	Paper Science Textbook Classroom	Total
Positive	13	3	16
Negative	3	10	13
Total	16	13	29

Note. $\chi^2(1, N = 29) = 9.81, p = .002$.

Learning Science

The percentage of participants differed by condition (Techbooks vs. Textbooks) for learning science using a digital science techbook, $\chi^2(1, N = 29) = 4.07, p = .044$. Table 4 reflects the positive and negative responses of participants. Learning science with a digital science techbook was “easy because it helps you understand. When you watch a video, you learn!” Students in the paper science textbook classroom felt learning with a digital science techbook, “is harder because it doesn't always explain and it has too many distractions.” Using a paper science textbook to learn science was easier because “it cannot crash or get a virus.”

Table 4
Learning Science with a Digital Science Techbook

Responses	Digital Science Techbook Classroom	Paper Science Textbook Classroom	Total
Positive	14	7	21
Negative	2	6	8
Total	16	13	29

Note. $\chi^2(1, N = 29) = 4.07, p = .044$.

Gender Differences

One item had a difference in gender. Female participants responded more positively to whether paper science textbooks help to understand science. A typical female response was, “It's very easy to look back in the book and study from that page. You also know that your book will always open.” Male participants were evenly split. A typical negative response from male participants was, “[my paper science textbook] doesn't really help me because it doesn't describe when you don't get something.”

Table 5
Gender Differences in Paper Science Textbook Helping to Understand Science

Responses	Male	Female	Total
Positive	7	14	21
Negative	7	1	8
Total	14	15	29

Note. $\chi^2(1, N = 29) = 6.81, p = .009.$

Summary

A chi-square statistic was used to determine if differences occurred in student responses between the techbook and textbook conditions. Internal consistency was good with Cronbach's $\alpha = .925$ and the participants differed by condition (Techbooks vs. Textbooks) across the five items in each condition for use of techbooks vs. textbooks. The results provided evidence of gender differences and differences between conditions, as described in the next chapter.

Chapter 5: Conclusions

Student responses had significant statistical differences between two conditions, using digital techbooks and paper textbooks. Students in the techbook condition reported responses that were more highly favorable to finding science information, solving science problems and learning science compared to students in the control classroom. Students' motivation for learning was based on responses to items addressing interest, ease of access, and ability to solve science problems.

Students who have used the digital techbooks find the videos and games to be a fun and descriptive way to learn science. They also like the e-book option of having informational texts read to them. Being able to work with a partner was another benefit cited. When thinking about paper science textbooks, many felt they were more boring and it was harder to find answers because you had to flip through pages instead of using the search bar as in the techbook.

Students in the control paper science textbook classroom, who have never used a digital techbook, seemed more evenly split. About half of them felt a digital techbook would be an effective way to learn science because they like digital items and feel this interest would increase student focus and attention. The other half was worried about not having access to the techbook at home or some other technical or internet connection problems. The paper textbook class felt learning with a paper textbook was then easier because of these issues.

Connections to Previous Research

Digital textbooks are a new technology in classrooms. When related to the three variables of expectancy-value motivational theory, digital textbooks have the potential to be a great asset to help teachers motivate students to learn new content (Pintrich & Degroot, 1990). Students value and have an interest in anything related to technology. Since current students have grown

up in a digital age, they are confident in their skills to use technology. New interactive technology sparks students' interest and engages students in the learning task. The interactive features of digital textbooks, such as embedded videos and simulations, get students excited about learning.

Digital textbooks improve reading and comprehension (Connell, Bayliss, & Farmer, 2012; Grimshaw et al., 2006; Korat & Shamir, 2007; Lacina & Mathews, 2012; Larson, 2008; Moody, Justice, & Cabell, 2010). The digital techbooks were especially effective for my struggling readers. Using a digital techbook format allowed struggling readers to have independent access to science information, which made differentiating instruction simple. Students who normally struggle were able to keep the same pace as their classmates and did not need to be pulled aside for instruction and assistance.

Students appreciated the ease of navigation, search features and overall usability of the digital textbook when compared to a traditional paper textbook. Videos, simulations & embedded enhancements were all appealing to students (Grensing-Pophal, 2010; Weisberg, 2011). A typical response from students in this action research project was that the videos and science games embedded in the digital techbook helped build understanding of the topic.

Reflections

Being involved in this research project made me more aware and attentive to the effect my teaching practice had on my students. My students were excited and showed a sense of pride in assisting me in my studies. Everything that I asked my students to do was taken very seriously. Each question was carefully pondered and then answered using complete thoughts. Remarkably, out of all the 290 items answered, only one item was left blank.

The take-home message that jumped out to me when analyzing the data was that students enjoyed listening while the computer articulated the text. All the informational text embedded in the digital techbook could be read independently or the computer could read the text aloud in an e-book format. I expected my strong readers to prefer reading the passages independently because I assumed reading alone would be quicker. However, students reported having the informational text read made decoding difficult vocabulary words easier, thus increasing student understanding. The students' reflections make sense based on the dual-coding theory, which posits the representation of information uses both visual and verbal information in memory (Sternberg, 2003).

Another unexpected effect of using a techbook was that more girls favored using paper science textbooks, while more boys favored using digital science textbooks. Comparing attitudes towards digital textbooks among genders would be an interesting topic for future research, given the disparity of women in Science, Technology, Engineering, and Math (STEM) research.

Recommendations for Teachers

Much of the research on digital textbooks has been done at the undergraduate level. For college professors, I recommend experimenting with digital textbooks at the elementary level because researchers suggest (Grensing-Pophal, 2010; Sun & Flores, 2012; Weisberg, 2011) that students are more motivated to learn from digital textbooks. Very little research exists for the use of digital textbooks with elementary and secondary students because very few research studies have been implemented at this level. Discovery Education launched a new science Techbook program for elementary and middle school students in the 2011-2012 school year (Discovery Education, 2013). Since Discovery Education's techbook is a new program, little research has been conducted on its effectiveness. The students who participated in this study had only been

using the digital techbook for approximately seven months, so the data collected may reflect the novelty of the program, rather than scientific evidence of its effectiveness as an educational tool. If I were to conduct this study again, I would collect data over a longer period, possibly even several years, to gauge whether student attitudes and opinions towards digital techbooks change over time.

This action research project was conducted with students who were not randomly selected to participate in this study. The study is also limited in its scope because only one particular online techbook was used. Student opinions may change if a digital techbook were used to learn math, social studies, or other core curriculum.

Implications for Future Research

Given that digital textbooks are a new technology available to students and teachers, further research on the motivational benefits and effectiveness of digital textbooks as a learning tool is needed. I suspect that by making learning more enjoyable, digital textbooks will have long term influences on student involvement in education. Most current research with digital textbooks has been conducted with undergraduate students. Research with students of different backgrounds and age ranges, especially with elementary students, would be beneficial. More experimental studies should be conducted that compare two groups: one that reads a digital textbook for content information and one that reads a traditional textbook for the same content. Using pre-tests and post-tests, researchers could potentially explore whether digital techbooks affect students' learning by comparing results in the two classrooms. Studying how teachers perceive digital textbooks and their willingness to incorporate digital textbooks into the classroom would also be informative.

Final Thoughts

Digital techbooks are a powerful tool to interest, excite, and engage students in learning science. Even though students report finding paper science textbooks easy to use, students still find digital textbooks to be more fun with videos and games to increase science understanding. For schools looking to update science curriculum resources and trying to decide between purchasing a digital science techbook or new paper science textbooks, I would recommend going digital. With the evolution of today's e-readers and tablet computers, students now have the possibility to hold both a traditional textbook and a digital textbook in the palm of their hands. What separates digital techbooks from printed paper textbooks? You can hold a printed textbook in your hand, but you cannot make the book come to life.

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Appendix A: HSIRB Approval




Office of Graduate Education and Research
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Memorandum

TO: Auna Oman
Education Department

CC: Judy Puncochar
Education Department

FROM: Dr. Brian Cherry 
Assistant Provost/IRB Administrator

DATE: November 21, 2012

SUBJECT: IRB Proposal HS12-490
"Textbooks vs. Techbooks: Effects of Digital Textbooks vs. Paper
Textbooks on Elementary Student Learning"

Your proposal "Textbooks vs. Techbooks: Effects of Digital Textbooks vs. Paper Textbooks on Elementary Student Learning" has been approved under the administrative review process. Please include your proposal number (HS12-490) on all research materials and on any correspondence regarding this project.

Any changes or revisions to your approved research plan must be approved by the IRB prior to implementation.

ljc

Appendix B: Administration Permission

August 31, 2012

Dean Brian Cherry
Associate Provost and Dean of Graduate Studies
1401 Presque Isle Avenue
Marquette, MI 49855

Dear Dr. Cherry,

Auna Oman has permission to conduct research on “Textbooks vs. Techbooks: The Effectiveness of Digital Textbooks on Elementary Student Motivation for Learning ”in the St. Francis de Sales school system. The research will involve assessment of school-aged children’s learning, held during instructional hours, which is an integral part of the teaching for learning process. Auna Oman is a certified and/or licensed educational professional employed by the St. Francis de Sales school system and is conducting research on teaching methodologies and/or curricula within the classroom or school district where this activity is a normal part of assigned responsibilities. I approve of the research and collection of learning assessment data for the purposes of the research project.

Sincerely,

NAME, *Principal* DATE
St. Francis de Sales School

NAME, *Superintendent* DATE
Diocese of Marquette Catholic School District

NAME, *Principal* DATE
Father Marquette School

Appendix C: Parent Permission

Dear Parents:

I am writing to invite your child to participate in a research study I am conducting through Northern Michigan University. The purpose of the study is to find out whether digital textbooks motivate students to learn. I am inviting your child to be in this study because he/she will be using a digital textbook this year to learn science.

If you agree to allow your child to participate, I would like you to know that they will be asked to complete a couple of simple surveys. The surveys will take no longer than 30 minutes to complete. The questions will involve what motivates them to learn. If you would prefer that your child not participate, please indicate that at the bottom of this form.

I will keep the information they provide confidential; however, federal regulatory agencies and the Northern Michigan University Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. My thesis will be written in such a way that your child cannot be identified.

There are no known risks from being in this study, and your child will not benefit personally. However we hope that others may benefit in the future from what I learn as a result of this study.

There are not any costs for being in this research study nor will you, the parent, be paid for allowing your child to be in this research study. Taking part in this research study is completely voluntary. If you decide for your child to not take part in this study, your child will not be penalized or lose any benefits.

If you have any further questions regarding your child's rights as a participant in a research project you may contact Dr. Terry Seethof of the Human Subjects Research Review Committee of Northern Michigan University (906-227-2300) tseethof@nmu.edu. Any questions you have regarding the nature of this research project will be answered by the principal researcher who can be contacted as follows: Dr. Judith Puncochar (906-227-1366) jpuncoch@nmu.edu.

I have read the above "Informed Consent Statement." The nature, risks, demands, and benefits of the project have been explained to me. I understand that I may ask questions and that I am free to withdraw from the project at any time without incurring ill will or negative consequences. I also understand that this informed consent document will be kept separate from the data collected in this project to maintain anonymity (confidentiality). Access to this document is restricted to the principle investigators.

Check one of the following:

----- Yes, my child has my permission to participate in this research study.

----- Sorry, my child will not be participating in this research study.

Parent/Guardians' Signature

Date

Thank you very much for your consideration.

Sincerely,
Ms. Auna Oman

Appendix D: Questions

Part 1

My digital science techbook helps me understand science because

My paper science textbook helps me understand science because

Part 2

Finding science information with my digital science techbook is

Finding science information with my paper science textbook is

Part 3

Solving science problems with my digital science techbook is

Solving science problems with my paper science textbook is

Part 4

Learning science with a digital science techbook is

Learning science with a paper science textbook is

Part 5

Is learning science with a digital science techbook fun? Why?

Is learning science with a paper science textbook fun? Why?

Appendix E: Data

Name	Gender	Class	My digital science techbook helps me understand science because	Code_Q1
IS	M	4O	I like using computers and things like that	2
JK	M	4O	I don't like it	1
SB	M	4O	because it is easy to read	2
DL	M	4O	it tells me more and it helps me understand it that's why I like it	2
DN	M	4O	the games are fun a little and they taught me how frogs and all about that and I learned 20 things I did not know	2
LG	M	4O	you can watch vides that describe it to you	2
GC	M	4O	I love the e-books and the videos. The ebooks read to you so you don't need to read and the videos tell you about the topic and give a demonstration because they videotaped it.	2
CL	M	4O	I get to watch videos and use the e-book, even though I am good at reading	2
IN	F	4O	it helps me with the glossary with the definition	2
KG	F	4O	It's really easier to understand and it reads to you	2
MR	F	4O	it has lots of games and videos	2
DZ	F	4O	I enjoy watching videos. It helps me understand what I am learning.	2
SJ	F	4O	there is more videos to help me get it and learn more about what I'm working on so I know it without even thinking about it. The techbook is easier than the textbook for me and I love it.	2
CG	F	4O	We watch videos to make us understand. There's games to make us learn.	2
OB	F	4O	I love the videos and it makes me learn new things and the games and you learn things in the games and videos even when the person is reading to you.	2
MZ	F	4O	You get a chance to read by yourself and some of the games help you learn a lot and you get to have fun at the same time. Also it is hard to find.	2
IP	M	4M	Instead of flipping it might have all the pages on one. And it is a lot funner	2
JA	M	4M	There is not only one answer. You can search the entire web.	2
BL	M	4M	it would keep your desk neat and clean. You don't lose anything.	2
ED	M	4M	You because your backpack wouldn't be so heavy. You would get to learn how to type better that's what I think about the digital textbook.	2
CO	M	4M	instead of switching on and off from a science textbook to a computer, its just a computer	2
AN	M	4M	if you don't know what a word is you can look it up on google. Also you don't need a lot of books in your desk.	2
AB	F	4M	it's more fun than paper	2
RU	F	4M	Digital science textbooks are fun. Sometimes when you're having fun you pay more attention	2
NA	F	4M	it is on the computer and I can search something on the internet if I need help. I can also go on at home.	2
MA	F	4M	maybe you can look stuff up easy. It can help you with typing also. You can maybe play science games.	2
AL	F	4M	it would help me a little but if you need to study at home you can't unless you have internet but some people don't. If you get a bad grade, it's your fault.	1
LE	F	4M	it has more details and can fix lots of the problems and mistakes. Also it will normally give you the right answers.	1
AD	F	4M	it would help sometimes because it wouldn't always fully explain to you everything you don't understand.	1

Note: 4O=Digital Techbook Classroom 4M=Paper Science Textbook Classroom

Name	Gender	Class	My paper science textbook helps me understand science because	Code_Q2
IS	M	4O	I hated it	1
JK	M	4O	I don't like it at all	1
SB	M	4O	because it never helped me	1
DL	M	4O	it is harder because I have to read a lot	1
DN	M	4O	I learn like 10 things a day that I didn't know	2
LG	M	4O	it doesn't really help me because it doesn't describe when you don't get something	1
GC	M	4O	I have to write it down and if I need to study I can take my textbook along	2
CL	M	4O	it tells you stuff the boring way, but the good part is laughing at the pictures	1
IN	F	4O	it lets me read outloud to understand more	2
KG	F	4O	it tells a little more about little tricks to do a problem	2
MR	F	4O	we can read it together or out loud or to ourselves	2
DZ	F	4O	There are no games to distract me and I have a chance to read.	2
SJ	F	4O	it helps me with some things like knowing more about the environment and animals not how they live or anything	2
CG	F	4O	we study and we take practice tests to help us learn	2
OB	F	4O	so I can get some help on my paper if I don't get a question so I look in my book	2
MZ	F	4O	It is easier to read and to find things also there are no games and you usually get to read in front of your classmates	2
IP	M	4M	Not fun because you have to flip pages. And usually you rip science textbook when you flip	1
JA	M	4M	If I'm looking for one answer in a paper book there is only one answer	2
BL	M	4M	you can take it anywhere and the book won't crash or break down. It's a lot easier to look stuff up on your book.	2
ED	M	4M	You can study with your parents. You explain what you mean too.	2
CO	M	4M	You can look up things easier with a textbook because there is an index	2
AN	M	4M	It would be easy to understand. Also you can look it up in glossary and gazeteer. Also the print is a good size.	2
AB	F	4M	some people don't have wi-fi	1
RU	F	4M	It's very easy to look back in the book and study from that page. You also know that your book will always open.	2
NA	F	4M	I can flip through the pages and find something. I don't need to worry about the internet shutting down either.	2
MA	F	4M	It would be easy for me to look stuff up. Its easy to explain because it is right in front of you. It is easier to look up in the glossary.	2
AL	F	4M	It helps me understand science because you don't need a computer or internet and if you need to study at home you take the book home and study.	2
LE	F	4M	it has lots of answers of the scientific method and lots of stuff like that. They have great instructions too.	2
AD	F	4M	it helps me a lot because it explains more than a digital textbook.	2

Name	Gender	Class	Finding science information with my digital science techbook is	Code_Q3
IS	M	4O	easy and fun	2
JK	M	4O	hard to find stuff	1
SB	M	4O	easy and fun	2
DL	M	4O	easy because it is faster than a book. You type it in and it is there	2
DN	M	4O	easy the info is so easy because one station you learn like 30 things from one video or go up in a search bar	2
LG	M	4O	easy because theres and interactive glossary	2
GC	M	4O	easy because you clik a few buttons and your there	2
CL	M	4O	pretty fun I guess, but we are going to need new computers someday. They're freezing up a lot!	2
IN	F	4O	pretty easy because you just type in the search bar	2
KG	F	4O	like having help from someone	2
MR	F	4O	very easy and I love it a lot	2
DZ	F	4O	easy to look for stuff	2
SJ	F	4O	fun with all of the games, videos and the people who read it to me if I don't know a word or soemthign like that, and it helps me know it better	2
CG	F	4O	very easy, I love using it.	2
OB	F	4O	kind of hard. I like a partner to help me find it but its easier for me now	2
MZ	F	4O	difficult because there are tabs, readings, videos, and games. Also it is hard to find what is on there and some of the questions are hard.	1
IP	M	4M	Fun because it shows science images and its easier	2
JA	M	4M	harder because there is more than one answer	1
BL	M	4M	not fun because it can break down or some breaks it	1
ED	M	4M	Yes, because you get to go on the internet. You can look stuff up on google.	2
CO	M	4M	harder because some people don't have computers at their house	1
AN	M	4M	is hard because every page has to load	1
AB	F	4M	fun because I don't like the way paper feels	2
RU	F	4M	sometimes hard and sometimes easy. It's hard when your internet crashes. It's easy when you want to get it done quick.	1
NA	F	4M	not too fun. I have to worry about the power going out and might not have a computer at home.	1
MA	F	4M	It would maybe help you find stuff. It would be fun to do it with friends. You can play science games maybe.	2
AL	F	4M	would be harder because you would have to go through lots of things on the computer just to get on the website and it would take forever to get the information.	1
LE	F	4M	easy because we can just type in the page number and it will appear. Also you can look up something while saving the other page.	2
AD	F	4M	it would be hard because there are so many different answers on the internet and there are so many different web sites to look on.	1

Name	Gender	Class	Finding science information with my paper science textbook is	Code_Q4
IS	M	4O	hard and there are pages ripped out	1
JK	M	4O	easy to find stuff in it	2
SB	M	4O	hard and there are pages ripped out	1
DL	M	4O	hard because you have to look it up and it don't tell you all the information	1
DN	M	4O	A little more challenging because I try figuring it on my own first then ask someone then if they don't know, I go on the computer	1
LG	M	4O	harder because you have to look in there glossary and you have to look through letters to find it	1
GC	M	4O	not as easy because you have to flip through a bunch of pages to find the topic	1
CL	M	4O	Boring because the books are nice but outdated. Computers are holding more memory than 10 books	1
IN	F	4O	a little tricky but I just go to the table of contents	1
KG	F	4O	not really fun for me because I just don't like it because its just weird because you could look up information on your computer	1
MR	F	4O	very hard	1
DZ	F	4O	harder, you have to flip to the right page.	1
SJ	F	4O	fun and a little boring. We just sit around reading to our classmates stopping and writing stuff down and highlighting	1
CG	F	4O	hard I don't like it at all	1
OB	F	4O	easy because you just flip through the pages it is so easy but its kinda hard on digital textbook	2
MZ	F	4O	Easy piesy because you just have to turn pages and sometimes answer questions	2
IP	M	4M	not fun because you lose your page	1
JA	M	4M	easier because there is one answer	2
BL	M	4M	fun because it doesn't break down or someone spills on the computer it will but if you spill on a book it will get wet but it will still work	2
ED	M	4M	Is harder to look it up in your paper textbook because of the page numbers	1
CO	M	4M	easier because it is portable, and cheaper	2
AN	M	4M	is easy because every pages does not have to load	2
AB	F	4M	not fun because kids like digital items	1
RU	F	4M	Sometimes easy you can always look back in your book to find answers.	2
NA	F	4M	fun! I don't have to worry about the power going out or not having a computer at home!	1
MA	F	4M	You get your own book. Easier to look up stuff. Easier to explain things.	2
AL	F	4M	IT is easier because you just have to go on the lesson your on and you will find lots of infoermentation in a couple minutes.	2
LE	F	4M	harder than with digital textbooks because you can't type what you want and you have to flip through every page.	1
AD	F	4M	Is easier because you can look it up in the glossary	2

Name	Gender	Class	Solving science problems with my digital science techbook is	Code_Q5
IS	M	4O	easier and more fun, you learn more.	2
JK	M	4O	hard	1
SB	M	4O	easy because it is on the internet	2
DL	M	4O	easy and hard. Its easy if you know right where you are going, its hard when you don't know where you are going.	2
DN	M	4O	Really easy like the only sheet that stumped me was 2 then I figured that out so it was really easy	2
LG	M	4O	easier because you can just go back in a few clicks	2
GC	M	4O	isn't quite easy because you don't have it written down and in front of you. Plus you have to memorize it to figure out the answer	1
CL	M	4O	easy you just have to type it in real quick, unlike a book	2
IN	F	4O	easy because it trys to help you understand the question	2
KG	F	4O	really enjoying because its way easier than looking it up in your book	2
MR	F	4O	so easy	2
DZ	F	4O	easier than looking in a book.	2
SJ	F	4O	awesome because I like solving problems and it's easier with the videos. It helps me focus too.	2
CG	F	4O	is easy because we also have a partner to work with	2
OB	F	4O	easy for me it helps me on tests, quizzes, work, papers, even homework	2
MZ	F	4O	hard because some of them are very difficult to answer because I don't get them sometimes	1
IP	M	4M	Solving with a digital techbook is good. It's easier than flipping pages. It makes it less heavy. Also because usually gives hints. Its easier than just sitting on a chair, you could set on a chair.	2
JA	M	4M	solving science problems on a digital techbook is a lot harder because of glitches, and if you don't get good reception where you live. But it is easier to get to a page. And if you don't have a computer what will you use? If you use a phone, the screen is very small.	1
BL	M	4M	not fun because if your computer broke down or is in for repairs, you can't do your homework. Books don't break down or usually need repairs. Its good for your brain to just sit down and read a book	1
ED	M	4M	No, the paper textbook is better than the digital textbook. Because what if your internet crashes. The assignment was due the next day? What if you don't have a computer? Computers are very expensive. That's why I like the paper textbook better.	1
CO	M	4M	not fun because it is portable. Plus some people don't have computers so you couldn't do your work. And if power goes out or your internet crashes	1
AN	M	4M	is okay because the internet could crash. But it is easy to find pages you just have to type it in. For a paper textbook you have to flip the page. Also you can write things easy because it so much more easy to click a button than flipping a page.	1
AB	F	4M	ok because digital is always more fun but some people may not have internet or wi-fi. I would prefer digital over paper books	2
RU	F	4M	hard. What if you did not have internet? Maybe your internet crashed and you cannot do your work and your teacher expects it. A digital science textbook wouldn't be heavy to bring home.	1
NA	F	4M	not easy for me. It would be fun, but what if your computer had some problems. You could not do your homework. And then what if you didn't have a computer? I like the textbook better for me.	1
MA	F	4M	Is not fun because some people do not have a computer. Also when you are using it, it could shut down. It would be easier to look something up in a paper textbook. Some computers do not work that well so you can't get information and homework would be late.	1
AL	F	4M	would not be fun because your computer could freeze up and you would have to start the computer up again. Not everyone has internet at their house. It would be fun for a little while, but after awhile it would get boring.	1
LE	F	4M	fun because we don't have computer time. Also because using them is lighter than carrying around books. Plus they have better and cooler pictures. And its more fun to type than to write with pencils.	2
AD	F	4M	would be hard. Sometimes when you get home and you could find out that your wifi crashed or your computer is broke, then what happens? Maybe you don't have a computer then what would you do? I think it would be hard.	1

Name	Gender	Class	Solving science problems with my paper science textbook is	Code_Q6
IS	M	4O	a waste of time	1
JK	M	4O	really easy to me	2
SB	M	4O	hard for me because I have to read it	1
DL	M	4O	easy, all you do is find the page number	2
DN	M	4O	Now this is a lot harder because it is a lot of more question and answers and difficult is my thing.	1
LG	M	4O	harder because you have to look through pages and they don't have titles and you end up reading extra words	1
GC	M	4O	easy because it's written down in front of you	2
CL	M	4O	hard because your flipping through page after page not finding it	1
IN	F	4O	always easy if you have a teacher helping!	2
KG	F	4O	not really easy because then all you have to do is look through the page and all that	1
MR	F	4O	not so easy	1
DZ	F	4O	harder to use.	1
SJ	F	4O	a little hard because a lot of times I don't get it and stuff just seems hard for me	1
CG	F	4O	is hard, I don't understand	1
OB	F	4O	easy, you copy the stuff on it to your homework even your paper at school	2
MZ	F	4O	Easy because I can understand them better for some reason it is easy	2
IP	M	4M	Its harder because you have to flip pages. Also its heavy. Because it is heavy its usually hard to walk	1
JA	M	4M	Solving science problems with a paper textbook is harder to carry around. But fun to use. Mostly because books can not glitch like electronics. Books are a lot faster to use because they don't glitch. If someone doesn't have a computer at home, they could bring the book.	1
BL	M	4M	is fun because if your internet crashes or if you don't have a computer. A book doesn't crash or break down and if you have a lot of homework and look at the computer for a very long time, it hurts your eyes	1
ED	M	4M	The paper science textbook is easier to solve. Because they don't break. It doesn't spell things wrong. You don't forget to save an essay. I like the paper textbook better.	2
CO	M	4M	fun because it is not more portable. And you can go to your book for information. Plus it is more affordable and you can keep it in your desk.	2
AN	M	4M	is fun because you don't have to look at a computer also it crashes a lot. But its hard to bring heavy books home every day. You would not have a backpack if you had a digital textbook.	2
AB	F	4M	not fun but easier. But I don't like carrying my books all around, they are heavy. I don't like them.	1
RU	F	4M	pretty easy. You can always look back in the book without worrying if it will be there or not. Sometimes when you have an assignment you have to carry your book home, but you know you always have the book. Sometimes the book doesn't make sense so you have to re-read it.	2
NA	F	4M	easier for me to use. I like the computer, but paper and book is better in my opinion. I can take my book wherever and a computer isn't as easy for me. I like the textbook better for me.	2
MA	F	4M	It is fun to do it with a paper textbook because you have the book right in front of you. Its easier to look for stuff. Paper books are easier to turn pages and go to the glossary. Books are easier than computers because you can put a pretty book cover on it.	2
AL	F	4M	is fun because you don't need internet for a book. You can do your homework anywhere with a book. If you needed to take your homework home, then your books can't break, but a computer can. If we didn't have books, there would be no sense for a backpack.	2
LE	F	4M	boring because the pictures are old, worn out, and boring. And the book is super heavy and hard to lug around. Plus they can give horrible paper cuts. Also people can have to flip page after page.	1
AD	F	4M	is hard and fun. It would be fun because it is sometimes fun searching for things. It would also be fun because it is fun to look at the pictures. It would be hard because it would sometimes be hard to find things. I will say that it is kind of fun to use techbooks.	1

Name	Gender	Class	Learning science with a digital science techbook is	Code_Q7
IS	M	4O	quicker and easier	2
JK	M	4O	really hard	1
SB	M	4O	fun because you do not have to read it	2
DL	M	4O	easy because we get partners and ipads so it will make it better	2
DN	M	4O	it is pretty easy because it tells half the stuff on one video	2
LG	M	4O	fun because you get to watch videos and learn at the same time	2
GC	M	4O	easy because you just sit there while it teaches	2
CL	M	4O	easy because of things like the e-book and videos	2
IN	F	4O	easy because it helps you understand. When you watch a video, you learn	2
KG	F	4O	is simpler than looking through a textbook	2
MR	F	4O	a lots of fun	2
DZ	F	4O	sometimes fun and sometimes hard.	2
SJ	F	4O	easy and fun with games to see how long they live and where they live and what creatures they have what structure and behaviors	2
CG	F	4O	ok. Sometimes its easy, sometimes its hard	2
OB	F	4O	learning science is a big responsibility. Yes it is really important	2
MZ	F	4O	medium because it is usually a game or video and to me that is hard to understand	1
IP	M	4M	It makes your backpack less heavy. And it puts less weight to your backpack.	2
JA	M	4M	harder because you have to turn on your computer	2
BL	M	4M	not fun because it can break or get wrecked and it would be expensive to buy a computer again	1
ED	M	4M	Fun because you get to type	2
CO	M	4M	harder because the internet might crash and then you couldn't work.	1
AN	M	4M	is worst because internet could crash and the print is normally small	1
AB	F	4M	fun because books are heavy	2
RU	F	4M	hard because sometimes if internet crashes or you don't have internet. Sometimes your computer has glitches.	1
NA	F	4M	not fun. I might not have a computer at home. I also have to worry about the power/internet going out.	1
MA	F	4M	It would be fun to find stuff. It would be fun to do it with friends. You can play science games maybe.	2
AL	F	4M	would not be fun because if you need to study at home you can't.	2
LE	F	4M	fun and hard because they can shut down on you at any time. Its fun because they have very detailed pictures and lots of great facts and new information.	2
AD	F	4M	it is harder because it doesn't always explain and it has too many distractions	1

Name	Gender	Class	Learning science with a paper science textbook is	Code_Q8
IS	M	4O	really boring	1
JK	M	4O	really, really easy to me	2
SB	M	4O	not fun because I have to read it	1
DL	M	4O	hard because we don't get ipads and partners all the time	1
DN	M	4O	fun but one thing that really bugs me is your hand gets sore and on a computer it just click and you are done	2
LG	M	4O	boring because you have to read instead of watching videos	1
GC	M	4O	easy because you write it down for later in the future	2
CL	M	4O	not fun because it doesn't really help me that much	1
IN	F	4O	easy because if you don't understand a word, instead of having to remember how to get to the glossary, you can just go tot the back of the book	2
KG	F	4O	not that really fun. I think that techbook is a little simpler because you get to watch videos and play games and people read to you	1
MR	F	4O	a lot of hard work	2
DZ	F	4O	it is always not so easy.	2
SJ	F	4O	easy, a little hard, fun and a little boring. We just have to read outloud or stop and highlight and it is boring	1
CG	F	4O	hard I don't like the paper science textbooks	1
OB	F	4O	learning science with a paper. You do need paper because you need to answer	2
MZ	F	4O	Medium too it is just that I really think just reading is the best and no games or videos	2
IP	M	4M	Not fun it makes your backpack really heavy. It puts more weight.	1
JA	M	4M	easier because you can just flip to a page	2
BL	M	4M	fun because it won't break down. It is cheaper to buy a book than a computer.	2
ED	M	4M	fun because get to see pictures	2
CO	M	4M	easy because it cannot crash or get a virus	2
AN	M	4M	learning science because you don't need internet for it and some people don't have a computer	2
AB	F	4M	not fun because books are heavy	1
RU	F	4M	easy and hard. Sometimes its hard to pay attention,but its easy because you can always look back in your book.	2
NA	F	4M	Fun!! I can bring it home whenever I need to! I don't have to worry about power outs either.	2
MA	F	4M	You can have fun explaining it. For me it would be easier to look up stuff. You get your own book.	2
AL	F	4M	is fun because you can study at any time and if your on a trip you can take it with you and with a techbook you can't take it anywhere.	2
LE	F	4M	cool and easy because lots of people use them and they are great and stuffed with information.	2
AD	F	4M	it is easier because it explains more than a digital techbook would and it has less distractions.	2

Name	Gender	Class	Is learning science with a digital science techbook fun? Why?	Code_Q9
IS	M	4O	more easy than a book	2
JK	M	4O	No, because it is hard to find stuff	1
SB	M	4O	yes, because you can play games to learn	2
DL	M	4O	it is fun because you get to watch videos and learn more stuff	2
DN	M	4O	sorta because the one game was very fun, but station 7, 6, 2 all stumped me and only a bit, but overall it is pretty fun	2
LG	M	4O	Yes. It's fun because you play games and learn	2
GC	M	4O	yes it's very fun. It's fun because it can read to you and it's on a computer. Sometimes they have games to help understand also	2
CL	M	4O	yes because you get 101 training with the internet	2
IN	F	4O	it is fun because you can play games but learn while doing it	2
KG	F	4O	oh yes because you get to watch videos and play games	2
MR	F	4O	its fun because it is easy	2
DZ	F	4O	yes, because you are on a computer	2
SJ	F	4O	Yes it is fun because theres games to tell about how long does it live or where do it live	2
CG	F	4O	Yes, because sometimes you get to play games and watch cool videos	2
OB	F	4O	yes, because you have fun with my partner and helps me and I help him or her	2
MZ	F	4O	Yes - you get to do it by yourself sometimes. And you can get it done way, way, way, way faster	2
IP	M	4M	Yes because you are looking at the picture like when you play on an Ipad	2
JA	M	4M	yes it is because I enjoy technology	2
BL	M	4M	It would save a lot of room in your desk and you won't lose it.	2
ED	M	4M	You have to lift less in your backpack. It's faster to find an answer.	2
CO	M	4M	it is not fun because it is not portable. And if you drop it, it could shatter, plus it is more expensive.	1
AN	M	4M	yes I think its fun being on electronics, but sometimes some kids will mess around	2
AB	F	4M	yes because the books are heavy	2
RU	F	4M	Sometimes because its not that boring so you can pay better attention	2
NA	F	4M	No! I can not take the computer home. I might not have a computer. I can not take it wherever I want.	1
MA	F	4M	It might be easier to look up stuff. It would help with typing. It would be fun to look up science games.	2
AL	F	4M	No, it wouldn't be fun because you have to go all the way to the computer lab and all you would have to do with textbooks is take it out of your desk.	1
LE	F	4M	yes because we don't get to use computers a lot. Also I don't know what its like, but we have an idea. Also you get amazing pictures.	2
AD	F	4M	No, because it would be really hard to keep up with your teacher because there are so many distractions on a computer if you are a kid.	1

Name	Gender	Class	Is learning science with a paper science textbook fun? Why?	Code_Q10
IS	M	4O	it isn't	1
JK	M	4O	Yes, because it is really easy to find stuff in it	2
SB	M	4O	it is not fun because you have to read	1
DL	M	4O	it is fun because sometimes you get to have partners and learn cool stuff	2
DN	M	4O	yes, it is more challenging because everything on paper is challenging and I like challenging	2
LG	M	4O	No. It's not fun because there's not games to help you learn	1
GC	M	4O	This one isn't as fun. It's not as fun because there aren't videos, games, and when you don't understand a word or a sentence it doesn't read to you	1
CL	M	4O	NO!! Because it is outdated and books fall apart	1
IN	F	4O	it is fun because you get to try to find the page you want	2
KG	F	4O	no because you don't have as many games and videos	1
MR	F	4O	it isn't fun because its hard	1
DZ	F	4O	no, not all the time because it is just hard	1
SJ	F	4O	Not really because it's just highlighting and reading outloud	1
CG	F	4O	No, because sometimes you forget the stuff you need on your papers for a test	1
OB	F	4O	No because you need to look in your textbook and its hard	1
MZ	F	4O	No - you have to do it with the class	1
IP	M	4M	Its not fun because you rip paper when you flip pages	1
JA	M	4M	its not as fun because there is not as much pics and info and it only explains it one way	1
BL	M	4M	It's a lot easier to find stuff than a computer	1
ED	M	4M	Yes because you can get better at reading.	2
CO	M	4M	it is fun because it will not shatter if dropped.	2
AN	M	4M	It's fun because it has cool pictures. Also you can tell what they are doing cause on a lpad kids would mess around.	2
AB	F	4M	no because books are heavy	1
RU	F	4M	No, It can be boring sometimes when your teacher wants you to read the book by its self.	1
NA	F	4M	Yes! I can bring my textbook home and study when ever I want. I can take it where ever I want.	2
MA	F	4M	You get your own book. Easy to look up stuff. Easier to explain things for me with books.	2
AL	F	4M		
LE	F	4M	Yes and no. Yes because you get cool pictures and its really fun to look at other pages. No because its really heavy and lugging it around is really hard.	2
AD	F	4M	Yes, because there is a lot of cool pictures and for some people it is easier to read in a book.	2