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An iBook for Elementary Students: the Great Wall of China

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AN IBOOK FOR ELEMENTARY STUDENTS: THE GREAT WALL OF CHINA

CARRIE L. CARLSON

Submitted in partial fulfillment of the
requirements for the degree of
Master of Arts in Education

AUGSBURG COLLEGE
MINNEAPOLIS, MINNESOTA

2013

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MASTER OF ARTS IN EDUCATION
AUGSBURG COLLEGE
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CERTIFICATE OF APPROVAL

This is to certify that the **Leadership Application Project** of

CARRIE L. CARLSON

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ABSTRACT

AN IBOOK FOR ELEMENTARY STUDENTS: THE GREAT WALL OF CHINA

CARRIE L. CARLSON

2013

Leadership Application Project (EDC 585)

Digital texts may provide learners with a richer reading and learning experience as compared with traditional paper texts. Research suggests learners enjoy reading interactive texts and may spend more time with interactive materials. For my Leadership Application Project, I developed an interactive text for third grade students focused on the Great Wall of China and then tested it in several classrooms. I found that students showed a significant increase in content knowledge after using this book. In addition, they were engaging in learning and wanted to spend more time with the material, even when their assigned task was complete. This book will be used by third grade students in seven elementary schools in the Wayzata district and made available to other schools around the state of Minnesota that might also find this helpful in meeting the new social studies standards.

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Chapter 1: Introduction

Digital texts may provide learners with a richer reading and learning experience as compared with traditional paper texts. Research suggests learners enjoy reading interactive texts and may spend more time with interactive materials. For my Leadership Application Project, I developed an interactive text for third grade students focused on the Great Wall of China and then tested it in several classrooms. I found that students showed a significant increase in content knowledge after using this book. In addition, they were engaged in learning and wanted to spend more time with the material, even when their assigned task was complete.

In this introduction I will discuss the increased use of digital text and mobile digital devices in schools, the way in which learning and learners are different in the 21st Century, and the increasing push for personalized learning. As a result you will begin to see why I chose a digital platform for my project. Then, in the literature review, I will discuss the research that points to some of the possible advantages of using digital text rather than traditional paper textbooks.

Digital Text and Mobile Digital Devices in Schools

Digital texts are rapidly becoming the norm in school districts across the country. Some states, such as California, Virginia, and Florida, are creating their own digital textbooks, which schools can download at no cost. New high schools in Arizona and Louisiana have embraced digital curriculum and eschewed paper textbooks altogether. Even major educational publishers like Pearson are offering digital copies of their standard texts (Schachter, 2009). School districts seem

reluctant to continue to spend money on expensive paper texts that are quickly outdated and are instead strongly encouraging teachers to develop online resources and digital materials.

Along with the move away from paper textbooks there has been an exponential increase in the number of districts pushing mobile digital devices into the hands of their students. In Minnesota we have seen districts like Hopkins, Lakeville, Minnetonka, and Wayzata, among others all adopt some sort of one-to-one strategy involving devices such as netbooks and iPads. Districts are also quickly looking for ways to incorporate the student's own devices (such as smartphones) as learning tools rather than distractors.

21st Century Learning and Learners

Students need different skills to be literate in the 21st Century. Essential skills include problem solving, communication, teamwork, technology use, and innovation (Trilling & Fadel, 2009). The International Reading Association (IRA, 2009) has stated that current literacy programs must include information and communication technologies (ICTs). The Organization for Economic Co-operation and Development (OECD) also acknowledges the need for the inclusion of digital technologies in education in order for students to face 21st Century challenges (O'Mara & Laidlaw, 2011).

Digital natives (children born since 1990) interact differently with the world around them, and there is often a large gap between their digital interactions at home and those at school (Schwahn & McGarvey, 2011). Digital natives have always had technology as a part of their lives and they have not had

to relearn anything. They expect interaction rather than one-way communication. They create information as well as consume it. Teachers are no longer the experts and the keepers of information.

This vignette of the student, Joe, trying to interact with his traditional paper textbook as if it were a digital hyper-linked text, illustrates the case in point: http://youtu.be/6s5iISaVGrk

Joe taps at various parts of the book (text, headings, and pictures) expecting them to open a new page with additional information. He expects links to definitions, videos, and additional articles. He wants to adjust the size of the text to suit his preference and expand pictures to see more details. He cannot understand why his paper textbook does not work this way when everything else he interacts with does!

Personalized Learning

In the Wayzata School District, the initiative that includes iPads for students is called MyWay. "At the core, the goal of MyWay is to provide a world-class and personalized student learning experience" (Wayzata, 2012). As a teacher in the district, I am constantly reminded that this initiative is not about iPads. It is about creating a personalized learning environment that fits the needs of each of our students. Enhanced digital text is one tool that allows for the individualization of the learning experience. Users can proceed through the material in a variety of ways, making meaning from the text in the modalities that suit them the best. Students can click on videos, define words, and link to related material.

I created a project that allows students to use the advanced features of digital text to learn about The Great Wall of China in a personalized way. It has the potential to be used not only across all of the seven elementary schools in the Wayzata School District, but also by third grade students across the state of Minnesota and in other states where ancient civilizations are studied. Now let's take a closer look at what the research has to say about the advantages of digital text.

Chapter 2: Literature Review

E-Books have been available for more than two decades, but researchers have only recently begun to evaluate the quality, benefits, and possibilities of this form of reading (Shamir & Korat, 2006). These books have evolved from printed text, which traditionally include text and illustrations, but also include multi-modal features such as video, audio, and hyperlinks, as well as interactive tools. When readers can highlight, include notes, change the text size, etc. it invites them to interact with the text in ways which were not possible with traditional printed text (Larson, 2009). Although these books can be delivered by a variety of mechanisms, today they are most commonly used on portable digital reading devices, such as the Amazon Kindle, Sony Reader, Barnes & Noble Nook, and Apple iPad (Larson, 2010).

In this literature review I will discuss the rapid revolution of digital text from three points of view. First, I will examine the broad topic of the changes in the way in which information is conveyed and how those changes impact the next generation of learners. In other words, how is "going digital" changing the learning environment? Next, I will look at the changing view of literacy in the 21st Century. What is literacy in this new digital world? What skills define literacy for the next generation of learners? Finally, I will look specifically at enhanced digital text. Does it increase learning? How so? Are there specific features that make some texts better than others? The answers to these questions are essential to teachers and curriculum writers as they spend countless hours creating new digital learning materials for this next generation of learners.

Going Digital

Throughout history there have been many conveyances of information. Oral story telling, the alphabet, and written language have been with us for a long time. "The telephone, the fax machine, the calculator, and, ultimately, the computer are only the latest innovations devised for saving, manipulating, and communicating knowledge" (Gleick, 2011, p. 11). The digital impact, however, has been that the amount of information available is increasing at breakneck speed. Eric Schmidt, former CEO of Google said, "Every two days now we create as much information as we did from the dawn of civilization up until 2003" (Siegler, 2010, p. 1). That is an overwhelming amount of information, which Gleick describes as a "flood" (Gleick, 2011). Given this "flood," Gleick says that one life skill people need to develop is how to properly use a search engine (Chattopadhyay, 2011).

The way information is conveyed has fundamentally changed as a result of the digital revolution. For example, it used to be that writers needed to choose whether their coverage of a topic would be wide (lots of topics, a little about each) such as an animal encyclopedia, or deep (one or two topics, lots of details) such as a book about cats. Now readers and authors can flow easily from one to the other (Negroponte, 1995). Multimedia and hyperlinks make it easy to flow from one to the other. A student reading my book about the Great Wall of China can tap on a photo to see more detail, tap on a word to find the definition, or tap on a link to go to a web site with more information. Rather than having information pushed at

them in a particular format, students can now choose to pull at the bits that really interest them, in the format that helps them learn the most (Negroponte, 1995).

There also has been a massive shift from broadcast to interactive media as illustrated in Figure 1 (Tapscott, 1998). The new generation of learners expects to be users, not just viewers or listeners. They rarely spend time watching television, but instead have shifted that time to use of the Internet where they can actively engage with, rather than passively receive, information (Tapscott, 1998). One author claims this change accelerates child development. "When children control their media, rather than passively observe, they develop faster" (Tapscott, 1998, p. 7). Digital media offers the promise of a new model of learning based on discovery and participation. New curricula need to take advantage of this opportunity. Research shows that use of technology when properly integrated improves student performance as well as motivation, collaboration, and communication skills (Tapscott, 1998). "We are at a crossroads of traditional print literacy and multimodal literacy with the rapid transition from print to digital texts" (O'Brien & Voss, 2011, p. 75).

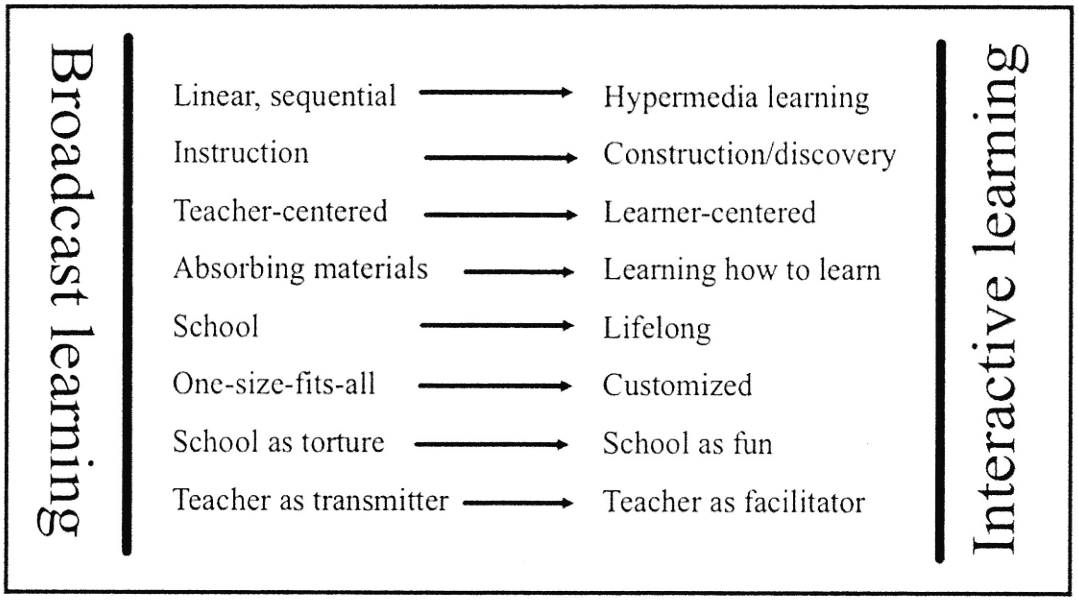

Figure 1. The shift from broadcast to interactive learning. Reprinted from *Growing Up Digital* (p. 143), by D. Tapscott, 1998, New York, N.Y.: McGraw-Hill. Copyright 1998 by The McGraw Hill Companies, Inc. Reprinted with permission.

Literacy in the 21st Century

It may be the case that traditional definitions of reading, writing, and communication are inadequate in today's world of interconnected communication technologies. Expanded definitions of reading and writing must, according to the International Reading Association, include skills in the areas of locating and evaluating information, as well as techniques for constructing new ideas and communicating them clearly in a networked environment such as the Internet. If we continue to define reading solely around book technologies, we will shortchange our students (IRA, 2009).

Not only has the definition of literacy changed, but the term "text" is now understood to mean any form of tangible communication that conveys information such as language, images, graphics, sound, and interactivity (Hobbs,

2011). Written text is only one part of literacy, and no longer the dominant part. The new multimodal texts require different conceptualizations and a different way of thinking. The reader uses more senses (sight, hearing, tactile, kinesthetic) when engaging with this new type of text (Walsh, 2006). One cannot assume that the skills required to comprehend traditional print text will automatically transfer to this media-rich multimodal environment. The increasingly ubiquitous nature of digital text requires educators to arm students with the skills needed to become fully literate in the 21st Century (Anderson-Inman, 2009). In fact, the Knight Commission's report *Informing Communities: Sustaining Democracy in the Digital Age* made some very specific recommendations regarding this. "Recommendation 6: Integrate digital and media literacy as critical elements for education at *all* levels . . ." [emphasis added] (Hobbs, 2011, p.15). Teachers, even at the elementary level, owe it to their students to use high-quality digital materials wherever they can in the curriculum to build these necessary digital literacy skills. "Integrating e-books into an otherwise traditional literacy program is an effective move toward new literacies instruction" (Larson, 2009, p. 256).

Digital text has several features, each of which bring affordances (a positive enabling) to the reading/learning process. Anderson-Inman (2009) has outlined them as follows:

- *Modifiable.* Unlike printed text, digital text is not static. It can be easily changed in appearance, as well as extended, altered, and deleted. New text can be inserted into old, potentially blurring the distinction between reader and author. The ability to modify digital

text has resulted in its widespread adoption as a tool for writing – allowing writers to produce, revise, and refine documents using tools that produce professional quality products. The modifiability of digital text also means it can be customized for individual learner preferences and needs.

- *Enhanceable.* The capacity of digital text to be enhanced with various types of media is fundamental to the popularity of digital books, as well as the World Wide Web. Unlike print media, where the inclusion of images is expensive, it does not cost more to produce and disseminate digital materials laden with images, than it does to produce and disseminate materials that are image free. Further, there is a greater variety of media that can be embedded into digital texts, resulting in multimedia documents that are both visually and aurally dynamic.
- *Programmable.* Digital text can also be programmed to act in certain ways under specific conditions. For example, computer routines embedded in digital text can direct readers to specific text passages in response to their answers on quizzes or instructional prompts. This makes digital text feel responsive to individual input and an ally in the reading and learning process. Programming can also be used to modify the structure and readability of a text based on the accuracy or elapsed time of responses to text-based questions.

- *Linkable.* Because digital text documents "reside" on computers and servers instead of on paper, they can be easily linked to other documents on the same computer or to documents on the other side of the planet. Indeed, the links within, between, and among documents can be so fluid and accessed so effortlessly that there is little to indicate their separate identities or geographic dispersion. The capacity for digital texts to be linked to other digital texts supports the convergence of information across boundaries and our ability to make conceptual connections that otherwise might not be possible.
- *Searchable.* Today's learners are familiar with searching the web for information using key words or specific search strategies. It is the character recognition capacity of digital text that supports searches across web sites using an Internet browser. The same capacity can be employed to support searches within a web site, as well as within and across documents on a hard drive. Searching digital text can speed up the process of locating text-based information within documents, as well as captions and tags on images and videos shared worldwide.
- *Collapsible.* Because digital text is not permanent, it can be hidden from view until needed. We referred to this feature of digital text as ''collapsible'' because it is frequently used in electronic outlining software where the text of subheadings appears to

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collapse under the text of headings. However, the same hidden nature of digital is used to hide the text in pull down menus and mouse-over pop-ups.

- *Collaborative.* The collaborative potential of digital text has had a profound impact on communications such as online chat, instant messaging, threaded discussions, blogs, wikis, and social networking. Tools that enable multiple individuals to contribute to or comment on a document, either synchronously or asynchronously, are now commonplace. Together they have produced on online environment that is collectively more than the sum of its parts, and one that fosters instant and widespread sharing. (p. 124)

Digital texts that capitalize on these features permeate our daily lives and thus should perhaps become a part of any meaningful school curriculum.

Enhanced Digital Text and Learning

Over the last 25 years, several studies have attempted to assess student learning using digital text. Some studies focus specifically on the differences in comprehension for students who read text in traditional paper books versus those who read digital texts (Gambrell, Bradley, & McLaughlin, 1987 and Jeong, 2010). Other studies turn their focus on digital enhancements such as animation and audio (Matthew, 1997, Koroghlanian and Klein, 2004, Verhallen, Bus, & de Jong, 2006, and Dalacosta, Kamariotaki-Paparrigopoulou, Palyvos, & Spyrellis, 2009). All of the researchers reviewed here attempted to measure the effects on

comprehension and learning, but they went about it in a variety of different ways. Although the results were mixed, most studies support the idea that digital text has a positive impact on comprehension.

Traditional print versus digital text. In 1987, Gambrell et al. measured the comprehension and recall of information presented to students in either a traditional text format or computer displayed text. They selected 62 third and fifth grade students from one public school in a county near Washington, D.C. All subjects were described as having extensive experience with computer-assisted learning, based on the programs used at this school, although the researchers did not define "extensive."

In this study, students had to read appropriate informational text on either the computer or in the textbook. After each student finished, the researchers measured comprehension in two ways: free recall (students were asked to retell the information as if they were telling a friend who had not read it) and cued recall (students completed an eight question test which contained both literal and inferential questions). In addition, the students were asked to complete a survey that used a Likert scale to measure the students perceived interest in and difficulty of the text.

No statistically significant difference was found between the two conditions for either grade. On the survey, a greater percentage of students rated the printed text as easy to read than rated the computer text as easy. However, a greater percentage of students liked and enjoyed reading the computer text. This

finding surprised the researchers, given that computer use was not a novel experience for these students.

This study was particularly significant in its time due to the fact that computers were beginning to have much wider use and acceptance in schools, and a greater number of programs were being developed which required extended reading on the computer screen. The finding that reading text from a screen had no adverse impact on comprehension was important. The results of this study suggested that it was indeed "feasible to have elementary students as young as eight years of age read continuous prose materials presented on the computer screen." (Gambrell et al., p. 162). In addition, the researchers speculated (based on the attitude survey) that computer learning might be a positive motivational factor for students, even when they have extensive prior computer experience.

Although the results of the study are interesting, they are difficult to generalize to all school children of this age. The sample size was small, only 62 children, and all students were from only one school. The researchers imply that extensive prior experience was important because it shows that novelty is not a significant factor, but they do not define extensive experience. For all we know, that experience was a math game, completely unrelated to reading text online. In addition, it may be that the experience these students had was indeed a factor in the results. Perhaps students with less experience would in fact not perform as well on the tasks.

Twenty-three years later, Jeong (2010) conducted a similar study in Korea. In addition to comprehension and students' perception (akin to attitude in the

previous study), Jeong measured eye fatigue in order to determine if fatigue was greater when reading an e-book. Fifty-six public school students (ages 10-12) participated in this study, but the researcher gives no indication as to how or why these students were selected. All had at least one personal computer at home (shared with a brother or sister), all had multiple e-mail accounts, 85 percent used e-mail at least once a week, and 80 percent had mobile phones and texted with friends and/or family. All students had 20/20 Visual Acuity with corrective lenses. Although the published date of the study was 2010, the data was collected in the spring of 2008.

Five award-winning children's stories, unfamiliar to the students, were selected as the reading material for this study. Similar copies were prepared for the text (p-book) and digital (e-book) versions. Text size, font, words per page, etc. were controlled. Two reading teachers developed the quizzes for each story, based on answers that could be found in the text (literal comprehension). Three other teachers reviewed the quizzes for content validity. A pretest was conducted to ensure that each of the five quizzes had an equal level of difficulty. The feedback questionnaire focused on three variables: satisfaction, usefulness, and behavioral intention. The questionnaire items were adapted from several previous studies related to e-books.

All participants took part in both the p-book (first) and e-book experiments (one week later). Students randomly selected two from the five books for each experiment, but were not allowed to select the same book twice. Participants' eye fatigue was measured using critical flicker/fusion frequency

(CFF) threshold before and after reading. Then, students answered the comprehension quizzes for the two stories read that day. Finally, after the e-book experiment during the second week, participants completed the e-book questionnaire.

Quiz results were compiled and the mean and standard deviation were computed for the p-books and the e-books. A one-way analysis of variance was computed and the results revealed that p-books appear to enable better reading comprehension. Eye fatigue ratings were also subjected to a one-way analysis of variance and the increase in fatigue experienced during e-book reading was found to be statistically significant. Finally, a Cronbach's alpha was computed for the questionnaire, and the inter-item reliability was determined to be 0.80. The researchers reported the percentages for each question at each point in the five-point scale, but then also computed a mean for each of the three variables. They concluded that although students were generally satisfied with the e-reader and found it useful, they would not choose it over a paper book in the future.

Although the results of this study are interesting, the methodology raises several questions. First, it seems that in order to counterbalance novelty, fatigue, and any number of other factors, half of the students should have read the e-book first, rather than all students reading the p-book first and then the e-book one week later. Second, although the researchers seem to be interested in e-book technology, they used a computer monitor (which by design is backlit and rather hard on the eyes) rather than a portable e-reader, such as the Amazon Kindle (which uses electronic paper technology), as the comparison to paper books.

While it is likely that this technology was not available in Korea at the time the data was collected, it certainly was by the time the study was published, and thus warranted attention in the discussion/conclusion sections.

Finally, the questionnaire used to measure satisfaction, usefulness, and behavioral intention was a five-point Likert scale, which allowed the respondents to essentially "sit on the fence" by selecting the middle response. In every question, more than 30% of the participants chose that option. In addition, the researcher incorrectly calculated a mean for each response, which has no meaning because the data is ordinal, not interval. It would have been more meaningful if the researchers had said, for example, that 26% of respondents indicated that they agreed or strongly agreed with statements that indicate their intention to increase their use of e-books, and that 45% of the participants, neither agreed nor disagreed with those statements.

Traditional storybooks versus animated storybooks. In 1997, Matthew investigated the difference in reading comprehension for traditional print storybook readers and CD-ROM storybook readers. Seventy-four third grade students were selected and placed in matched pairs based on gender and reading-comprehension level. One student from each pair was randomly assigned to the experimental or control condition.

Students worked in groups of four, with the researcher, for approximately one hour each week for four weeks. All students read three third-grade level books, which were available in both print and CD-ROM format. All students

answered open-ended questions and did a story retelling to measure comprehension.

The retelling in this study was similar to free recall in Gambrell et al.'s study, where students were asked to retell the information as if they were telling a friend who had not read it.

No statistically significant difference was found between the experimental and control groups on the open-ended questions. However, when comprehension was measured by story retellings, a statistically significant difference was found between the two groups, with the CD-ROM group performing better.

Matthew also conducted a second study, using four similar but unfamiliar books, to compare the same students reading both CD-ROM and text. Thirty students who read printed text in the first study were selected to now read from the CD-ROM. Procedures were the same as in the first study, however this time only story retellings were used to measure comprehension. As before, a statistically significant difference was found between the print retellings and the CD-ROM retellings. The CD-ROM group again performed better on the retelling task.

Matthew admits this study has limitations. Only a small number of stories were assessed (although admittedly more than in many other studies) and the researcher was only able to work with students for a short amount of time. The students in the second study had all read the printed text first, thus the study was not counter-balanced. This is the same problem that Jeong experienced. The researcher does not indicate whether prior knowledge of the stories was assessed,

nor did he control for the fact that the CD-ROM in some cases read the story to the student, whereas the print students did not have that option. These factors would need to be controlled in order to have more definitive results.

Interactive books on CD-ROM exploded onto the market in the late 1990's and have been followed by similar storybook web sites and apps. These storybooks provide a multisensory learning experience that allows students to interact with text and illustrations. Students can control the pace and flow of the story, actively processing the text as they go. They are able to build a personal experience in the story, which was reflected in their retellings.

Verhallen et al. (2006) also studied the effects of multimedia storybooks. However, rather than using print text, they compared computer-based stories with static pictures to computer-based stories with animated pictures and multimedia features such as video, sounds, and music. They wanted to see if the multimedia stories could help at-risk kindergarteners with their narrative comprehension and language skills.

Subjects for this study were recruited from 33 kindergarten classrooms in seven different inner-city schools in The Hague, Netherlands. Sixty students participated in the study. All were from immigrant families, spoke Dutch as a second language, and were deemed at risk for school failure according to government guidelines. All participants were of normal intelligence and were not familiar with the stories used in the study.

Children were randomly assigned to conditions that varied by media type (static pictures vs. animation) and number of presentations (1 vs. 4). The control

groups had either no treatment or played a computer game. Students all began with a retelling designed to measure the children's level of text comprehension. In all cases, the story was read aloud by the computer with the same voice. Children then were post-tested by retelling the stories. Expression vocabulary and syntax were also pre and post-tested.

The pattern of results was consistent with the researchers expectations that story comprehension improved in all experimental conditions but more in the multimedia than in the static conditions and more with repetition. The scores after four encounters with the multimedia condition were significantly higher than the static condition. In particular, the multimedia condition had a positive effect on the recall of implied story elements, which are typically harder for children to discern.

Limitations of this study include the use of only one book, the fact that computer reading is not equal to an adult reading aloud, and that home viewing may differ greatly from school use. In addition, the population tested was deemed at risk and had limited Dutch language. These results cannot be generalized to Dutch speaking natives.

None-the-less, this research was well planned and designed to control for a number of factors, which could have impacted the outcome. Independent coders, blind to the experimental condition, coded the children's responses from the videotape of the session. Inter-rater reliability and alpha reliabilities were satisfactory. In this study, the use of multimedia clearly improved students

reading comprehension and language acquisition. It provides strong support for the use of multimedia in early elementary education.

Audio and animation in science education. Koroghlanian and Klein (2004) designed a study to measure the effects of audio and animation in a multimedia science program on the achievement of the students, attitude about the activity, and time spent in the program. They also measured the spatial ability of the students and correlated it with their results.

One hundred nine students from an urban high school biology course participated in this study. They were blocked by spatial ability and randomly assigned to one of four treatments (Text-Static Illustration, Audio-Static Illustration, Text-Animation, Audio-Animation). The computer-based instruction (CBI) program used in this study was developed by the researcher in conjunction with the teacher, a biology textbook, and a biology website (used with permission), which supplied the animations. All four versions contained the same illustrations (static or animated) and the same information (full-screen text or audio with lean text), along with the same activities, practice items, and reviews. Students were allowed to repeat information as much as they wanted.

Three measurements were used in this study: an attitude survey, practice item results, and posttest scores. The time that students spent on each treatment was also recorded. The study found no effect on posttest scores for illustration or text type. However, there was a difference between the Low and High Spatial Ability groups. It appears that while inclusion of animation or audio was neither beneficial nor detrimental for participants with Low Spatial Ability, students with

High Spatial Ability did better with static illustrations. Attitude surveys indicated that students found the information interesting, worked hard to understand it, and that the animated pictures helped them understand the concepts. Students using the animated program spent significantly more time in the program that those with static pictures.

The results of the study do not support the idea that students benefit greatly from animation and audio. However, they do show that students prefer multimedia and spend more time learning the material when it is presented in this way. Unfortunately, the researchers used a means calculation when discussing the results of the attitude survey, which is an incorrect calculation to make on ordinal data such as this. The results should have been presented as a percentage for each response in order to see where the students truly sat on the scale.

In 2009, Dalacosta et al. designed a study to determine if animated cartoons could help 5th grade students better understand the concepts of mass, volume, and density as presented in the science curriculum.

For this study, 179 children were selected from eighteen schools in the Athens, Greece metropolitan area. They represented a variety of intellectual abilities, economic status, and gender. All students were in fifth-grade with a mean age of eleven years.

Two groups were used in this study. The first group received classic teacher-led instruction, which included a theoretical explanation of the concepts, examples in the textbook, and student inquiry/response. The second group used

only the animated cartoons multimedia program. Both groups completed the same questionnaire at the end of the lesson.

The results showed the animated cartoons to be superior to the conventional instructional method. Students' correct answers reached 80.3% in the case with the cartoons application and 61.3% in the classic method. The Mann-Whitney U Test was performed and statistically significant differences between the groups were found for every test question but one. The study supports the use of multimedia for learning difficult science concepts for fifth-grade students.

In addition to these specific studies, a recent research synthesis showed that small to moderate comprehension gains are afforded with the use of e-books (Zucker, Moody & McKenna, 2009). Studies selected for this review were conducted from 1997-2007 and included only pre-K to grade 5 students. They defined an e-book as electronic text that had an oral reading option (text-to-speech) and at least one other hypermedia feature (i.e., imbedded images, sound, video, animation, and such). Included in the many studies they reviewed were two of particular interest. One concluded that second grade students showed better comprehension with a simple e-book vs. printed text (Doty, Poppelwell, & Byers, 2001) and the other determined that fifth grade students benefited from an e-book with hyperlinks vs. plain text or teacher lectures. Students showed the most gain in concept association questions (Rehbein, Hinostroza, Ripoll, & Alister, 2002). Overall, they also cautioned e-book authors about the use of "animated hot-spots" unrelated to the text (i.e. a character in a story that waves

when clicked). These types of "hot-spots" decreased comprehension whereas meaningful "hot-spots" that are related to the content of the text were shown to be beneficial to readers.

Finally, in 2010, Larson conducted a case study in which she observed the integration of new literacy skills by second grade students using a digital reading device (Kindle). She found that use of these devices promoted new literacy practices and extended the connections between readers and text. In particular she noted that the use of electronic tools to adjust the text, highlight, and make notes put the reader in control. The students also made use of the dictionary and text-to-speech features. Reading on the Kindle increased the girls' confidence and their motivation to read. In addition, the teacher noted that by carefully examining the students' responses (notes in the text) she was better able to modify future assignments to the girls' specific needs.

Summary of results. These studies support the idea that students enjoy working with computers, find animations helpful to learning, and spend more time working on material that is interactive. Comprehension tests showed mixed results, which are summarized in Table 1. Three studies showed that enhanced digital text was better than traditional paper textbooks or storybooks. Two studies showed no difference and only one study showed that paper books were better.

Primary Researcher *Topic*	**Comprehension Results**	**Survey Results**
Gambrell *Informational text on paper vs. on a computer*	No difference	Subjects liked and enjoyed using the computer.
Jeong *Paper text vs. computer text*	Paper was better	Subjects found the computer satisfying and useful but would not

		choose it over a paper book.
Matthew *Print storybook vs. multimedia storybook*	No difference on open-ended questions Multimedia was better for retelling	N/A
Verhallen *Computer text vs. multimedia text with audio, animations, and music*	Multimedia was better	N/A
Koroghlanian *Computer text vs. multimedia text with audio and animation*	No difference	Subjects liked the multimedia better, found it more interesting, said that they worked harder on it, and spent more time in the program.
Dalacosta *Teacher led instruction vs. computed based animated instruction*	Animated instruction was better	N/A

Table 1. A summary of the studies reviewed.

Although the results are mixed, it is quite clear that those studies in which multimedia technologies were used had better comprehension results and were better liked by the students.

The Future of Enhanced Digital Text

Digital text and multimedia programs are here to stay. Schools are adopting digital devices at a rapid rate, and students are demanding interactive content. As technology rapidly evolves, research will need to continue to determine which digital components are most conducive to better learning and comprehension. In the near future it will be possible to create better learning materials that provide content in a variety of modalities. Students could then choose to have the material presented in the style that best meets their learning needs. Enhanced digital text and multimedia have the potential to help teachers

create truly individual learning environments customized for each individual child.

There are many reasons that researchers believe enhanced digital text reinforces learning, but the most compelling is the supportive resources that digital text provides to make the process of reading a specific text easier or more educational. These supports were originally described and revised by Anderson-Inman and Horney (1998, 1999, 2004, and 2007) and have since been adopted as the conceptual framework for the National Center for Supported eText (NCSeT). These are fully outlined in Table 2. When creating the iBook about the Great Wall of China, I tried to incorporate as many of these supportive features as possible.

Resource Type	Description	Examples
Presentational	Enables the text and accompanying graphics to be presented in varying ways, hence customizable to meet the needs of individual readers	Font size and style, text and background color, line and page length, page layout and juxtaposition with other pages, graphics in relationship to text
Navigational	Provides tools that allow the reader to move within a document or between documents	Within-document links, across-document links, embedded menus, links from other resources such as Table of Contents, Glossary, Bibliography
Translational	Provides a one-to-one equivalent or simplified version that is more accessible or familiar to the reader. May focus on a word, phrase, paragraph, picture, or whole document. Translation may or may not be of the same modality or media.	Synonyms, definitions, digitized or synthesized text-to-speech, alternate language equivalents (Spanish), video of ASL translation, text descriptions for images, captions for video
Explanatory	Provides information that seeks to clarify the what, where, how, or why of some concept, object, process, or event.	Clarifications, interpretations, or descriptions that point to causes, operations, components, mechanisms, parts, methods, procedures, context or consequences; list of influencing factors

Illustrative	Provides a visual representation or example of something in the text. Designed to support, supplement or extend comprehension of the text through illustrations or examples.	Drawings, photos, simulations, video, photos, reenactments, sounds, music, information that something is representative of its type (".... is a typical example of...")
Summarizing	Provides a summarized or condensed way of viewing some feature of the document.	Table of contents, concept map, list of key ideas, chronology, timeline, cast of characters, abstract
Enrichment	Provides supplementary information that is not strictly needed to comprehend the text, but adds to the readers' appreciation or understanding of its importance or historical context	Background information, publication history, biography of the author, footnotes, bibliography, influence on other writers
Instructional	Provides prompts, questions, strategies or instruction designed to teach some aspect of the text or how to read and interpret the text	Tutorials, self-monitoring comprehension questions, annotations, instructional prompts, study guides, embedded study strategies, online mentoring, tips for effective reading
Notational	Provides tools for marking or taking notes on the text to enable later retrieval for purposes of studying or completing assignments.	Electronic highlighting, bookmarking, post-its, margin notes, outlining, drawing. Ways to gather and group these notes for post-reading review.
Collaborative	Provides tools for working or sharing with other readers, the author, or some other audience.	Threaded discussion, online chat, email links, podcasts, blogs
Evaluative	Provides materials, prompts, and assignments designed to assess student learning from the text.	Questions, quizzes, tests, surveys, online interviews, assignments leading to products

Table 2. NCSeT typology of etext supports. Reprinted from Anderson-Inman, L. & Horney, M.A. (2007). Supported eText: Assistive technology through text transformations. *Reading Research Quarterly, 42*(1), 153-160.

Chapter 3: Product

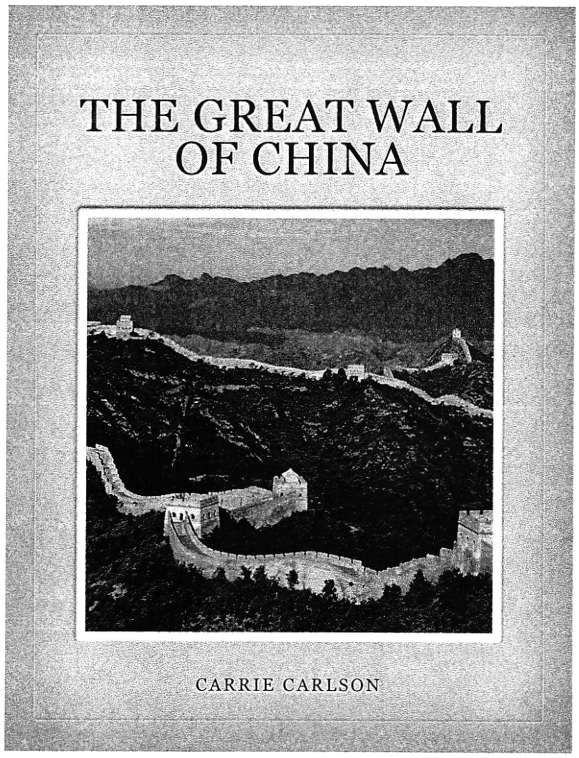
The product I created is an iBook about the Great Wall of China intended for use by elementary school students in grades three and above. This iBook includes many features that research shows enhance learning. These include video, interactive photos, an illustrated glossary, review quizzes, searchable text, links to a dictionary and Wikipedia, and the ability to highlight and take notes in the text. A summary of these features listed in Table 3. The user can also select to have words or passages read aloud by using the iPad text-to-speech feature. This book is formatted for use on the iPad using the iBooks app. A full copy can be downloaded to an iPad from the following web site and a PDF (non-interactive) version of the iBook follows:

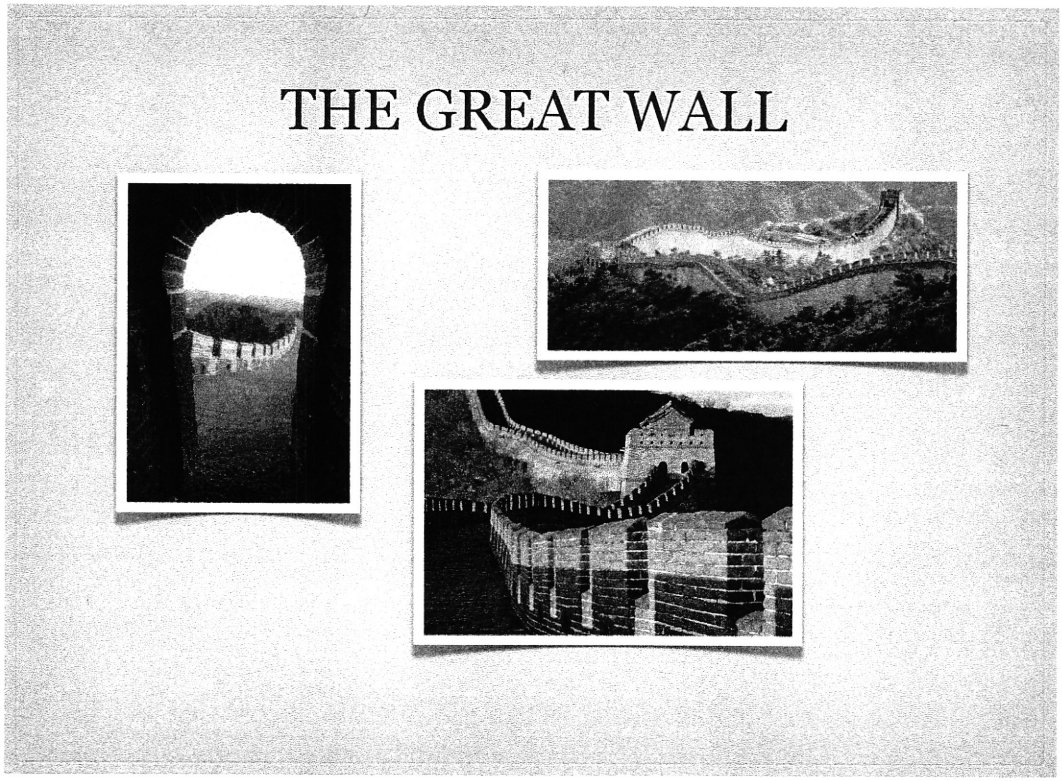
https://www.dropbox.com/s/ur5m73v6s773iy7/Great%20Wall%20V3.ibooks

Resource Type	**iBook Features**
Presentational	-brightness adjustment
Navigational	-embedded menus for the table of contents and glossary -links to glossary from bold words -links to dictionary and Wikipedia from any word -links to picture sources online
Translational	-text-to-speech -text description for images -definitions available for any word
Explanatory	-text gives history and background in relation to building the wall
Illustrative	-*hang-tu* construction diagrams (photo gallery) -tower diagram (photo interactive)
Summarizing	-table of contents flows along bottom of first page
Enrichment	-"fun facts" in the side bars
Instructional	-instructional notations under photos, features, and first quiz
Notational	-electronic highlighting -note taking -bookmarking -study cards

Collaborative	-none
Evaluative	-section quizzes -vocabulary word search

Table 3. A summary of the iBook features based on the NCSet Typology of Supported eText.

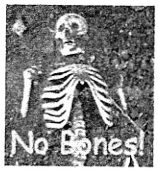

THE GREAT WALL
OF CHINA
CARRIE CARLSON


THE GREAT WALL

• Section 1 •

Fun Fact

* Folklore says that the people who died while working on the wall are buried inside it. This is not true. No bones have ever been found in the wall.



This photo shows a tribe moving using camels, similar to what they did in ancient times. Click to view image. Click the X to return to the book.

Life in Ancient China

Long, long, ago in ancient China most people lived in **tribes**. They hunted animals and gathered plants for their food. Tribes would move to new places to follow the animals and to get away from bad weather. They would take all of their things with them, so it was a very difficult life.

About 6,000 years ago, tribes that lived in the south started growing crops. They were lucky because they had good soil.

2

They didn't have to move any more so they tamed their animals and made farms. The tribes in the north weren't so lucky. They lived in mountains and deserts, which were no good for growing crops. They had to continue moving to get enough to eat.

This did not make the tribes in the north very happy. They started wars to get the good land away from the farming tribes. Villages in the south put up walls to protect themselves. Over time, the kings of these farming villages also began to fight each other. The kings each wanted all of the good land to make one big **kingdom**. More and more walls were built. Finally, in 221 B.C.E. one king won the war. He became the first **emperor** of China.

Review 1

Life in Ancient China

Question 1 of 3

Why did the tribes move?

- **A.** To follow the animals and get away from bad weather.
- **B.** To find new houses.

Check Answer

Correct!

Sorry, this is not correct.

3

Fun Fact

* The word "Qin" is pronounced "chin." This is where China got its name.

* Qin Shi Huang is most famous for the standing terra cotta army left to guard his tomb. These life size clay figures were buried with the first emperor.

• Section 2 •

The First Emperor

The king gave himself the name Qin Shi Huang (First Emperor of China). He did many things to help the different tribes get along. First, he made rules that all writing, weights, measurements, and money must be the same so people could trade with each other. Then, he had many roads built so he could visit all the villages. He wanted to make sure his rules were being obeyed. He was very strict and expected everyone to follow his

4

rules. He even burned books that did not agree with his new ways.

But, Qin Shi Huang had a problem. There were walls all over his kingdom! This made it difficult for him to travel, so he ordered them torn down. In the north, however, China still had enemies. So rather than tear down these walls he ordered that they all be connected into one great wall. This was the beginning of the Great Wall of China.

Review 2

The First Emperor

Question 1 of 3

Why did the First Emperor have new roads built?

- ✓ **A.** So he could visit villages and make sure his rules were being followed.
- ○ **B.** So his people could easily travel between villages.

◀ Check Answer ▶

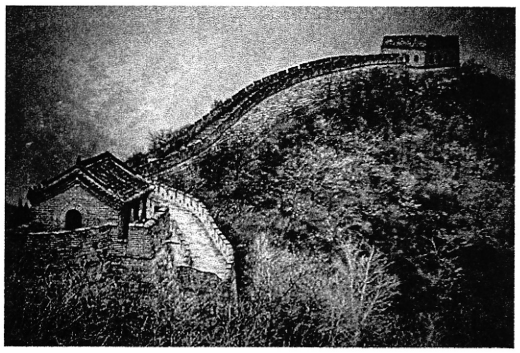
5

• Section 3 •

Fun Facts

* Folklore says that the First Great Emperor galloped his magic flying horse along the entire wall. Wherever his hooves touched down a tower sprang up.

* Better not make the First Emperor unhappy! Your punishment could be working on the Wall.



The First Great Wall

The Building of the Wall

The First Emperor had grand plans. The wall he wanted to build had to stretch almost 3,000 miles. That is like driving across the United States from Maine to California! All the work was done by hand. They didn't even have wheelbarrows to carry supplies. They dug the dirt with their hands and used baskets to carry it to the wall.

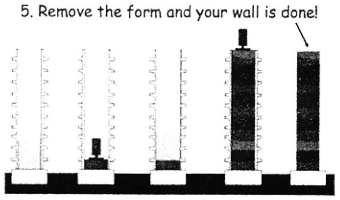
The First Emperor put his friend General Meng Tien in charge of building the wall. General Tien gave orders to thousands of **slaves** and **peasants** working on the wall. He also was responsible for 300,000 **soldiers**. They kept away the enemies while others worked. In seven years they built over 1,500 miles of wall. General Meng Tien sure was a busy man!

A Terrible Place to Work

Sooner or later almost every person in China worked on the wall. The wall was so important to the emperor that he even pulled workers from the field to work on it instead of letting them grow crops. This caused a food shortage and much suffering among the Chinese people. When there weren't enough men, the emperor ordered women to work on the wall. Sometimes children were left home alone!

The wall was built on all types of land, but no matter where you were, working conditions were terrible. In the mountains it was cold, rainy, and snowy. In the desert it was hot, windy, and sandy. There was never very much food and workers had to wear the clothes they came with until they wore out! In all, it is believed that over one million people died while working on the wall for the first emperor.

Hang-tu Construction



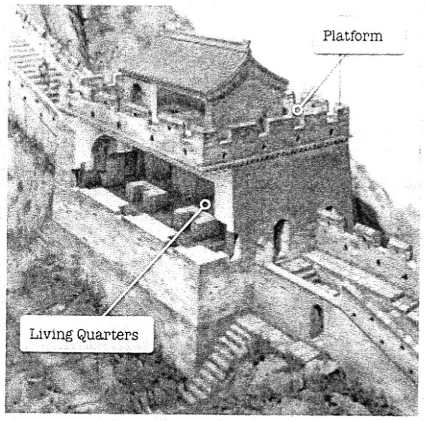
Hang-tu Construction

Since there were no machines to do the building and no bricks, cement, or other modern tools to use, the wall

was built out of dirt. All of the walls in the Great Wall of China were built using hang-tu construction. This means that the walls were made from packed earth. Hang means "pounded" and tu means "earth."

First, the workers would build a form to hold the dirt. Then they would add small layers of earth (2-3 inches) and pack it down. They would continue to add layers and pack them down until the wall was as tall as they wanted it. Finally, they would remove the forms and the strong wall would be left standing.

Towers



Click on each label to see more information.

Towers

All along the wall there were very important towers. Each tower had three floors, joined together by ladders, with rooms for the soldiers to live in. At the top, there were platforms to stand on so the soldiers could watch for enemies. Each tower was close enough to the next one so that an **archer** from one of the towers could shoot enemies trying to get over the wall.

The End of the First Great Wall

In just eleven years the first emperor was able to force workers to build nearly 3,000 miles of wall across northern China. Unfortunately, he left the people of China very poor and angry. Too many people had to suffer for the building of the wall. The first emperor died in 210 B.C. and the Qin **Dynasty** ended soon after.

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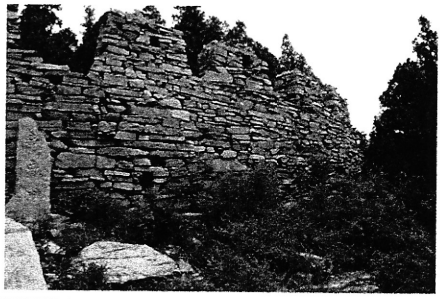


Very few sections of the first wall are left. This section has bricks on it that were added later. They were not part of the first wall.

Review 3

The First Great Wall

Question 1 of 3

Why was working on the wall to terrible?

- A. It was too hot or cold.
- B. There was not enough food.
- C. Workers never got new clothes.
- D. All of the above.

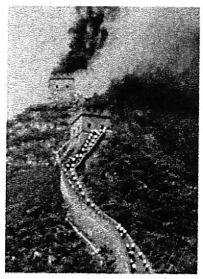
Check Answer

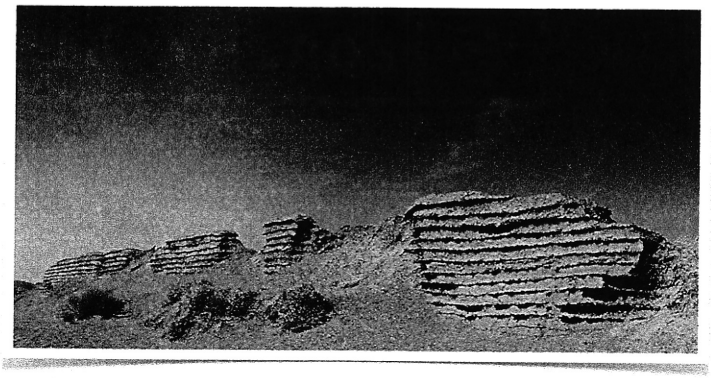
9

• Section 4 •

Fun Fact

* Soldiers burned wolf dung to make a black smoke signal fire. This thick smoke was easy to see from the next tower.





The Han Dynasty

Fortunately for the Chinese, the next several emperors cared much more for the people than the first emperor. They worked to rebuild China and make it a good place for them to live. For the next 100 years no one paid any attention to the wall and it started to fall apart. Unfortunately, the enemies from the north noticed this and began to invade China through the broken parts of the wall.

10

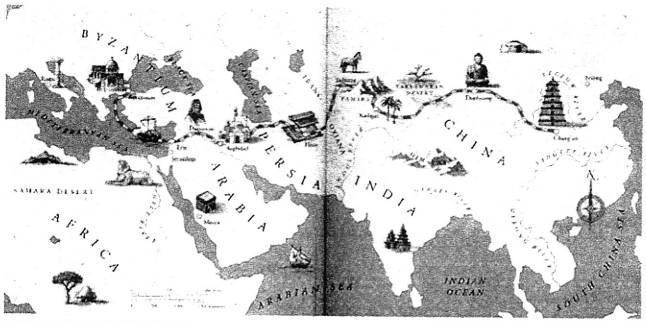
Emperor Wu Di added a large section to The Great Wall. He fixed the broken sections and added 300 miles to the wall across the western desert. He even put more watchtowers in places where there was no wall. His workers were treated much better than those who worked for the first emperor.

The Silk Road

During the Han Dynasty, China began to trade goods with other nations of the world. They had many things that other people wanted including silk, paper, tea, spices, and jade. The safest place to travel was along the Great Wall because the soldiers along the wall could protect them. Since silk was traded along this path, it became known as the Silk Road. Peaceful trade along this road continued for more than 200 years.

The Second End of the Wall

Unfortunately, the enemies to the north continued to grow stronger, and in 220 A.D. the Han Dynasty fell apart. Peaceful trade along the Silk Road ended. By 300 A.D. the northern enemies (**barbarians**) controlled the wall. Over the next thousand years Chinese emperors ignored the wall. It was broken by enemies, overgrown with weeds, and crumbled from lack of care.



The Silk Road

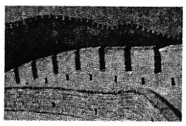
11

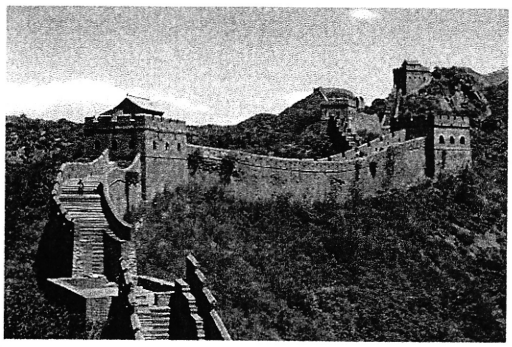
• Section 5 •

Fun Facts

* The Qin and Ming Dynasties did not call the structure they built the Great Wall of China. This name came from the Europeans who visited the area.

* Holes in the wall were used to shoot arrows at the enemy.





The Ming Dynasty

In about 1215, a second enemy from the north, the Mongols, invaded China. They took over and ruled for the next 150 years. The Chinese were not happy about this and in 1368 they pushed the Mongols out and began the Ming Dynasty. In order to keep the Mongols out, Emperor Hongwou decided to rebuild the wall.

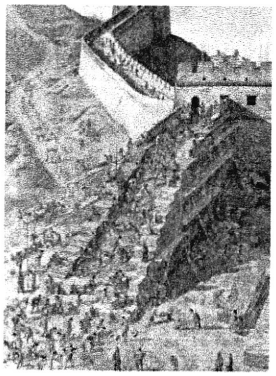
Over the next 276 years, emperors of the Ming Dynasty rebuilt and expanded the

Great Wall. When they finished, it was over 4,000 miles long. Emperor Wanli ruled from 1572 until 1620 and did much of the wall building. Most of the wall that we can see today was build during the Ming Dynasty.

The Ming Great Wall was much more beautiful than the first wall. The builders made the towers and gates look like ornate temples and office buildings. The workers used the better transportation methods to get materials all along the wall so that each section looked the same, whether it was built in the mountains or the desert. They also put drains in the wall to keep water from freezing in the cracks and breaking the wall.

Better Ways to Build

Building methods had changed since the first wall was made during the Qin Dynasty. They still used the huang-tu method, but the layers were thicker than before, about eight inches thick. In addition, the wall was covered with bricks and granite. This made the wall much stronger against the newer weapons, **cannons**! Workers were able to use wheelbarrows, rollers, and ropes and pulleys to move materials into place. Still, it was not easy work.

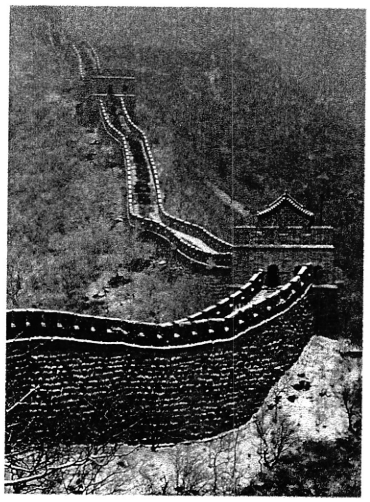


Building the Great Wall.

The Wall Crumbles a Third Time

Emperor Wanli spent nearly twenty years finishing the wall, but then he lost interest in it. His most trusted advisor died and Wanli became very withdrawn and locked himself inside his palace. He didn't seem to care about China or the wall any more. He spent all of China's money on fancy palaces for himself and gifts for his friends. By the time he died in 1620 China was a mess.

Workers were not getting paid and people didn't do their jobs. The wall began to crumble again.



The Great Wall of China at "Mutianyu" just north of Beijing.

Review 4

The Ming Dynasty

Question 1 of 3

Why did Emperor Hongwi decide to rebuild the wall?

- **A.** To keep the Russians out.
- **B.** To keep the Japanese out.
- ✓ **C.** To keep the Mongols out.

Check Answer

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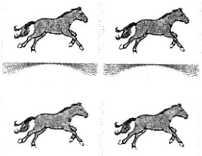
Fun Facts

* The Great Wall was designed to be wide enough for four horses to ride beside each other.



• Section 6 •

The Great Wall Today

Tear It Down

For the next 300 years the wall was ignored by the government and forgotten by the people. Then, in 1960 the Chinese government decided that all old Chinese culture and traditions should be done away with. This included tearing down the wall. They used dynamite, heavy digging equipment, and other methods to destroy hundreds of miles of the wall.

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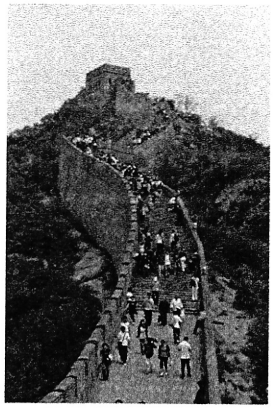
A Better Idea

Fortunately, a new leader (Deng Xiaoping) took over in 1984 and he had a different idea. "Let us love our country and restore our Great Wall," he said. Since then work has been done to bring back the beauty of the wall. It is the main Chinese tourist attraction and you can still visit it today.



The Great Wall is a major tourist attraction.

The Great Wall tells the story of ancient China in its bricks and dirt. It has both opened and closed China to the outside world.

Vocabulary Words

Click on the icon to try the word search.

16

• Sources •

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p. 6 wall* - http://www.flickr.com/photos/22240293@N05/4060523800/lightbox/
p. 9 Qin wall* - http://commons.wikimedia.org/wiki/File:Great_wall_of_qi_2008_07_14.jpg
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p. 15 wall width - http://media-cache-ak2.pinimg.com/originals/6b/07/f2/6b07f2037979da920c4ca31230e1c63a.jpg
p. 15 modern wall* - http://en.wikipedia.org/wiki/File:The_Great_Wall_of_China_at_Jinshanling.jpg
p. 16 - http://media-cache-ec2.pinimg.com/originals/01/f1/a3/01f1a34d7ae7578eba31d4398054fb09.jpg

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Dynasty - http://media-cache-ak1.pinimg.com/originals/72/15/0f/72150fe888161c01fe84ea06a9863520.jpg
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Slave - http://media-cache-ak1.pinimg.com/originals/eb/f6/9b/ebf69bab0b4d7a945efc8dee2fe7b69f.jpg

Opening Video - http://www.youtube.com/watch?v=j_s0TxwIG7Q

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Archer

a person who uses a bow and arrow

Related Glossary Terms

Drag related terms here

Index Find Term

The Great Wall - The First Great Wall

Barbarian

a member of an uncivilized society; crude and lacking culture

Related Glossary Terms
Drag related terms here

Index Find Term
The Great Wall - The Han Dynasty

Cannon

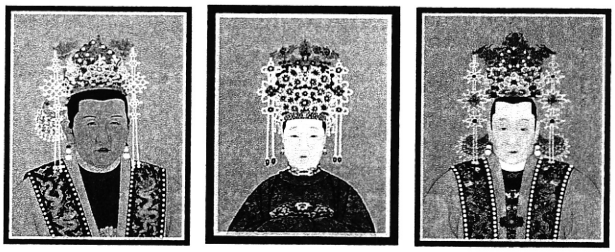
a large artillery gun that is usually on wheels and shoots large iron balls

Related Glossary Terms
Drag related terms here

Index Find Term
The Great Wall - The Ming Dynasty

Dynasty

a series of rulers from the same family



Empresses from the Ming Dynasty

Related Glossary Terms

Drag related terms here

Index Find Term

The Great Wall - The First Great Wall

Emperor

a person who rules a group of people or countries

Emperor Wu of the Han Dynasty

Related Glossary Terms

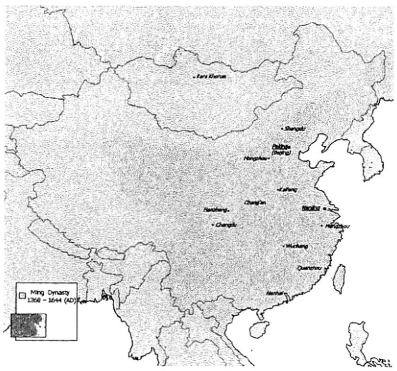
Drag related terms here

Index Find Term

The Great Wall - Life in Ancient China

Kingdom

a community ruled by a king or queen



The Ming Dynasty, 1368-1644 A.D.

Related Glossary Terms

Drag related terms here

Index Find Term

The Great Wall - Life in Ancient China

Peasant

a usually uneducated person of low social status

Related Glossary Terms

Drag related terms here

Index Find Term

The Great Wall - The First Great Wall

Slave

person owned by another

Emperor Wu and his slave, Jin Midi.

Related Glossary Terms

Drag related terms here

Index Find Term

The Great Wall - The First Great Wall

Soldier

a skilled warrior that fights in the military (e.g. the army)

Related Glossary Terms

Drag related terms here

Index Find Term

The Great Wall - The First Great Wall

Tribe

a social group of many families, of multiple generations together with slaves, dependents, or adopted strangers

Related Glossary Terms

Drag related terms here

Index Find Term

The Great Wall - Life in Ancient China

Chapter 4: Developing the iBook

The idea to write an iBook about the Great Wall of China came about during the 2011 - 2012 school year. At the time, I was serving on the Third Grade Social Studies Curriculum Review committee for the Wayzata School District. We were informed that the Legislature had approved new social studies standards, which included teaching three ancient civilizations to third grade students. The committee decided that we would teach Egypt, Greece, and China and the hunt for age appropriate materials began. We soon discovered that most of the materials available to teach ancient civilizations were written at a much higher reading level and that China, in particular, was lacking in materials accessible to third grade students.

At the same time, I had scheduled a meeting with the district Elementary Technology Integration Specialist, Dave Zukor, to discuss possible ways to integrate new technology into a meaningful curriculum project. He introduced me to a new tool, iBook Author (available on the Mac) to create multimedia books for the iPad. He also put me in touch with another teacher that was using the program and, after further discussion with him, I decided to upgrade my computer, install the program, and explore the possibility of writing an iBook.

Naturally, the two needs came together, and I proposed writing an iBook about the Great Wall of China for third grade students. The Social Studies Curriculum leader, Amy Swenson, was very excited about the idea and strongly encouraged me to pursue it.

Writing the Text

The first major task was to learn about the Great Wall and write text that would be easily read by students aged eight to nine. I began by reading many books and web sites about the Chinese history and the story of the wall. When choosing content, I relied mostly on books written for children, and one book in particular, *The Great Wall of China,* by Lesley DuTemple, served as a guide for my project. I also kept in mind the new Minnesota Standards for Social Studies, and tried to design a text that would give students some insight into life in ancient China. Ultimately, I developed an outline of the major events and used these to form small chapters (sections) of the book. Both the district social studies curriculum manager and a Chinese college student reviewed the text for historical accuracy. However, an ancient Chinese civilization scholar did not review the text and I believe that this should be done before the book is made available to a wider audience (via iTunes U or the iTunes bookstore).

After outlining and then writing the six sections of the book, I began the meticulous task of testing the document readability. Most of the texts I had used as resources were written for middle and high school students. The first tool I used to assess the reading level was a built-in feature of Microsoft Word. As an option when you use the "spell-check" tool, you can turn on readability statistics. I soon discovered that my own text was largely written at a 10th grade reading level.

After shortening my sentences and removing difficult vocabulary, I then used a second tool to further refine my writing. The online tool, *Readability*

Calculator, assesses one passage at a time, highlights difficult passages that contain many words and syllables, and offers suggestions for simplification. With this tool, I was able to revise the text and bring the reading level down to a fourth to fifth-grade level. I struggled to reduce the level any further without losing content, so I decided to use this text in Version 1 of the iBook and save further text revision, if needed, until after teachers had a chance to review it.

Selecting Photos and Video

The next task was to collect suitable photos and video to make the book come alive. At first, I was overly concerned with finding material that was either copyright free or available in the creative commons. This proved to be an arduous task. Many of the pictures that were available were of poor quality and there were not enough to select from to truly illustrate the text and enhance the understanding. I quickly abandoned the idea and instead decided to collect web site information as I collected pictures, so that I could go back later and contact picture owners for permission to use them in the book. I created a Pinterest Board for this purpose.

In addition to collecting photos, I knew that I would want at least one video to pique student's interest as they open the book. I found the perfect video using the Google search engine and was able to download, cut, and save the video into the appropriate format for the iBook.

Learning & Using iBook Author

iBook Author is a free creation tool available on the Mac computer platform. It is similar to other Mac tools that I am familiar with, such as iMovie,

iPhoto, and iTunes, and works well with these programs to put together a complete multi-media book. In an effort to continue to expand teachers' knowledge, each year our district offers classes through the Academy of Wayzata Educators. Fortunately, this year a class on iBook Author was offered. On my first day, I discovered that I was the only elementary teacher enrolled. Most of the rest were middle school teachers using the tool to create science lessons and a few were high school teachers with a variety of different applications. I was really the only person using the tool to write a book with many pictures in several sections.

I began by trying out different templates. Although you can make your own, it is best to use a premade template. This will keep the color scheme, fonts, and style consistent throughout the book. Templates are available for free in the program and can be purchased online from various third-party vendors. After trying a couple of different ones, I finally settled on "Craft." It has a pleasant cream and light green background and was set up in a way that would be appealing to young students. On the left-hand side of the cover page for each section, there is a column for additional information to supplement the text. I chose to use this column as a place for "fun facts" and photos that would make the Great Wall more interesting to young students.

Next, I inserted the text and photos into the appropriate places in the book. I discovered that I really did not want "chapters" because the template then forced a lot of additional unnecessary pages into the book. I discovered that I could eliminate chapters and instead have "sections." This still created a wonderful

table of contents, but allowed for a much shorter and more efficient book. I also took the time to create a glossary of terms that I thought would be new to third grade students.

Widgets

One of the great features of iBook Author is that it allows you to insert interactive features called widgets. The widgets included with the program are: Gallery, Media, Review, 3D, Keynote, Interactive Image, and HTML. In addition, other widgets are available to download from third party sources. I tried many of these features and selected the best ones to include in my book.

The Gallery widget allows the author to create a slide show of videos for the reader. They reside in a picture frame in the book similar to how a photo would look in a printed book. However, when the reader clicks on the photo, it turns into a full screen image. The reader can then slide their finger along the screen to view the other images in the show. This allows the author to place many images in the same amount of space traditionally given to one image in a printed book. It gives the reader the advantage of quick access to multiple images that can better explain the concept.

The Media widget allows the author to insert a movie into the book. As soon as the reader clicks on the movie, it takes over the screen with full video and sound. When it is finished, the reader is returned to the book. This feature is automatically imbedded at the beginning of the book and can be added anywhere else the author chooses. I used the introduction feature to show students a 30

second video of different parts of the Great Wall as it stands today. The reader can control the video on screen and replay it multiple times if desired.

The Review widget enables the author to create an onscreen quiz anywhere in the book. The reader can select the answer and will receive immediate feedback as well as a total score at the end. I used this widget at the end of several sections in the book to keep the reader involved and engaged in the text.

The Interactive Image feature allows the author to insert an image and then zoom in on different parts of the image to draw attention to details. As the reader zooms in, they are presented with a text box that further explains the image. I used this feature to explain a diagram of the towers in the Great Wall.

In addition to these widgets, I used the Word Search widget from Bookry.com. I included all of the vocabulary words from the glossary in a fun and easy word search puzzle at the end of the book.

Feedback & Revisions

Version 1. First, I shared the book with the other teachers who took the iBook Author class. They all thought that it was fantastic and had nothing but praise for the book. I then sent the book to three knowledgeable colleagues.

Rhonda Hullinger has been teaching third grade at Oakwood Elementary School for fifteen years. She is a good friend and has been my teammate for all of the five years I taught third grade. She is someone I trust to give honest and thoughtful feedback. She initially responded with these remarks, "OMG!!! Are you a professional or what? You might have missed your calling! I am very

impressed and learned a ton that I didn't know before. I loved it all. I have very few suggestions and we can go thru it on Monday if you would like. I would buy this book today!"

We then met and discussed a few details that she felt would make the book even better, such as adding captions to some of the photos, rewriting certain sentences for clarity, and adding an explanation for the review quiz. I incorporated those changes into Version 2 of the book. She assured me that the readability was appropriate for third grade students.

Dave Zukor is the Elementary Technology Integration Specialist for the Wayzata School District. He offered the following response after reading the book, "Nice job on the iBook. I am excited about the potential integration of multimedia and questions." I have learned since then that he has also shared the book with district Technology Director and the Director of Curriculum and Instruction. In addition, he has started writing a book of his own, also to supplement the third grade ancient civilization curriculum.

Amy Swenson, Social Studies Resource Teacher, also had a chance to look at the book. She said, "I did look at the book and it is AMAZING! You really could sell it!" She is leading the Social Studies Curriculum Review Committee and invited me to share the book with other third grade teachers at their meeting on April 9, 2013. In preparation, I finished Version 2 and posted it on a MOODLE course that the other teachers would have access to. Then I attended that meeting and showed Version 2 of the book to several teachers. They loved the book and enthusiastically thanked me for creating it. One teacher

even asked if there would be a final version that she could use with student yet this year! Although I provided a link to a written survey about the book, none of the teachers has taken the time yet to fill it out. When I arrived at the meeting, they were immersed in writing curriculum about Ancient Greece, so it is understandable that they did not want to spend too much time thinking about Ancient China just yet. I suspect that that work will come over the summer or next fall and I will continue to revise the book based on their feedback if needed.

Version 2. Next came the tough testers, students! Version 2 of the iBook was presented in a lesson to both third and fourth grade students. The lesson plan included the following statements as learning objectives for the students:

- Explain the purpose of the Great Wall.
- Describe the *hang-tu* construction method.
- Explain how the soldiers communicated along the wall.
- Describe the role the wall played in trade with other nations.

(See Appendix A for a copy of the lesson plan.) Prior to looking at the book, students were given an assessment to determine their current level of knowledge of the Great Wall of China (See Appendix B for a copy of the assessment). After reading the book, the students took the same assessment a second time, in using alternate color pencil. Overall, students scored 61% on the pretest and 93% on the posttest, and these improvements were found to be statistically significant. Students learned a lot from the book.

In addition, I was able to circulate among the students and gather "real-time" feedback on items they liked, didn't like, didn't understand, or thought

should be changed. Students wanted more interaction with the pictures, a different font in the sidebar, pictures in the glossary, a more difficult word search, and a better explanation of *hang-tu* construction. As a direct result of this feedback, I changed all of the images in the main body of the book to be able to respond to clicking (they now open in full screen and expand to their full size), changed the font in the sidebar from Bradley Hand to Noteworthy, added pictures to the glossary where appropriate, expanded the word search to a larger size and included diagonal words, and replaced the one diagram of *hang-tu* construction with a series of explanatory diagrams. A couple of students wanted more playful items in the book (for example to be able to click and drag the horses onto the wall) but since research shows that playful elements unrelated to content can take away from comprehension, I refrained from adding these types of elements.

Version 3. After finishing the changes that students suggested, I began the complicated task of gaining permission to use the photos I had selected for the book. After consulting with Ron Kurpiers, Reference Librarian at Augsburg, I determined that the best and safest strategy would be to use as many pictures as possible that are licensed under the Creative Commons. I went through the book and replaced many of the photos to fit this specification. In addition, I contacted several web site creators to obtain permission to use their photos. I was met with a variety of responses that ranged from people trying to sell me images that they most likely did not own to others admitting that they did not own the photos and had themselves gotten them from other web sites. The most interesting response came from the European Space Agency with regard to a photo that was labeled as

the Great Wall as seen from space. As it turns out, the photo was actually a river that had been incorrectly identified as the wall. The myth that you can see the Great Wall from space was nearly perpetuated inadvertently in my book!

In the source section of the book, I identified print and web resources that I used for the text and provided links to the source site for every photograph. There are also links to the Creative Commons license specifications. I met with Mr. Kurpiers to review the book and verify that I had followed the appropriate Fair Use guidelines. He was very impressed with the book and confirmed that I had indeed done an excellent job of giving credit to my sources.

The Future of the Book

It is difficult to stop revising and call the book done. Version 3 of the book includes all of the changes mentioned above and some additional editing changes as suggested by my advisor and readers. For the purposes of this project, the book is finished and will be used by third grade students in the Wayzata Public Schools this coming academic year. The book and the accompanying lesson plan and assessment will be located on a Moodle course for teachers along with directions on how to download and use the book on the iPad. It will become a resource for the third section of the unit, which engages students in historical inquiry, allowing students to actively tell the stories of the people who lived long, long ago. I anticipate that the book will be used along with the ongoing "timeline" activity and as a part of a collaborative unit culmination project. The curriculum work for ancient China is ongoing, but it will follow the same format used in the ancient Greek and Egypt units. The

book may also be offered for free in the iTunes bookstore for other teachers/students across the country.

However, there are already elements I know I want to add. The new version has a speech element that allows the author to record elements that could be played when the speaker icon is tapped. Although the users can already have the book read aloud using the iPad's text-to-speech feature, this new option would offer a human voice (vs. the computer) that is much easier to understand and a much easier user interface (click the speaker vs. highlight the text first and then click "speak"). I would like to add this element to the book before students use it this year.

Also, the Social Studies committee is still in the process of writing the curriculum for ancient China. If they determine that different vocabulary will be taught, then I would like to change the glossary to reflect the appropriate words. Other than those two areas, I imagine that the book will remain as currently published.

This project has been a tremendous learning opportunity for me. I not only anticipate creating more books (although perhaps on a smaller scale) for my own use in teaching, but also plan to offer classes to other teachers on the iBook Author tool. This project took over a year to complete, but was worth every minute.

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The Great Wall

Social Studies

Grade 3

May 2013

Overview

Students will learn about The Great Wall of China: its purpose, creators, and impact on society over time.

Objectives

By the end of this lesson, students will be able to:

- Explain the purpose of the Great Wall
- Describe the Hang-tu construction method
- Explain how soldiers communicated along the wall
- Describe the role the wall played in trade with other nations

Activities

Students will be given a pretest to assess prior knowledge about the Great Wall. Then, we will watch the introductory movie together and students will be given brief instructions on how to navigate the iBook. iPads will be distributed to groups of three and students will be allowed time to read the book and explore the various activities in the book. The teacher will circulate to ensure that students know what to do and answer questions.

Adaptations

Students with special needs will be placed in groups with students that can assist with their learning.

Evaluation

Students will take a pre/post test on paper to evaluate the effectiveness of this lesson.

Materials

- The Great Wall iBook on the iPad (1 per 3 students)
- Pre-test/ Post-test

Minn. Standards

Historical Thinking Skills

- Historical events have multiple causes and can lead to varied and unintended outcomes. (3.4.1.3.1)

People, Cultures, and Change Over Time

- History is made by individuals acting alone and collectively to address problems in their communities, state, nation and world. (3.4.2.5.1)
- The emergence of domestication and agriculture facilitated the development of complex societies and caused far-reaching social and cultural effects. (3.4.2.7.1)
- The development of interregional systems of communication and trade facilitated new forms of social organization and new belief systems. (3.4.2.8.1)

The Great Wall

Pre/Post Test

1. Why did farming tribes in the south begin putting up walls?
   A. To mark the borders between farms.
   B. To protect themselves.
   C. To keep animals from getting away.

2. Why did the First Emperor decide to connect the walls in the north?
   A. To keep Chinese people from leaving.
   B. To attract tourists to China.
   C. To protect China from enemies in the north.

3. What does "hang-tu" mean?
   A. pounded earth
   B. smashed sticks
   C. crushed rock

4. Why did the wall have towers?
   A. So the emperor would have a place to sleep when he visited.
   B. So the soldiers could live there and watch for enemies.
   C. So the workers could eat and sleep in comfort.

5. How did soldiers in one tower communicate with soldiers in the next tower?
   A. They beat loud drums in patterns.
   B. Errand boys ran along the wall with messages.
   C. They set black smoke signal fires.

6. What was the name of the road (along the wall) that travelers used to trade goods with other parts of the world?
   A. The Silk Road
   B. The Great Wall Road
   C. The China Road

7. What goods were traded with other nations along this road?
   A. Diamonds and gold
   B. Tea, spices & silk
   C. Books and music

8. How was construction of the Ming Wall better than the first Great Wall?
   A. The walls were covered with bricks and granite to make them stronger
   B. Workers had tools like wheelbarrows, rollers, and ropes and pulleys.
   C. The hang-tu layers were 8 inches thick instead of 2.
   D. All of the above.

True/False:

_____ The Great Wall cannot be seen from space.

_____ The Great Wall is a major tourist attraction in China today.

_____ The Great Wall was rebuilt many times.

_____ Over one million people died building the first great wall.

_____ Working on the wall was a great job to have.

Matching:

_____ kingdom	a. a community ruled by a king or queen
_____ slave	b. a member of an uncivilized society
_____ tribe	c. a skilled warrior that fights in the military
_____ archer	d. a person who uses a bow and arrow
_____ soldier	e. a social group of many families
_____ barbarian	f. a person who rules a group of people
_____ emperor	g. a person owned by another