A STUDY OF THE INSTRUCTIONAL EFFECTIVENESS OF
Holt McDougal World History: *Patterns of Interaction iBook*
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ABSTRACT

To help secondary school students develop better knowledge and analysis skills and strategies about World History, Houghton Mifflin Harcourt has published, **Holt McDougal** *World History: Patterns of Interaction* **iBook edition.** The program is designed to connect students to the world and is a comprehensive program for grades 9-12. The program provides visuals and interactive technology that help students make connections between the past and the present.

In order to evaluate the program's effectiveness, *Houghton Mifflin Harcourt* contracted with the *Educational Research Institute of America* (ERIA) to conduct a one semester study of the new program. The study was conducted during the second semester of the 2012/2013 academic year.

A test was designed to assess students' understanding, knowledge, analysis skills and strategies. The **Holt McDougal** *World History: Patterns of Interaction* **iBook** program had not been previously used in the schools by any classes.

The results showed that the **Holt McDougal** *World History: Patterns of Interaction* **iBook** classes made statistically significant gains over the course of the single semester. The results also showed the **Holt McDougal** *World History: Patterns of Interaction* **iBook** program proved equally effective with both higher and lower pretest scoring students.

Overview of the Study

This report describes a semester long study conducted to determine the impact of the *World History: Patterns of Interaction* **iBook** program for high school students. The study took place over a single semester, from January to June in 2013. For the one-semester study *World History: Patterns of Interaction* iBook editions were the primary instructional program.

Houghton Mifflin Harcourt contracted with the *Educational Research Institute of America* (ERIA) to conduct a one-semester study to determine the program's effectiveness.

Research Questions

The following research questions guided the design of the study and the data analyses:

1. Is **Holt McDougal** *World History: Patterns of Interaction* **iBook** effective in improving the skills and knowledge of high school students in World History?
2. Is **Holt McDougal** *World History: Patterns of Interaction* **iBook** effective in improving skills and knowledge in world history of lower performing as well as higher performing high school students?

Design of the Study

The program's efficacy was evaluated using a pretest/posttest design. The study took place during the 2012/2013 academic year. All of the students in the study were grade 9 and 10 students. A total of four different teachers in two different schools in two states were included in the study. The study took place over a single semester.

Before the program instruction started, students were administered a comprehensive test designed to cover the content of the *World History: Patterns of Interaction* textbook. A similar posttest was used at the end of the study. Pretest and post-test administration was under the direction of the classroom teacher. All tests were returned to ERIA for scoring and analyses.

Project Background

The following focus for the program as put forth by the publisher highlights the importance of a research/best practices based program:

World History: Patterns of Interaction is a highly integrated program that provides teachers with a practical and motivational approach to teaching world history and to helping students think critically and reflectively. World History: Patterns of Interaction combines a highly visual approach with primary sources to help all students understand world history and make global connections. It emphasizes the big picture by connecting key concepts, themes, and patterns of interaction found throughout history.

Piquing the interest of today's media-savvy students is no easy task. But our exclusive partnership with HISTORY® means World History: Patterns of Interaction infuses the study of history with streaming video, instructive games, and interactive features. With innovative learning assets like these, you can fundamentally change the way students experience social studies in general and world history in particular. World History: Patterns of Interaction not only revolutionizes and enhances instruction, but it also engages, inspires, and encourages the love of learning. We provide tools that help students connect with history, see its relevance and importance in their lives, and integrate strategies and support to help them experience success.

The edition of World History: Patterns of Interaction used in this study was an iBook edition. The Holt McDougal iBooks are designed to engage students and bring the curriculum to life. The iBooks textbooks for the iPad® feature multi-touch technology that allows today's digital learners to truly interact with content. The rich, magazine style student editions include embedded interactive features to maximize learning engagement and promote higher order thinking skills.

Special features of the iBook textbook programs are the inclusion of:
- *image galleries*
- *audio summaries, 3d graphics, and interactive activities and quizzes*
- *text highlighting, note-taking, and bookmarking*
- *built-in search for any word or phrase*

Timeline and Program Use

The teachers used *World History: Patterns of Interaction* **iBook** as the primary world history instructional program. The teachers reported using the program from 2 to 5 days per week and from 25 to 45 minutes per day on the days the program was used. Pretests were administered at the beginning of January, 2013 and posttests were administered the middle of June, 2013.

Description of the Research Sample

Table 1 provides the demographic characteristics of the schools included in the study. It is important to note that the school data does not provide a description of the make-up of the classes that participated in the study. However, the data does provide a general description of the schools and, thereby, an estimate of the make-up of the classes included in the study.

Table 1
Demographic Characteristics
Of the Schools Included in the Study

Location	Grades	Enrollment	% Minority	% Free/Reduced Lunch	% Special Education
Suburban	9-12	108	0%	0%	0%
Rural	K-12	841	5%	24%	N/A
AVERAGES		**475**	**5%**	**24%**	**0%**

Description of the Assessment

The pretest and posttest used in the study were developed to assess standards-based world history topics across the program chapters. Based on these standards a 40 item multiple-choice assessment test was developed focusing on the skills, strategies, and knowledge necessary for effective understanding of world history.

Table 2 provides the statistical results for the administration of the pretest and the post-test. The KR 20 reliabilities for the post-tests indicate the test was reliable for arriving at decisions regarding the achievement of the students to whom the tests were administered. The pretest reliability is a bit low. However, this is not uncommon when students are taking a pretest dealing with a topic to which instruction has not yet begun. There is usually more guessing on such tests lowering the internal consistency measure of reliability.

Table 2
Pretest and Post-Test Test Statistics

Test	Reliability*	SEM**
Pretest	.59	2.86
Post-test	.77	2.90

Reliability computed using the Kuder-Richardson 20 formula.
*** SEM is the Standard Error of Measurement.*

Data Analyses

Standard scores were developed in order to provide a more normal distribution of scores. The standard scores were a linear transformation of the raw scores. A mean raw score was translated to a mean standard score of 300 and the standard deviation of the raw scores was translated to 50. Standard scores were then used for the statistical analyses.

Data analyses and descriptive statistics were computed for the standard scores from the World History assessments. The $\leq.05$ level of significance was used as the level at which increases would be considered statistically significant for all of the statistical tests.

The following statistical analyses were conducted to compare students' pretest scores to posttest scores:

- A paired comparison t-test was used to compare the pretest mean standard scores with the posttest mean standard scores for all students.
- The students were split into two groups based on pretest scores. Paired comparison t-tests were used with the group that scored higher and the group that scored lower on the pretest to determine if the program was equally effective with lower performers and higher performers.
- A further descriptive analysis was conducted by determining the percentage of students who scored below 50% on the pretests and who scored 50% or higher on the post-tests.

An effect-size analysis was computed for each of the paired t-tests. Cohen's d statistic was used to determine the effect size. This statistic provides an indication of the strength of the effect of the treatment regardless of the statistical significance. Cohen's d statistic is interpreted as follows:

.2 = small effect
.5 = medium effect
.8 = large effect

Data Results and Analyses

Total Group Analysis

Researchers at ERIA conducted a paired comparison *t*-test to determine if the difference from pretest standard scores to posttest standard scores was statistically significant. For this analysis, researchers were able to match the pretest and posttest scores for 143 students. Students who did not take both the pretest and the posttest were not included.

Table 3 shows that the average standard score on the pretest was 284, and the average standard score on the posttest was 316. The increase was statistically significant ($\leq$.0001). The effect size was medium.

Table 3
Paired Comparison *t*-test Results
Pretest/Posttest Comparison of Standards Scores

Test	Number Students	Mean Standard Score	SD	t-test	Significance	Effect Size
Pretest	143	284	41.6	9.008	$\leq$.0001	.78
Posttest	143	316	52.8			

Higher and Lower Scoring Students

An additional analysis was conducted to determine if students who scored lower on the pretest made gains as great as those students who scored higher on the pretest. For this analysis students were ranked in order on the basis of their pretest standard scores. The group of 143 students was divided into two approximately equal groups of 72 and 71 students. The first group included those students who scored lower on the pretest with a mean of 251 with scores ranging from 203 to 275. The higher scoring group scored an average standard score on the pretest of 317 with scores ranging from 275 to 420.

Pretest-to-posttest comparisons are shown in Table 4 for the lower and higher pretest scoring students. Scores were analyzed using a paired comparison *t*-test to determine if both groups made significant gains.

For both the higher and the lower scoring group, the average scores increased. The increase for both groups was statistically significant ($\leq$.0001). The effect size for the lower scoring pretest group was large and for the higher scoring group the effect size was medium. In line with those results, the data shows that the lower pretest group increased 41 standard score points and the higher pretest scoring group increased 23 standard score points.

Table 4
Paired Comparison *t*-test Results for Pretest/Posttest Standard Scores
for the High- and Low-Scoring Pretest Groups

Test	Test Form	Number of Students	Mean Standard Score	SD	t-test	Significance	Effect Size
Lower Scoring Group							
Total	Pretest	72	251	18.0	8.102	≤.0001	1.15
Total	Posttest	72	292	45.1			
Higher Scoring Group							
Total	Pretest	71	317	30.7	4.794	≤.0001	.62
Total	Posttest	71	340	48.6			

Figure 1 provides a pretest-to-posttest comparison of the standard scores of lower and higher scoring pretest students. The lower scoring pretest group increased their scores more than the higher scoring pretest group resulting in scores that showed a 66 point difference at the beginning of the academic year and only a 48 point difference by the end of the academic year.

Figure 1
Standard Score Increases* for Lower and Higher Pretest Score Students
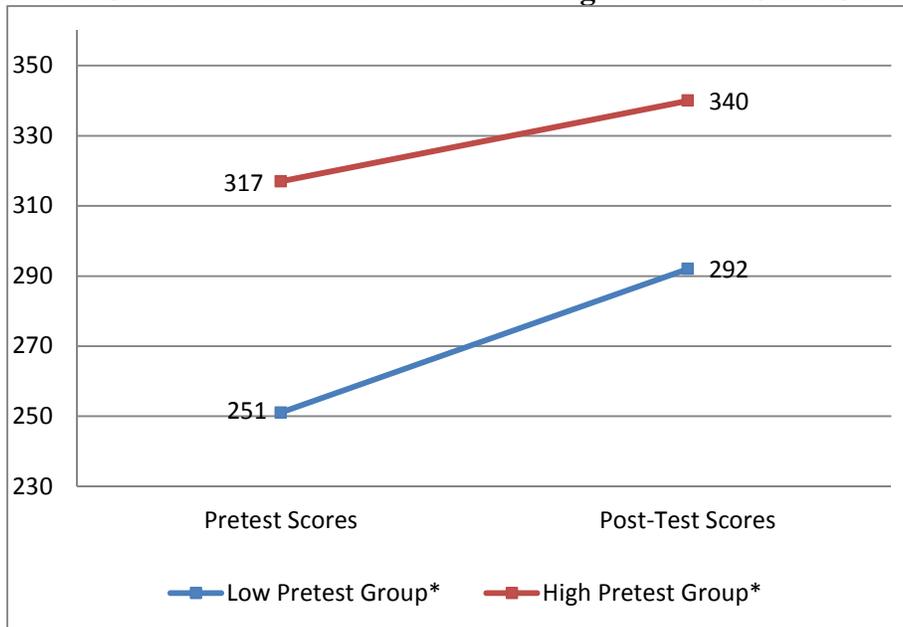
    *Statistically significant

Figure 2 shows the percentage of students scoring below 50% and 50% or higher on the pretests and post-tests. The percentage of the decline scoring at the lowest level declined by 13% and the increase at the highest level was 13%.

Educational Research Institute of America

Figure 2
Percentage of Lower Pretest Students Scoring Less than 50% Correct
**50% and Higher Correct on the Pretests and Post-Tests**
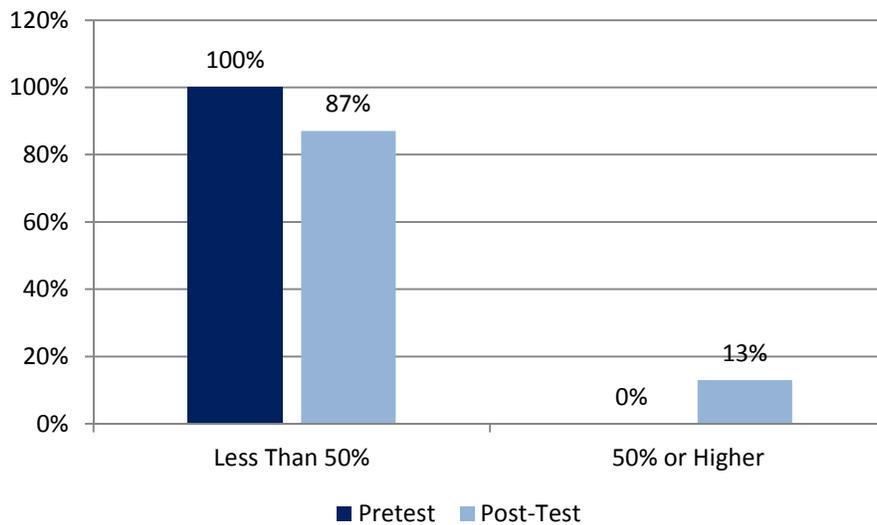
Figure 3 shows the percentage of lower pretest scoring students scoring below 50% correct and 50% or higher on the pretests and post-tests for the. The percentage scoring at the lowest level declined by 30% from pretesting to post-testing. The percentage scoring at the highest level increased by 30%.

Figure 3
Percentage of Higher Pretest Scoring Less than 50% Correct and
50% and Higher Correct on the Pretests and Post-Tests
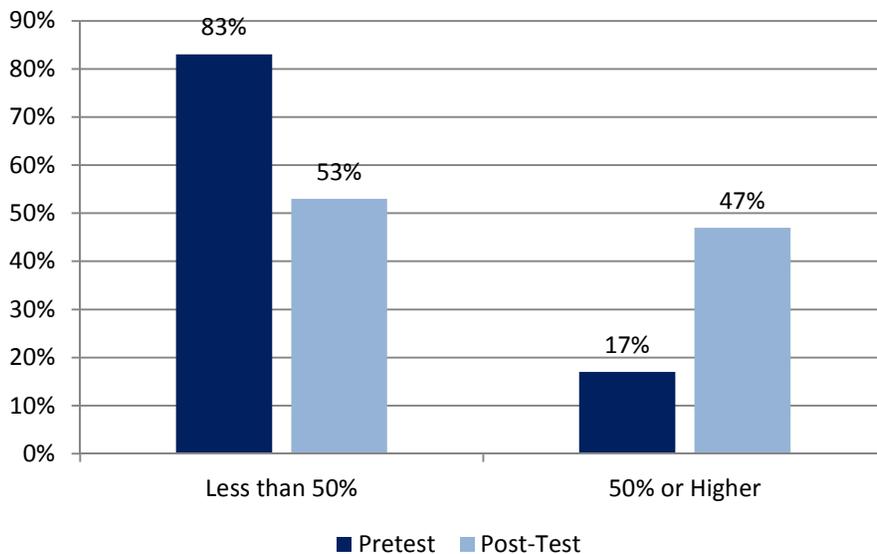
Conclusions

This study sought to determine the effectiveness of ***Holt McDougal World History: Patterns of Interaction* iBook,** a high school U.S. History program published by Houghton Mifflin Harcourt. The study was carried out with secondary classes in two schools in two states. The teachers were using the program for the first time and received no special instruction in using the program.

Two research questions guided the study:

1. Is **Holt McDougal** *World History: Patterns of Interaction* **iBook** effective in improving the skills and knowledge of high school students in World History?
2. Is **Holt McDougal** *World History: Patterns of Interaction* **iBook** effective in improving skills and knowledge in world history of lower performing as well as higher performing high school students?

Question 1: Is Holt McDougal World History: Patterns of Interaction **iBook** *effective in improving the skills and knowledge of high school students in World History?*

A test designed to assess the knowledge, skills, and analytic skills in world history was developed to assess students at the beginning and end of semester tryout of the program. Statistical analyses of students' scores showed that the students increased their scores statistically significantly on the assessment. The effect size was medium.

Question 2: Is Holt McDougal World History: Patterns of Interaction **iBook effective in improving skills and knowledge in world history of lower performing as well as higher performing high school students?**

Statistical analyses of lower pretest scoring students' scores showed that for both the lower and higher pretest scoring students the increases were statistically significant. For the lowest pretest scoring students the effect size was large and for the higher pretest scoring group, the effect size was medium.

On the basis of this study, both research questions can be answered positively.

- ***The* Holt McDougal World History: Patterns of Interaction iBook** *program is effective in improving the skills and knowledge of high school students in World History*
- ***The* Holt McDougal World History: Patterns of Interaction iBook** *program is effective in improving skills and knowledge in world history of lower performing as well as higher performing high school students.*