Fall 2011

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Michael Barbour
Sacred Heart University

Jim Kinsella

Lloyd P. Rieber
University of Georgia

The Georgia Social Studies Journal
Fall 2011, Volume 1, Number 2, pp. 31-44.
Georgia Council for the Social Studies

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Michael K. Barbour
Wayne State University

Jim Kinsella
University High School (Normal, IL)

Lloyd P. Rieber
University of Georgia

The integration of technology into K-12 classrooms has long been hampered by the problem of scalability. Familiar software programs, such as MS PowerPoint, can be used as a tool for students to create educational games to deepen their understanding of content. In this article, the authors examine students in two secondary social studies classes that created homemade PowerPoint games as a way to review for their mid-term and final examinations. The authors compared student performance on these exams based upon the topics covered by their game design. While no significant differences in student outcomes were found, qualitative analyses indicate that students and the teacher reported that the activity enjoyable and wished to continue this project. The authors speculate the lack of statistical differences was due to the small sample size and plan to use the lessons from the first year as this research continues.

There has been a persistent tension within the social studies and history education between teaching facts and helping students come to some deeper understanding of the interconnectedness of those facts and what it means for today's society. Four decades ago, Barth and his colleagues described this tension as different traditions in social studies, specifically cultural transmission vs. reflective inquiry (Barr, Barth, & Shermis, 1977, 1978; Barth & Shermis, 1970). For the past decade, this tension has been realized in the form of teachers' desires to focus on problem solving, critical thinking, and other higher order skills; and the reality of the rote knowledge required by state and *No Child Left Behind* testing regimes.

At the same time, there has been a push to increase the use of technology in the classroom (e.g., Lawless & Pellegrino, 2007; Schrum, 1999). Yet, there have been few examples of technology integration that have had much of an impact on classroom teaching or student learning (Cuban, 2001; Lawless & Pellegrino, 2007). This has resulted in technology mainly being used as a tool to support existing classroom practice, for example Berson (1996) found that the most common use of technology in the social studies classroom was the drill-and-practice style computer applications that essentially were glorified multiple-choice tests – often masked in a game-based environment. Further, Whitworth and Berson (2003) described numerous instances of technology being used in social studies classrooms to essentially replace the traditional textbook or the Internet being used like another resource from the school library. Technology-based projects that were designed to

change classroom pedagogy were often limited in scope and failed to become scalable beyond the initial project or research site.

According to Barbour, Rieber, Thomas, and Rauscher (2009) one of the few projects to have overcome the scalability issue and receive widespread adoption has been the WebQuest initiative (Dodge, 1995). Whitworth and Berson (2003) reported that the use of WebQuest had become increasingly common in social studies classrooms. However, like many of the existing uses of technology in the social studies classroom, WebQuests allow teachers to continue to teach in a manner consistent with what they were already doing (e.g., the teacher gives the students a task, the teacher describes the process that students should use to complete that task, the teacher selects the resources the students should use, the teacher defines the student product, and the teacher creates a well defined rubric to evaluate the students' product). This should be contrasted with the potential for technology to change the nature of classroom instruction to an environment where students are more responsible for their own learning and the process they complete to gain that knowledge.

While constructivist approaches have the potential lead to students' deeper understanding of the content (Duffy & Jonassen, 1992; Jonassen, 1997), there are legitimate questions about whether it lead to increased learning on traditional testing instruments (e.g., standardized multiple-choice tests). In this article, we explore the effectiveness of a technology-based design activity (i.e., the creation of games using *MS PowerPoint*) as a learning strategy. We report data from the first year of a multi-year study that used multiple-choice testing as a basis for judging the effectiveness of this strategy.

Social Studies, Deeper Historical Understanding, and Design Activities

Our aim was to find an activity in which each student learns about history as would a storyteller who values historical accuracy – to find in the ocean of facts, the drama, suspense, and human interest that leads another to want to hear the story, or better yet, to participate in the story as a game. We believe this view of learning is consistent with the National Council for Social Studies' (NCSS, 1994) *Vision of Powerful Teaching and Learning in the Social Studies*, which states that "teachers should not only expose their students to curriculum content but should also provide them with opportunities to think and communicate in ways that will help students construct a working knowledge of such content" (p. 160).

Barr, Barth, and Shermis (1978) stated that one of the criticisms of the reflective inquiry tradition, which is consistent with the NCSS vision, "is that its highly abstract nature renders it much less clear and understandable than the other two [i.e., the other two traditions]" (p. 132). Included in their *Vision of Powerful Teaching and Learning in the Social Studies*, the NCSS has provided a concrete guide to teaching and learning in the reflective inquiry tradition. The NCSS vision begins with a statement that "the primary purpose of social studies is to help young people develop the ability to make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world" (NCSS, 1994, p. 157). Students need to make decisions within a particular democratic framework or structure. This decision-making must be viewed as a process, and not a pre-conceived position where students should eventually arrive.

To achieve this stated purpose, the *Vision of Powerful Teaching and Learning in the Social Studies* supports a curriculum that includes a body of knowledge, democratic values and beliefs, critical thinking skills, and various social and civic participation skills. In describing this curriculum, the authors stated "knowledge is not merely a fixed body of information transmitted for students to memorize" (NCSS, 1994, p. 160). This is clearly a statement against the citizenship transmission tradition in the social studies, which believes that "there is a kind of content which is known in advance and which should be taught – transmitted – to the young" (Barth & Shermis,

1970, p. 744). Through the use of primary sources (such as the Declaration of Independence or the Bill of Rights), students can and should explore fundamental values and beliefs because, after all, "exemplary [social studies] programs do not indoctrinate students to accept these ideas blindly" (NCSS, 1994, p. 160). The NCSS vision expresses the belief that while there is a body of knowledge within social studies, the purpose of social studies education is to prepare students to evaluate that knowledge instead of accepting it without question. We believe that an activity in which students must identify, understand, and evaluate such knowledge in order to design an artifact, such as a game, that compels other students to interact with it is in complete agreement with this point of view.

We believe the concept of students learning from the process of designing and refining a game is a good example of what the NCSS considers actively engaging students. Learning activities, such as designing a game based upon historical content, is a "minds-on activity that engages students" (NCSS, 1994, p. 161). Further, "students are encouraged to process what they learn on several levels" as they determine what will be an accurate historical narrative, yet still be engaging to their peers (p. 163). In order to design a game that was both accurate and engaging to their colleagues, these students would need a deep historical understanding of the content.

Our conception of historical understanding is based on the levels of historical understanding as defined by Wineburg (2001). Level I is characterized by "just because" explanations given by students and is heavily based on factual representations. Level II understanding is also very superficial and is characterized by very rational, logical thinking processes — students seeing historical facts as being like pieces of a puzzle that have to fit together. Level III understanding begins to show a more sophisticated awareness of the role of historical interpretation and how different interpretations based on the same evidence can occur. Level IV understanding is a mature level of understanding where students are able to analyze and interpret historical events using the original context. The goal of this project is to have students acquire deeper levels of historical understanding and have more students attain Level IV understanding.

The use of design activities as a way to achieve the kind of deeper understanding described by Wineburg and valued by the NCSS has been found to be effective in several studies conducted by Kafai and her colleagues (Kafai, 1994, 1995; Kafai, Ching, & Marshall, 1997; Kafai & Harel, 1991). In these studies, upper elementary school students were responsible for designing multimedia, science-based projects for their younger student colleagues. These studies found that students demonstrated in increase in their learning (as evidenced by test scores), along with higher levels of motivation and an increase in the amount of content-related discussion. In a similar line of inquiry, Rieber and his colleagues examined the concept of students creating their own educational games based upon subject matter content in Project KID DESIGNER (Rieber, Luke, & Smith, 1998; Rieber, Davis, Matzko, & Grant, 2001). While these studies did not examine student learning, one of the useful lessons learned was that the software used to create the game needed to be something that students and their teachers were familiar with in order for the activity to be adopted beyond the stage when it was being supported by the research team.

These experiences led Rieber and his colleagues to develop a project entitled "homemade PowerPoint games." Parker (2004) described the homemade PowerPoint games created by his students as having "game pieces, virtual or real game boards, and questions with correct and incorrect answers" (¶ 11). Essentially students created board games that used *Microsoft PowerPoint* as a vehicle to ask students the questions required to progress in their games, an accurate description of most of the homemade PowerPoint games created to date – electronic board games that use the interactive, non-linear aspects of *MS PowerPoint* to provide a way to house and delivery questions or problems. The proponents of this project argue that homemade PowerPoint games, as an example of a design activity, have the potential to promote deeper understanding for three reasons.

First, design activities allow students to construct their own knowledge (Papert, 1991). Based on his work with the programming language *Logo* as a way to teach mathematics to elementary school student, Papert (1980) found that students were able to develop and test hypothesis, refine those hypothesis as they debugged their programming, to construct new knowledge by directing the computer-controlled "turtle" to create patterns based on the student's programming. Also, as noted earlier, Kafai and her colleague found that upper elementary school students who created science-based games for younger students improved their test scores, and reported higher levels of motivation and an increase in the amount of content-related discussion (Kafai, et al., 1997). In both instances, the researchers noted the ability to construct a working artifact (i.e., a computer program or a game) that was created by having the students break down the problem into workable parts and then proceed in an environment where they were free to make errors in order succeed (Rieber, 2004).

Second, the writing involved in the students' construction of homemade PowerPoint games, particularly the game narrative or story slide, is a specific form of concise writing that is quite similar to a microtheme. Work (1979) described microthemes as an essay that could fit on a five by eight inch index card. Research into the use of microthemes has consistently shown that students who are able to write in the concise, highly structure format about a topic demanded by microthemes perform better than students who do not undertake this form of writing (Ambron, 1987; Collins, 2000; Kirkpatrick & Pittendrigh, 1984; Moore, 1993, 1994). In constructing a homemade PowerPoint game, students have to write a narrative that provides a player with background to the game, the basic context for the game, and motivational elements that entice the player to play the game on a single *MS PowerPoint* slide.

Third, students are required to write their own questions to provide the skill or challenge component to homemade PowerPoint games. Writing good questions is essential since questions dictate how easy or difficult the game is to play. If the questions are too easy there is little challenge to the game, if the questions are too difficult it becomes impossible for the player to proceed. Both of these situations would cause players to stop playing the game, so the key is for the student to write questions that allow the player to progress in the game, but for those questions to get progressively difficult as the game continues. Rickards and DiVesta (1974) argued that students who were able to write higher-order questions, similar to those that would be needed as the game progressed, were able to process the original information better because the skill demanded better comprehension. The benefits of student-generated questions have a long research history. In her review of 27 studies from 1965 to 1982, Wong (1985) concluded that, excluding the research that contained methodological problems; generating questions "enhanced students' processing of prose" (p. 250).

To date, there have been few studies that have examined these claims. Parker (2004) examined the effectiveness of homemade PowerPoint games with middle school students in two language arts classes to teach concepts of grammar. While Parker found that students in the control group performed better and had larger gains than students who constructed a homemade PowerPoint game, he did not randomize the two groups. In fact, Parker's data indicated that the control group was the academically stronger of the two groups of students, which likely explained the control group's stronger performance. In their study of the effectiveness of homemade PowerPoint games with a high school English language arts class to review the play *Macbeth*, Barbour, Clesson, and Adams (2011) found no statistically significant differences in student performance between the control group and the treatment group that created homemade PowerPoint games. However, theses authors had a sample size of only 35 students and speculated the small number of participated resulted in a lack of statistical power for the small differences that were witnessed in a comparison of the means of the two groups of students. Clearly more research is needed to investigate to determine whether homemade PowerPoint games can result in increased learning and deeper understanding.

Methodology

The purpose of this study was to investigate how students performed on the questions based on the units they designed their homemade PowerPoint games compared with the other topics covered during that semester on both their mid-term and final examinations. This general purpose lent itself to the following research question.

1. Does the construction of homemade PowerPoint games affect student learning?

H_1: There is a difference in student performance on the multiple-choice portion of mid-term and final exams.

H_0: There is no difference in student performance.

The examinations were given over a period of four days (i.e., classes) that included questions requiring students to match text-based statements and images with statements, multiple-choice questions, essay questions, and an oral examination. For the purposes of our study, the multiple-choice question portions were used for comparative purposes.

The multiple-choice portion of the mid-term exam had a total of 70 questions, ten from each of the seven units that had been covered. Approximately 65%-70% of the exam included items from a previous test, with additional questions being added to ensure that all seven units were equally covered. The exam was constructed by a university-level teaching assistant in the Department of History and was administered to a first year university US history class during the first week of the semester to determine its suitability. The multiple-choice portion of the final exam was also constructed in the same format, with 90 questions (i.e., ten each from the nine units covered in that semester).

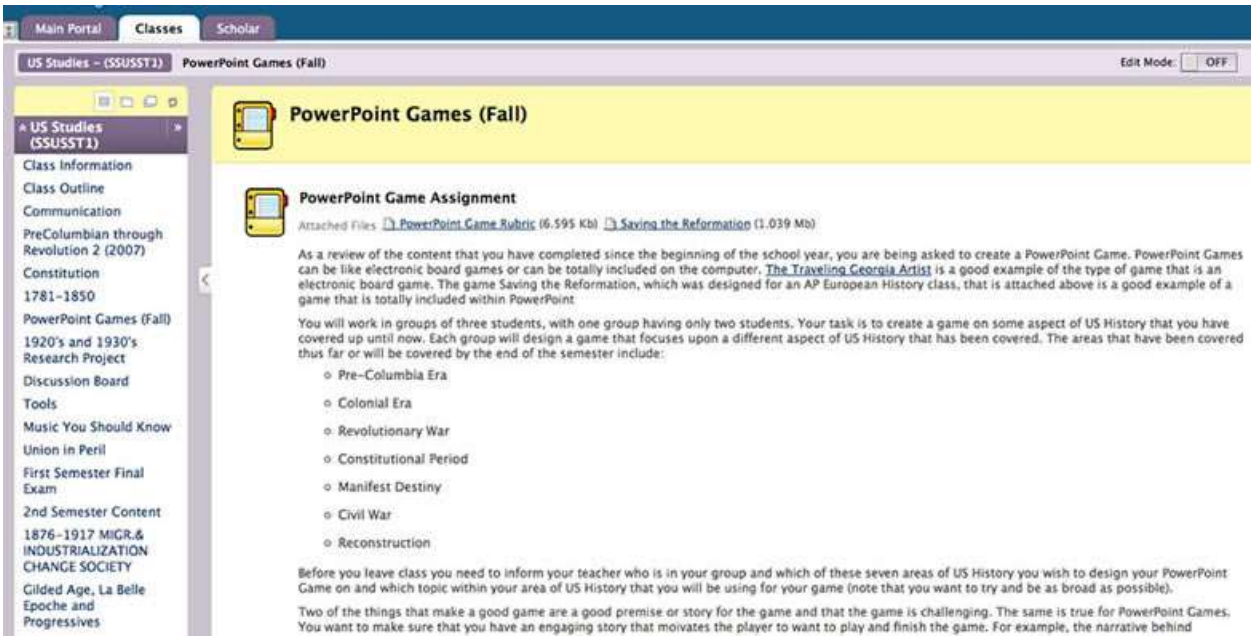
Both exams were broken down into the respective sections that corresponded to the topics on which the students completed their homemade PowerPoint games. The students' score for each section was recorded to allow for comparisons between how the students did on the questions that were related to the unit their game was based on compared to the other units. A total of three analyses were conducted using *Statistic Program for the Social Sciences* (*SPSS*). The first analysis compared the means of the students' exam scores on questions that were related to the games students designed to questions that were not related to the games for both the mid-term and final exams. The second analysis was a paired sample *t*-test, which was a more robust measure given that the game and non-game scores represented two assessments from the same group of students.

Sample and Implementation

This study involved 52 grade 11 students (i.e., 28 male and 24 female) in two sections of a United States Studies course at a laboratory high school located in the American Midwest. The students were part of a laptop initiative, with this study occurring during the second year of this initiative. The students' US Studies course was delivered electronically through a course management system (CMS), and approximately half of the students' courses were delivered in this fashion.

In this instructional environment, while the teacher was in the room, the instruction was primarily offered via the CMS and the teacher's role was to supervise the class, facilitate the students' use of the course content in *Blackboard,* provide technical support, and deliver any supplemental instruction deemed necessary.

Figure 1. Screen shot of the students US Studies course through the CMS



In the study, students created their own homemade PowerPoint games as one method of review for the multiple-choice portions of both their mid-term and final exams. These games were created using the six-stage method described by Rieber, Barbour, Thomas, and Rauscher (2008). Once the students had constructed their own games, they played the games created by other students prior to taking their online examinations. During the Fall semester, the students worked in groups of three to create a homemade PowerPoint game to review one of seven units that they had covered during the first semester. The units were assigned to students on a first come, first serve basis to ensure that games were created for all seven units. The instructional materials posted in *Blackboard* for the students to utilize included an *MS PowerPoint* game template, hand-outs and instructional videos related to creating action buttons and hyperlinks in *MS PowerPoint* and for writing higher-order questions based upon Bloom's taxonomy (see Appendix A for a copy of each of these instructional items). Students also submitted drafts of their stories and a sample of their questions to their teacher and a member of the homemade PowerPoint games research staff for feedback. Upon completion of the own game, students were given two class periods to play each other's games.

During the Winter semester, the students worked in the same groups of three to create a homemade PowerPoint game to review one of nine units that they had covered during the second semester. Again, the units were assigned to the students based upon their own request, ensuring that each of the nine groups covered each of the nine different units. The same instructional materials and feedback process that was used during the first semester was again utilized. Once they completed their own games the students also had two one-hour classes in which to play others' games.

Limitations

Several technical issues were experienced with the delivery of both exams that limit the data generated by this study. During the mid-term exam a number of students experienced difficulties with how the exam was delivered by the CMS. As some students entered the online

exam the CMS froze on them and prevented them from completing the exam. The teacher made the decision to close the exam to all students and have the students complete the exam the following day. As some students were able to access the exam and had started, and all students were able to see the first screen, the students were able to gain prior knowledge of four to eight questions (i.e., questions on the first screen and the second screen of the exam). An analysis of the student performance on these questions in comparison to the remaining questions indicated that there were no differences in how the students scored. As such, the decision was made that this limitation did not threaten the validity of the assessment.

The technical issues experienced with the delivery of the mid-term exam in the CMS were resolved prior to the final exam. However, prior to the students taking the final examination an incorrect version of the exam was loaded into the CMS. This version of the final exam did not contain an equal number of questions from each of the nine units, and in fact excluded questions from three of the nine units. This meant that not all students had questions from both their game topic and non-game topics. It also meant that an incorrect question had an unequal impact on the student score for that topic unit (e.g., one incorrect answer in an unit where there were only three questions had a much larger impact than a single incorrect answer in an unit where there were twenty-six questions). Because this exam had not been field tested, we conducted an item analysis of the exam questions using *MicroCAT Testing System*. The results of this analysis indicated that 56% of the questions were considered easy, 31% were considered challenging, and 13% were considered difficult. As this was roughly equivalent to the breakdown from the originally planned exam, the we felt that over the course of this multi-year project that these student results would compromise only a small percentage of the overall sample – and could be removed if their performance skewed the data from the overall sample – and therefore should be included in the analysis for this initial year of data collection.

Results and Discussion

Forty-nine students (i.e., 28 male and 21 female) successfully completed the mid-term examination. Table 1 provides for both classes, individually and combined, the mid-term exam average score for the unit students completed their game and their average score on the other six units.

Table 1. Student Average Scores By Class On Mid-Term Exam

	Class 1	Class 2	Total
Exam Score in Game Area	5.76	4.72	5.35
Average Exam Score in Non-Game Areas	5.10	4.71	5.01

There was a slight increase in the average student scores on the unit for which they designed their game compared to their average scores on the other six units. However, this result was not significant with the paired sample *t*-test, $F(1, 48) = -1.445$, $p > .05$. Generally speaking students did best on the Revolutionary War unit questions (μ=6.1) and worst on the Civil War unit questions (μ=3.9).

Table 2. Student Average Scores By Class On Final Exam

	Class 1	Class 2	Total
Exam Score in Game Area	6.89	6.07	6.49
Average Exam Score in Non-Game Areas	6.50	6.50	6.50

Fifty-one students (i.e., 27 male and 24 female) successfully completed the final examination. Table 2 provides similar information about the students' performance on the final exam.

In this instance, one class scored slightly higher on the portion of the exam that focused upon the topic of their game, while the other class scored slightly less. Overall there was no real difference in student performance on the portion of the exam on which their game was based compared to the remaining portions of the exam. Similar to the mid-term exam, the difference in student performance between the two sections of the exam was not significant with the paired sample *t*-test, $F(1, 34) = .376$, $p > .05$. Again, generally speaking students did best on the World War I unit questions (μ=8.4) and worst on the Gilded Age unit questions (μ=4.0).

We then combined the student scores from both semesters into a single data set. Table 3 provides the students' performance on the homemade PowerPoint game portion and non-game portions of both exams.

Table 3. Student Average Scores On Both Exams

	Total
Exam Score in Game Area	5.82
Average Exam Score in Non-Game Areas	5.77

Similar to the Fall semester, and one of the two classes during the Winter semester, there was a small improvement in the students' scores on the questions based upon their homemade PowerPoint game topics compared to the remaining questions. The difference between these scores was again not statistically significant.

Due to the difficulties described earlier in the limitations section, we also chose to conduct both a parametric correlation and a non-parametric correlation (also due to the small sample size) analyses to determine if there was any relationship between the students' scores on the questions associated with their game topics and the remaining questions from the non-game topics. The two sets of questions were found to have a statistically significant correlation using both the parametric and non-parametric measures for the mid-term examination. This indicates that there was some relationship between the students' performance on questions associated with the topic that they constructed their homemade PowerPoint game and their performance on the other questions on that exam. The correlation analysis was not significant for the final examination indicating that there was no relationship between the two sets of questions on this exam.

The statistically insignificant results found in this study were consistent with the results found by Barbour, et al. (2011). While these authors did not experience the same methodological challenges present in this study, Barbour and his colleagues speculated that their findings were – in part – due to their small sample size (i.e., 35). The results of this study were based upon two assessments of 52 different students (i.e., a total sample size of 100). It is reasonable to speculate that the small sample size may also be responsible for the statistically insignificant results in this study.

Beyond the small sample size, the promise of homemade PowerPoint games as a design activity – according to the literature – was based on three aspects: 1) students constructed their own knowledge through the creation of an artifact (Papert, 1991); 2) students writing concise narratives (Moore, 1993, 1994); and 3) students writing their own higher order questions (Wong, 1985). If we examine these promises in relation to this study, students created their own artifacts, however, the results of this study did not indicate that students were able to construct their knowledge any better than other methods of independent review the students undertook. One of the reasons for the lack of difference may be how the design activity was used. Kafai and her colleagues (Kafai, 1994, 1995; Kafai, et al., 1997; Kafai & Harel, 1991) used the design activity as an

instructional strategy to cover original content and reported an increase in student learning. Even with its methodological issues, Parker (2004) also used the design activity as a way to cover original content and reported increased gains in the treatment group. However, Barbour, et al. (2011) and this study used the design activity as a method of reviewing material that had previously been covered by the teacher. Unfortunately it was beyond the design of this study to determine if how the design activity was used was indeed a factor.

Conclusions

Previous research into the use of homemade PowerPoint games had largely been qualitative in nature, so the goal of this study was to explore whether criterion-reference tests could be used as a way to evaluate the use of game design on learning. Based on the results of the two examinations there were no statistically significant differences in the students' scores on portions of the exam where they did create PowerPoint games and portions of the exam where they did not create games. While there may not have been a statistically significant difference in student performance during this first year, the initial reactions from the students were positive. The students indicated, to both the teacher and us, that they enjoyed this activity as a means to review for the multiple-choice portion of their examinations. In addition to the students, the teacher was also quite pleased with this as a classroom activity in this online delivered course.

Unfortunately, there were technical problems with both the exams, which limited the results of this first year of data collection. Based on the lessons learned about CMS and the reliability of the two examinations, we addressed several methodological issues for the second year of data collection (which is currently being analyzed). Additionally, while further examination of whether the use of the design activity as a method to cover original content or review previously covered materials is beyond the ability of this study, we have the ability to incorporate an analysis of the level of writing contained in the game narratives and whether the questions written were indeed higher order questions into future rounds of data collection.

The information presented in this article represented the results from the first year of a two-year examination with this subject area and population of students. At this stage of the study, we were only able to conclude that this one teacher was able to use an innovative, constructionist design activity (that we viewed as more authentic and motivating on the part of students) to achieve the same student performance as other instructional methods. From the teacher's perspective the biggest problem with the homemade PowerPoint games was that instead of getting on *mySpace* or *Facebook* when they were supposed to be doing other work, the students were now going to play the homemade PowerPoint games they had created.

Clearly further research is needed. Future rounds of data collection will increase the sample, which may assist in drawing firm conclusions about the effectiveness of homemade PowerPoint games as an example of a design activity that can aid students in a deeper historical understanding. Subsequent cycles of data collection will also allow us to analyze the student narratives and questions to determine whether their homemade PowerPoint games live up to the expectations of the project proponents. Exploring these additional variables may help to better explain future student performance data. A better understanding of these variables would also allow the teacher to be able to modify the instruction and support provided to the students, and allow us the ability to modify the instructional materials that are designed to assist the students in the creation of their homemade PowerPoint games.

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Appendix A
PowerPoint Game Assignment

PowerPoint Game Rubric (6.595 Kb) [LINK]
Saving the Reformation (1.039 Mb) [LINK]

As a review of the content that you have completed since the beginning of the school year, you are being asked to create a PowerPoint Game. PowerPoint Games can be like electronic board games or can be totally included on the computer. The Traveling Georgia Artist [LINK] is a good example of the type of game that is an electronic board game. The game Saving the Reformation, which was designed for an AP European History class, that is attached above is a good example of a game that is totally included within PowerPoint

You will work in groups of three students, with one group having only two students. Your task is to create a game on some aspect of US History that you have covered up until now. Each group will design a game that focuses upon a different aspect of US History that has been covered. The areas that have been covered thus far or will be covered by the end of the semester include:

Fall Semester	Winter Semester
* Pre-Columbia Era	* Great American Wild West
* Colonial Era	* Gilded Age
* Revolutionary War	* Illinois Constitution Test
* Constitutional Period	* Progressive Era
* Manifest Destiny	* WWI
* Civil War	* 1920's - 1930's
* Reconstruction	* World War II
	* WWII to Present
	* Viet Nam

Before you leave class you need to inform your teacher who is in your group and which of these seven areas of US History you wish to design your PowerPoint Game on and which topic within your area of US History that you will be using for your game (note that you want to try and be as broad as possible).

Two of the things that make a good game are a good premise or story for the game and that the game is challenging. The same is true for PowerPoint Games. You want to make sure that you have an engaging story that motivates the player to want to play and finish the game. For example, the narrative behind Monopoly is that you are a real estate tycoon and your goal is to purchase as much real estate as possible in order to bankrupt your opponents through rental fees. After you have selected the topic for your game, the next step is writing the story or narrative for your game. By [DATE] you need to submit your story to your teacher and {the researcher} ({e-mail address}) [LINK]) for feedback.

You also want to make sure that your game is the right level of challenge. In PowerPoint Games, the primary challenge comes from the questions included in the game. Factual level questions are too easy (and boring) regardless of the grade level you are targeting. It is important to focus on the instructional value of the game -- and value is added through good questions. Bloom's Taxonomy is an easy way to learn more about various levels of questioning. If you are not familiar with Bloom's

Taxonomy, here are two resources that explain what it is and provide a guide for using it when writing questions for PowerPoint Games:

* Bloom's Taxonomy [LINK]
* Question Frames for Developing Higher-Level Questions [LINK]

Your game will have a minimum of 30 questions in it. Each question should be written in multiple-choice format and have four possible responses. By [DATE] you need to submit three questions to your teacher and {the researcher} ({e-mail address} [LINK]) for feedback.

Finally, below are some resources that may be of assistance to you (including the general template that can be used and a hand-out and some help videos that illustrate how to create action buttons and other parts of the PowerPoint Game.

Resources

* Homemade PowerPoint Games resource site [LINK]
* Game templates site [LINK]
    - o Game template [LINK]
    - o Template for one style of questions [LINK]
    - o Template for another style of questions [LINK]
* Creating Action Buttons in PowerPoint [LINK]
* Windows Media help movies
    - o Creating PowerPoint game headquarters (movie) [LINK]
    - o Creating Questions for PowerPoint games (movie) [LINK]
    - o Giving feedback on PowerPoint games (movie) [LINK]
    - o Creating simple animation with PPT (movie) [LINK]
    - o Creating a hyperlink (movie) [LINK]

In addition to your teacher, if you need assistance while working on this project feel free to e-mail {the researcher} at {e-mail address} [LINK]. You will also have time during class on [DATE] to work on this project during class.

This assignment will be graded using the rubric attached to the top of this page. This assignment is due on [DATE].

About the Authors

Michael K. Barbour is an Assistant Professor of Instructional Technology at Wayne State University. With a Ph.D. from the University of Georgia, Michael's research interests focus upon the use of virtual schooling as a way to provide educational opportunities and the use of game design as a pedagogical strategy. He can be contacted at mkbarbour@gmail.com.

Jim Kinsella holds an M.A. in Humanities from Loyola University in Chicago. For the past decade he has taught at University High School in Normal, Illinois and with the Illinois Virtual High School, where is also the Coordinator of Instructors.

Lloyd P. Rieber is a Professor of Instructional Technology at the University of Georgia. He has published extensively on the use of dynamic visualizations in the design of interactive learning

environments. Lloyd's recent research is about the integration of computer-based microworlds, simulations, and games using play theory.