Detailing Real Play Experiences with Children of the Sun

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by

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Abstract

Educational games are undergoing a renaissance compared to previous attempts at making games that teach. This thesis looks at the game *Children of the Sun*, which was designed with practices advocated by this movement, to see how effective it was at teaching its learning objectives. The game, designed at Ball State by a team of students in an immersive learning experience, was created for use by the Indiana State Museum to use in conjunction with other materials to teach young students about the Middle Mississippian Native Americans. The game is a collocated, multiplayer experience where players act as chief of a village and assign villagers to the historically accurate tasks of farming, hunting, mound-building and raiding other villages. Qualitative methods, which focus on individuals and quality of data, were used as the research methodology. Data collected from a play session where students were asked questions before and after playing the game were coded and three major themes emerged. The idea of man vs. man conflict and inter-village violence was understood by the players who all spent considerable time raiding each other in the game. Related to this is the recognition of separate villages and an understanding that the Middle Mississippians had a space of living. The data show that there were some problems with the user interface in the game and that the win condition was not understood, but the students overcame most of these with peer-learning and an understanding of the context in the game. Analyzing the design of the game in tandem with these results shows that design decisions, particularly the effort put into raiding, corresponded with how well the students grasped these concepts. We find that *Children of the Sun* met some of its learning objectives—those associated with raiding, hunting, farming, and the idea of separate villages—while also being a game that the students considered fun.
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Introduction

The phrase "educational game" is one that many people associate with the edutainment games that rose in popularity until the early 1990s (Klopfer 2009). These games were popular both at home and in-school for their obvious emphasis on learning and apparent game-like nature, but for kids they often paled in comparison to commercial games made solely for entertainment. Many of these educational games were simply not fun. This market of educational games declined during the late 90s, but a new movement that started in the 2000s has taken its place. Educational games are a part of this new Serious Games movement which also encompasses training games, games used for advertising and several other types of games. The new focus for educational game designers is in making games where the gameplay and the learning are more tightly interwoven than the edutainment games of the 90s (Klopfer 2009). This is a difficult task. Transfer of ideas from a game context to real-world context is hard to achieve and frequently the skills and knowledge that a player obtains from playing a game will not transfer outside the realm of games (McClarty et al. 2012). Despite this there are many that believe and provide evidence of the ability of games to teach us and make us better people. Jane McGonigal, creator of games such as SuperBetter which is designed to help people overcome illness and Top Secret Dance-Off which is a community-driven game to encourage people to dance, is one of the biggest proponents of games and their abilities to affect our reality (McGonigal 2011). Ambient Insights, a market-research firm that specializes in educational and serious games, predicts that that the field of educational video games will continue to grow through 2017 (Adkins, 2013). More evidence and case studies on game design and learning outcomes will contribute to a better understanding of how to effectively design an educational video game that both teaches and is fun to play.

Children of the Sun (abbreviated as “CotS” following) is a collocated multiplayer iPad game where players take on the role of a Middle Mississippian village chief and have to manage their people to accomplish various tasks. This game was designed with the intention stated above so that the learning objectives are aligned with the design of the game. This means that playing the game encourages and rewards player behavior that represents what is known about the daily life of the Middle Mississipians. The explicit learning objectives that the game was designed to meet are listed below. Creating a design that is successful in this regard is challenging. Conveying subtle nuances is difficult in serious game design because players always bring their own experiences with them and may play the game in ways not anticipated by the designers.

The initial set of learning objectives and content to be included in the game was ambitious, and the team was unable to accomplish them all. The ones listed below are ones taken from the game manual (Johnson 2013) and generally agreed on by the team at the end of development. There was no formal discussion by the team of these learning objectives at the end of the development process which brings their validity into question. A formal discussion might have yielded a different list. However, these items were major concerns during the development of the game and are all represented in it to some degree.

1. The Middle Mississipians were mound builders.
2. There were multiple tribes that each lived in their own village.
3. Tribes competed for resources.
4. They farmed and hunted their food.
5. They raided other villages on occasion.
To evaluate how effective CotS was at meeting these learning objectives, research was conducted to examine how playing it changed students’ articulation of their knowledge and understanding of Middle Mississippian culture and life. These results along with the knowledge and involvement in the design process of the game were analyzed together to determine how design decisions contributed to what the children learned from playing the game.

**Historical Background**

“Middle Mississipians” is a term assigned to the various groups of Native Americans that lived in and around what is now the southeastern United States during 1000-1500 AD which is known as the Mississippian period. Much of what is known about them today comes from archeological evidence (Cobb 2003). The Mississippian were mound builders and lived in permanent settlements that ranged in size and complexity, but it is generally agreed upon that the Mississippian era represents the most complex of the prehistoric cultures in North America. The mounds held religious and political significance with the elites living on higher mounds than the rest of the people. Open plazas and community areas were usually situated near the central mounds with houses along the outside of these. Chiefdoms were sometimes surrounded by wooden palisades for defense and were usually located near floodplains and rivers. Archeologist are still discovering and revising ideas about political organization and hierarchy, but the size and scale of some chiefdoms led some to believe that there was a substantial amount of oversight and organization as well as social hierarchy in these settlements (Cobb 2003).

The Mississippian grew various crops including maize, beans, and squash (known as “the three sisters”) and also hunted animals for food. Many finely crafted artifacts made from shell, bone, stone and ceramic have been found in various sites. Many of these artifacts are adorned with religious iconography. These artifacts were traded among chiefdoms with some made from regional materials appearing in sites far away. Trade was important to Mississippian culture and was a way of showing respect and cooperation between chiefdoms. Reciprocity was a vital part of trading. Competition for more important resources such as wood meant that some chiefdoms would raid others on occasion or fight over land (Kellar 1983).

The largest known Mississippian site is Cahokia which remains impressive today due to the large mounds that still stand. Monk’s Mound as it is known stands 30 meters tall and is 6 hectares at its base. Estimates of population of Cahokia at its height range from 20,000 - 40,000 (Cobb 2013). The Angel site also referred to as Angel Mounds is one of the northernmost Mississippian sites and the most significant in Indiana. This site is located near Evansville, Indiana and is around 100 acres in total. Near the center of the settlement is a three-terraced flat-top mound that is about 650 by 300 feet and 44 feet tall. Population estimates put the entire site around 1000 people minimum (Kellar 1983).

**Game Design**

CotS was designed in collaboration with the Indiana State Museum for use in one of their Summer workshops for upper elementary and middle school students. The final product was to accompany exhibits about the Middle Mississippian Native Americans. The seed for the game came from a card game designed by Jim Romelfanger in a game design course that took place during the Fall of 2012. In the Spring of 2013 the basic thematic elements and ideas from the card game were reified
into an iPad game. This game was designed and created in fifteen weeks by a team of students enrolled in an immersive learning experience at Ball State University. The iPad was chosen as the target platform because the ISM wanted to take advantage of roughly 20 that they had in their possession. It was known from the beginning that the game would be something students play only once, and this factored heavily into the design of the game. For many students, this was their first time working on a game or a project of this scope. The experience was both a major learning opportunity as well as a project that had a real client and deadline.

The finished game is a collocated, competitive, multiplayer game where each player takes on the role of a village chief and has to manage 300 villagers by assigning them tasks. Up to four players can play together in the same room and interact with each other both in-person and in-game as they strive to build the biggest mound. The game has a time limit of ten minutes and once it is reached, the player who has built the biggest mound is declared the winner. There are four activities that a player can assign villagers to: mound-building, farming, hunting, and raiding. The main user interface is a single screen with touch sensitive locations for the above actions. Players gather villagers by holding down their finger on the screen. The gathered villagers can then be swiped over to one of the locations which are identified by highlighting that appears when the player has a group of villagers. The various tasks are discussed in detail below.
Mound-building was identified as one of the key cultural ideas to emphasize which is why it was made the win condition, although having a win condition at all was something that was debated. Villagers are assigned to mound-building by dragging them to the dirt patch in the middle of the village. Once there, the villagers will animate to the lower part of the screen and come back with baskets of dirt. They repeat this until the player unassigns them. After enough time a mound similar to the squarish ones pictured will appear where the dirt is, and it will continue to grow as more time passes. Growth is shown by discrete mound sizes, and a sound plays every time a new size is reached.

Farming and hunting are how the player gathers food to feed the villagers, who eat on a recurring schedule. The amount of total food a player's village has is represented by an icon showing pots and various food items such as corn. This icon changes based on the proportion of food to villagers. When villagers eat, a sound will play and there may be a change in this icon. The food icon may also change when food is produced by hunters or farmers. Each player's village starts out with enough food to feed everyone three times. Assuming the player has produced no food by the 2:40 mark, 100 villagers will die because there is not enough food to feed everyone. This was done intentionally to make the players notice that they need food while still giving them a chance to stay in the game.
The player assigns villagers to farming by moving them to the dirt patch in the top-left corner. Once here, the villagers simply stand around. This mechanic received less polish than the others in regards to visual and audio feedback. The only indication that the dirt patch is a farm where the villagers grow corn is an image of cornstalks that appears when the player has selected some villagers. Each farming villager produces food after farming for a set amount of time. There is no indication when this happens.

Villagers go hunting when the player moves a group of them to the deer icon in the top-right corner. The group of villagers move offscreen and the player has the option of switching to a world-map screen which allows him to see where his hunters are going. Switching to this screen is done by tapping a sparkling star in the top right corner. This screen shows the villages of all the players along with trees and icons that mark hunting grounds. The hunting mechanic is fairly complex, but the key points are that there can only be so many hunters in one area, and that hunters will try to hunt as close as possible to their village. Hunters produce food when they return from hunting and this is shown by having them move to a small hut on the village screen. The decision was made to have hunters continue to go out hunting after returning because it was thought that having to tell them to go hunting every time would be tedious.
Players can steal food and kill the villagers of other players by raiding that player’s village. This is accomplished by moving a group of villagers to the tomahawks in the top-right corner. Once selected, the world map screen appears and the player touches the village she wants to raid. Raiders will go to the selected village and attack. Villagers from both the raided village and the raiding one are killed during the raid. This mechanic received more attention than any other during the development process. Animations for the villagers leaving and attacking were created. On the world map, the attacking villagers move in a ring towards the selected village. A short dying animation makes it clear when a villager is killed. Shouting sound effects were created to represent the raiding party and intense drum music was also created for the raiding sequence. When a player is being attacked, a red flashing warning contributes to the overall atmosphere of raiding. All of these elements create a complete sequence of events with rich feedback.

Early on the team decided to make the game a collocated multiplayer experience. Visions of students sitting in a circle together were used as justifications for certain design decisions. In particular, the idea that a player might look at another’s iPad and use that information to strategically raid said player was one idea. One of the reasons the mound has discrete sizes is to make comparisons between players easier. There was also the hope that four students playing the game together would lead to faster discovery and understanding of the interface.

The team spent a considerable amount of time designing an appropriate interface for the game, and there were many competing ideas about what was best. This was one of the hardest parts of the design and development process. One of the main tensions was between providing the player detailed information and making the interface fun. During development, there were a few sessions of playtesting...
where kids played the game and team members observed. The results of these sessions were used to refine certain aspects of Children of the Sun. These sessions occurred relatively late in the development of the game, however, which made it difficult to implement radical changes; some recommendations were never implemented.

The main screen, pictured above, that players see throughout the game was based on diagrams of the Angel Mounds site. Included in the scene are huts, small ceremonial mounds, a plot for farming, an area for a large ceremonial mound, and wooden palisades surrounding the village as a whole. The nearby river matches descriptions that the Angel site was located near one as were most Middle Mississippian villages. The palisades also factor into the raiding sequence in which the raiding villagers stand outside them with weapons before rushing into the village through the small entrance. Music in the game was based off of traditional flute and drum instruments and provides an ambient atmosphere.

Research Methods

The main research question was “How does playing Children of the Sun change how students articulate their knowledge of Middle Mississippians?” The researchers were also curious to see how an unpolished user interface affected learning from the game. Because these are qualitative questions interested in “how” things occurred, qualitative methods as described in Stake (2010) were used. Emphasis was put on getting as much high quality data as possible from a small group of students to create a local theory of learning around CotS. The study was done at a private school in central Indiana with children from a third grade classroom. Pseudonyms for these students are used in this report. Eight
students were randomly assigned to two groups of four students each, and both of these were run as focus group sessions. This means that emphasis was put on having the students talk to each other rather than just answer questions asked by the researcher. The intervention group consisted of two girls, Amanda and Julie, and two boys, Mark and Andy. They were asked a set of semi-structured interview questions (Appendix A and listed below) before playing CotS to gauge their initial knowledge of Native Americans in general and Middle Mississippians in particular. Because of time constraints, the game time was shortened beforehand to be five minutes. After playing the game, the four students were asked some followup questions in the same format as before. The non-intervention group consisted of one girl, Samantha, and three boys, Alex, Bruce, and Chris. They did not play the game and were just asked some of the questions. This allowed for more data collection in the limited amount of time.

**Pre-intervention Prompts**

1. Who were the Native Americans.
2. What does being Native American mean?
3. Has anyone ever heard of the Middle Mississippians?
4. Has anyone ever read about Native Americans or been to a museum that talks about Native American history?
5. Has anyone heard of Angel Mounds or Cahokia?

**Post-intervention Prompts**

1. What was it like being the chief of a village?
2. Who experienced a raid? → Who was a raider? → Who got raided? → What that was like?
3. Who really wanted to build a big mound?
4. What did the Middle Mississippians do?
5. What do you think of the game you played?
6. Is there anything you would like to add that we did not talk about?
7. Do you have any questions for me?

The questions that were asked were designed to be open-ended and to encourage discussion amongst the students. Time constraints and short attention spans meant being selective about what questions to ask. The first two pre-intervention questions were designed to make students identify the main ideas they associate with Native Americans. Questions three and five asked specifically about the Middle Mississippians and named sites where they lived to see if the students had any exposure to them. Question four was designed to have students think about Native Americans in the context of museums and to give them a concrete experience to talk about as opposed to something read in a book.

The post-intervention questions focused on specific game activities and then the Middle Mississippians. Question one was used to gauge how much students embraced the role of village chief. Question two and its followups were meant to make players talk about the experience of raiding since it was suspected that the students would engage in it. Question three was used to analyze how strongly the win condition and main thematic element of the game was projected to the students. The fourth question is important because it required the students to take their experience playing the game and contextualize it about a real culture of people. The fifth question was used to judge the game on its merits as a game.
The last two questions were just probes for more responses.

**Analysis**

Roughly forty minutes of video—15 from the non-intervention group and 25 from the intervention group—were transcribed and coded by the researchers. The coding was done using a method described in Spinuzzi (2012). Before transcription, a set of starter codes was developed. These represented ideas that the researchers expected to find in the data such as references to hunting and raiding etc. After the footage was transcribed, both researchers went through the process of coding using the initial starter codes and other codes that emerged from the data. The transcribed data was put in a spreadsheet with each utterance getting its own row. Appropriate codes were then put in columns for each row.

The two sets of coded data were compared and combined to check biases and get a more complete set of coded data. Following this, the primary investigator went through the data and looked for axial codes. Axial codes are those that link other codes together. Several themes which we discuss below emerged from these axial codes. Refer to appendix B for a table showing the relationship between codes and themes. In addition to the coded data, comments from the students’ teacher and notes made by the researcher during the transcription and coding process are used in this report. We discuss the three main themes below.

**Man vs. Man**

The idea of conflict between humans showed up in both groups of students. Raiding seemed to dominate the intervention group’s play session. During the gameplay time, the raiding code shows up 20 times as opposed to 9 for hunting, and 5 for each mound and farming. Before the students had even figured out the user interface, Mark asked excitedly “So we can attack each other?” As he tried to figure out how to attack in the beginning of the game, the other three commented on the flashing red effect upon seeing it for the first time. The children learned quickly that seeing other villagers was a bad thing because it meant they were being raided. Andy, seeing other villagers outside his village for the first time exclaimed, “There’s bad people outside mine!” After this Mark said “I think I attacked all of them!” The red flashing on the other iPads suggests that he might have. A little later Andy asked which village was his. Based on the game interface and context, we can extrapolate that he had started a raid and gotten to the map screen where he was deciding which village to select. Julie also seemed curious about this. Based on her movements, it looked like she was trying to figure out raiding as well. One of the players succeeded in attacking Mark because he exclaimed “Everyone’s attacking me! Who’s attacking me?” He also asked about fighting back to which Andy responded “Go to their village and attack.” The players spent some time doing other activities, but near the end of the game, raiding came up again with everyone accusing Andy of attacking them. Raiding was so engaging that it overshadowed the win condition of building the biggest mound. The winning player, Amanda, was doubtful that she won until the researcher explained that building the biggest mound meant she had. When asked about raiding afterward, she expressed that it was “just fun” regardless of being the one raiding or raided. She was also the first to respond with “I think the Middle Mississippians went over to other people’s villages and fought” to a question asking what the Middle Mississippians did.

While the notion of violence between Native American villages occurred in the gameplay group,
it did not manifest in the non-gameplay group. The non-gameplay group recognized violence between Native Americans and the Pilgrims, but inter-village violence was not something they were confident about. This group also focused much more on conflict between man and nature. Hunting animals came up early between both groups during the initial questioning, and the non-gameplay group held onto this throughout most of the session. Samantha, brought up practicing with weapons for fighting. When the group was asked who the Native Americans fought, the response was wild animals such as wolves and mountain lions as well as the pilgrims. Several students seemed familiar with this story that Chris explained: "In a story I heard about Native Americans, some of the pilgrims had guns and they were spying on the Native Americans and going to shoot them, but they ran away before they shot them." Overall it seemed that these students' understanding of Native Americans was limited to those associated with the Pilgrims. The gameplay group didn’t mention Pilgrims most likely due to time constraints and the researcher not spending much time on the pre-intervention questions.

**A Space of Living**

Both groups recognized the idea that some Native Americans had a space of living. Gates or fences were considered important for protection from wild animals and other forces. Building houses was mentioned by both groups as well. The non-gameplay students talked about building houses out of wood and mud bricks. Andy from the gameplay group asked “How do you create houses?” and Mark said he would put in a bunch of houses if he made a game about the Middle Mississippians. Students in the gameplay group made specific references to their own villages and those of other players in the context of raiding. They noticed that hunters left the village and came back later. The center of the village was seen as important, and Amanda asked if they would have a well near the center or inside the mound. Students in the non-gameplay group talked about guards for the village and mentioned the chief throwing people outside the village if they broke rules.

The data suggest that children playing the game took ownership of the village and their position as chief even if they did not explicitly acknowledge it. The axial code “MY PEOPLE” shows up around 15 times during the play session. This code is associated with utterances that show ownership or responsibility toward the villagers. After realizing that all his villagers died, Mark started viewing villagers more as an exhaustible resource asking “What happens if all your people run out?” He had been using his people primarily for raiding other players’ villages which incurs loss of people on both sides. Running out of people meant he could no longer raid so he seemed to view having people as a means to raiding. Raiding also caused players to ask how to defend their villagers and fight back. When players tried to figure out unassignment of villagers from hunting they specifically said “your people” or “mine.” The recognition of villagers from other players also shows that the players associated villagers with the “chief” that was responsible for them.

Visual art helped create the sense of the Middle Mississippians having a place of living. The depiction of the village influenced how the students thought about the game. Andy asking about building houses makes sense because he saw them and understood that the player had some control to create things, namely the mound. Andy also mentioned the “gate” as he called it during the post-gameplay interview. During the game he recognized that his village was the area inside said gate because he talked about bad people outside of his village as mentioned above. The use of different colors for each player's village and villagers was designed for distinction. It made it easier for players to identify with their village and recognize that there were other villages.
**Overcoming Interface Issues**

The mechanic of farming worked and generated an appropriate amount of food based on the number of farmers, but it received the least amount of work concerning visuals and feedback. Since there is no visual change in the farmland even though food is being produced, there was some confusion during the game. Andy remarked afterward “…I was growing corn, but nothing grew.” Julie said that stuff grew on hers, but this does not happen in the game. What both of these students were referring to could have been the image that shows cornstalks on the farm. This is the only indicator that the dirt patch is farmland. Nevertheless, these students were actively assigning people to the farm.

The students did not understand how farming and hunting differed either. Mark explicitly asked during the post interview “So what’s the difference between growing crops and hunting?” We suspect that none of the players ever looked at the world map unless they were raiding because no one ever mentioned the little villagers on the world map that represent hunters. Players only commented about the hunters coming back and going back out again. None of them could figure out how to get the hunters to stop hunting either. Andy and Amanda commented that their hunters just kept coming back. While both of them talked about unassigning villagers, their understanding was that you held where the villagers were gathered and then moved them somewhere else. Since the hunters don’t really gather anywhere, it was not obvious that holding down on the deer icon would unassign them.

The necessity of food was realized only late in the gameplay session, and there were several areas besides farming regarding food production and consumption where feedback was lacking. The idea that villagers eat on a timer was never mentioned by the players. No student made any reference to the image of pots and food either. Andy did say around the 3:40 mark “Oh, my people are dying because I’m not growing food.” Mark attributed the loss of his villagers to being raided, but it’s likely that some of them starved as well. Since the game does not project when the villagers will eat, it’s easy to miss the change in the food icon that might occur.

The students playing the game had noticeable problems with the user interface, but overall this did not prevent them from playing the game or wildly misinterpreting things. The researcher tried to hold back on answering questions about the interface, but some confusions did need to be clarified so that they would not detract from the rest of the game. However, there were instances where experimentation and peer learning among the students was used to understand the user interface and various feedback. Before all the iPads had been distributed, Julie watched Amanda input her name and was then able to do so without asking questions. She also helped Mark enter his name. Mark explained that “Raid” means attack when Julie asked. There was also group discussion about how the villager assignment works, but it ended with all players asking the researcher what to do. Unassigning villagers from tasks was discussed by Andy and Amanda and they came to consensus about how to do it. All of these examples are affordances that the collocated design provide. Had the game been one played across the internet, this communication would not have been as likely if it was even possible.

**Discussion**

The results of the study and knowledge of the design process led us to several observations and recommendations. During the play session under discussion, mound-building was not mentioned much by the players. Amanda’s doubt about being the winner because she had the biggest mound gives another indication that the win condition was not clearly broadcast to the students. This is hardly
surprising considering that the game mentions only once at the beginning “Build mound to win.” Amanda read this screen out loud when it first appeared, but she did not even finish before it disappeared. Throughout the rest of the game, it is not projected enough that building the mound is the way to win. While the villager animations and mound size changes provide feedback, it was not obvious to these players that this should be where they focused their villagers. This group of students did not look at each other’s screens and compare mound sizes like the designers envisioned. During the post-interview all students raised their hands when asked “Who wanted to build a big mound?” Amanda, the winning player said “I liked building the mound. That was where most my people went. I guess that’s why it grew bigger and bigger.” She may have liked it, but her response shows no evidence of strategy or trying to win. The other three students were the same. A potential change that could improve the sense of competition would be to add notification to other players on their iPads when someone gets their mound to the next level.

Mark, asked early on about attacking other players and brought everyone’s attention to this element of the game. Raiding was the only way that players could directly interact with each other and this is one possible explanation for why it occurred so frequently. Another possibility is the idea of retaliation. Mark was the most aggressive player and it appeared that many players initiated raids against him after they were attacked. This cycle could have then repeated indefinitely. The time and effort that went into the raiding mechanic made it the most fun and exciting activity which is another explanation. It had plenty of both visual and audio feedback. The animations used in raiding were the most complex and required considerable time designing. The chanting and intense drum music create an exciting atmospheric change compared to the rest of the music in the game. Raiding was also the aspect of the game that left the strongest impression on the students. Amanda claimed that the Middle Mississippian went over to other villages and fought each other. Part of the original design specification for the game included trading and we wonder if players having another way of interacting with each other would have reduced the amount of raiding that happened.

Overall, the emphasis that the designers put on the four aspects of raiding, farming, hunting, and mound-building in the game correspond with how much they were understood and acted on by the students. Raiding which received the most work was understood with minimal confusion and it was mentioned most the most during the game. Hunting was understood to produce food, but the players could not figure out how to unassign hunters because it differed from the way villagers did other tasks. Having the hunters continue go out hunting may have eliminated tedium, but it caused this confusion. Because the navigation to the other screen was unintuitive and never emphasized, players missed out on a significant part of hunting that would have shown how hunting grounds were areas that villages competed over. There was little confusion about building the mound, and every player did so to some degree, but they didn’t have the sense of competition or understand that building the mound was how to win. Farming was also understood due to the image of cornstalks even though it didn’t correspond with actual food production. When asked about what the Middle Mississippian did, Mark said that they probably farmed a lot. We can see then how the work that was put into certain areas influenced what the players did and understood. Some of the same interface issues brought up here were mentioned in the notes from a playtest, but the team did not act on these and take enough steps to resolve them.

Did the designers create a game that taught as well as being fun? The latter is easy to judge based on feedback from the students who played it. Amanda said the game was fun and both Andy and Mark asked if it was going to be on the app-store. They may have just been curious, but we suspect that they wanted to be able to play it again. Andy later asked about making games and how it’s done
and Mark asked about making money from games. Would the students have asked these same questions if the game had quiz questions and was more obviously trying to teach them something? Before playing the game, Andy asked if it would be asking questions about Native Americans. He, at least, had experience with “games” that were probably just quizzes. The feedback from the students showed that they thought of CotS as a “regular game” that they might play in their free time.

**Threats to Validity**

There were some difficulties imposed by the setup of the study. The time window was short which meant skipping over some opportunities for detailed questioning. In some responses, students seemed to be fishing for the “right” answer rather than saying what was on their mind. Both researchers were involved with the design of the game which means that there is a certain amount of bias toward the data collected from the play session and how it relates to the design. The primary researcher’s lack of experience coding data could mean that some data was misrepresented or omitted, but this is why the project advisor coded the data as well. It’s possible that some of the connections made are not as strong as stated because of bias, but care has been taken in being true to the data and basing claims off of it. If the game had a robust logging framework that kept track of player actions and screens viewed, some of the speculation in this report about what players were doing could have been replaced with actual data.

The data collected and discussed here is based on one group of students who played the game, and as such these results should not be generalized to all students. Ethnographic qualitative studies are concerned with the individuals in a particular environment and the quality of the data as opposed to quantitative methods which are concerned more with the amount of data. What we have presented is a local theory of learning that allows for broader studies to be done. A study on collocated multiplayer games or games featuring Native Americans, to name a few, can use the information presented here as anecdotal evidence for proving some claim.

**Conclusion**

Given the above observations, we find that *Children of the Sun* met some of its Learning Objectives (abbreviated below as “LO”) while also being a fun game for the students. The results of the session show us that raiding was the idea most articulated and understood by the students after playing the game. Raiding was a part of Middle Mississippian culture, and *Children of the Sun* made students consider this inter-village violence. This was LO5. The students were also very aware of their separate villages and how their villagers were different from the other players’ satisfying LO2. Farming and hunting were mentioned five, and nine times respectively throughout the game, but the players did not notice food production and consumption so the importance of these tasks was not as evident to them as the design intended. Still, the mention of both of these in the post-interview show that the players thought they were important. This satisfies LO4. It’s difficult to justify that the students grasped the importance of mound building. While Amanda might have liked doing it, she didn’t understand the significance and neither did the other players. This means that LO1 was not met. LO3 was definitely not met. Competition for resources was not understood because the world map where players could see their hunters was probably never viewed.

A follow-up with the students’ teacher revealed that the class as a whole was interested in the game and the students who played it. We can conjecture that the students who played the game told the
others about raiding before anything else. The understanding that the Middle Mississippian had a place of living and the recognition of a chief are important parts of Middle Mississippian culture that students articulated. We claim that the game expanded these students’ understanding of Native Americans beyond the Indians and Pilgrims stories, and it made them consider the permanent living spaces and raiding that are characteristics of the Middle Mississippian. It also reinforced the idea of hunting as well as introduced the importance of farming for survival. The game failed at teaching one of the defining characteristics of the Middle Mississippian, but the students did have fun playing it.
References


Appendix A

Pre-intervention Prompts

6. Who were the Native Americans.
7. What does being Native American mean?
8. Has anyone ever heard of the Middle Mississippian?
9. Has anyone ever read about Native Americans or been to a museum that talks about Native American history?
10. Has anyone heard of Angel Mounds or Cahokia?

Post-intervention Prompts

8. What was it like being the chief of a village?
9. Who experienced a raid? → Who was a raider? → Who got raided? → What that was like?
10. Who really wanted to build a big mound?
11. What did the Middle Mississippian do?
12. What do you think of the game you played?
13. Is there anything you would like to add that we did not talk about?
14. Do you have any questions for me?

Appendix B

<table>
<thead>
<tr>
<th>Codes</th>
<th>Themes</th>
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<tbody>
<tr>
<td>Starter or Open Codes</td>
<td>Axial Codes</td>
</tr>
<tr>
<td>S: RAIDING</td>
<td>MAN VS MAN</td>
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<tr>
<td>O: FIGHTING</td>
<td></td>
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<tr>
<td>O: DEATH</td>
<td></td>
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<tr>
<td>O: RETALIATION</td>
<td></td>
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<tr>
<td>O: PILGRIMS</td>
<td></td>
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<tr>
<td>Starter or Open Codes</td>
<td>Axial Codes</td>
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<tr>
<td>S: MOUND</td>
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<tr>
<td>S: FARMING</td>
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<tr>
<td>S: RAIDING</td>
<td></td>
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<tr>
<td>O: DWELLINGS</td>
<td></td>
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<tr>
<td>O: MUD BRICKS</td>
<td></td>
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<tr>
<td>O: PALISADES</td>
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<tr>
<td>O: VILLAGE</td>
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<td>O: DEFENSE</td>
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<td></td>
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<tr>
<td>S: INTERFACE</td>
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<tr>
<td>S: RAIDING</td>
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<td>O: DEATH</td>
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<td>O: MOVING</td>
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<tr>
<td>Clarification</td>
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<tr>
<td>O: Confusion</td>
<td></td>
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<tr>
<td>O: Peer Learning</td>
<td></td>
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</table>
IRB Documents

The following documents are those that were sent to the IRB for the project's approval. Identifying information that could compromise the anonymity of the research subjects has been redacted or not included.
IRB HUMAN SUBJECTS RESEARCH APPLICATION AND PROTOCOL FORM

PRINCIPAL INVESTIGATOR INFORMATION

The Principal Investigator (PI) MUST be a Ball State University Faculty, Staff, or Graduate Student. A BSU faculty must be the PI for any Undergraduate Student research.

Principal Investigator Name: Steffan Byrne

Current Degree: BA Department: Computer Science

Email: sjbyrne@bsu.edu Phone Number: +1 (765) 285-8641

Affiliation: BSU Undergraduate Student

Principal Investigator Research Experience:

1. Have you ever been a Principal Investigator?  
   - Yes  
   - No

2. How many years have you been conducting research in any capacity?  
   - 0 Years

3. Have any of your prior studies been suspended or terminated by BSU or a third party?  
   - Yes  
   - No

4. Have you or any member of your research staff ever been sanctioned for unethical behavior in research activities?  
   - Yes  
   - No

PRINCIPAL INVESTIGATOR AGREEMENT:

☑ I have read and understand the Ball State University's "Policy for the Protection of Human Subjects in Research," as stated in the Faculty and Professional Personnel Handbook, and I agree:

   a. to accept responsibility for the scientific and ethical conduct of this research study,
   b. to obtain IRB approval prior to revising and altering the research protocol, informed consent, or study documents, and
   c. to immediately report any serious adverse events and/or unanticipated problems as a result of this study to the IRB within 24 hours.

KEY PERSONNEL

List all Key Personnel (including Faculty Advisor), other than the PI, who will have a role in the research project (Thesis and Dissertation Committee Members are not required unless they will work with you on your research project):

<table>
<thead>
<tr>
<th>Personnel Name</th>
<th>Department/Organization</th>
<th>Role on the Study</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paul Gestwicki</td>
<td>Computer Science</td>
<td>Faculty Advisor</td>
<td>Guiding the PI and ensuring quality of research</td>
</tr>
</tbody>
</table>

HUMAN SUBJECTS RESEARCH TRAINING
COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

As of January 1, 2010, Ball State University policy requires that all Principal Investigators, Faculty Advisors, and all Key Personnel complete the CITI Training. To comply with the educational requirement, you and all key personnel (including faculty advisor) must have completed the online training modules on the protection of human subjects. For more information and link to CITI’s website, please go to the Office of Research Integrity website.

Have you and all key personnel completed the required online training modules? ☐ Yes ☐ No

NOTE: If this is your first BSU IRB submission, please include a PDF copy of your CITI Training Certificate, along with your Key Personnel.

Responsible Conduct of Research Training Modules (RCR): If your project is federally funded by the National Science Foundation, you and all key personnel (including faculty advisor), must complete the Responsible Conduct of Research Training Modules on CITI, along with the Basic/Refresher Course or Biomedical Course.

OTHER TRAINING

Are there any specialized training(s) required for your project (i.e., certification for medical procedure, training in crisis response, etc.)? ☐ Yes ☐ No

EXPORT AND DEEMED EXPORT CONTROL

The information below is required to be answered as part of the Federal Export and Deemed Export Control Regulations and as part of Ball State University’s Export/Deemed Export Control Program. These regulations apply to any transfer of, release of, or access to, controlled technologies/organisms either to a foreign country or by a non-permanent resident foreign national in the United States.

DEFINITIONS:

Foreign National: An individual who is not a natural-born US citizen or:
(1) is granted permanent residence, as demonstrated by the issuance of a permanent resident visa (i.e., "Green Card");
(2) is granted US citizenship; or
(3) is granted status as a "protected person" under 8 U.S.C. 1324b(a)(3).

Dual-Use: The technology/organism has both civilian and military uses.

Fundamental Research: "...basic and applied research in science and engineering where the resulting information is ordinarily published and shared broadly within the scientific community." (15 CFR §734.8) In general, for research to be considered "fundamental," it needs to have unrestricted access and/or dissemination (such as through publications, public presentations, available on the internet, etc.). Proprietary results/products (or where these will not be publicly available) are generally not considered fundamental research.

Released: When technology or organisms are available to foreign nationals for visual inspection (such as reading technical specifications, plans, blueprints, etc.); when technology is exchanged orally; or when technology is made available by practice or application under the guidance of persons with knowledge of the technology.

Technology: Specific information necessary for the "development," "production," or "use" of a product.

Use: Specific information necessary for the operation, installation (including on-site installation), maintenance (checking), repair, overhaul and refurbishing of a product.

1. Does the research involve any of the situations below?

-----------------------------
a. US Federally funded and the funder will control/restrict the release of research results/products.
b. Research is funded by and/or will flow through a foreign government
c. Involves proprietary technologies and/or computer/communications source codes.
d. Uses technologies/organisms that are classified as "dual-use."
e. The research/data/product has (or will have) release and/or access restrictions (beyond reasonable/customary review period).
f. Research involves classified information/technology.
g. Technology/software/data being used is under the exclusive control of the US Government.
h. Involves controlled/restricted weapons, law enforcement, security/surveillance, and/or non-publically available encryption technologies and/or information.
i. Uses GPS technologies in a foreign country.
j. Technology/software/information will be transferred to, released to and/or left in a foreign country.
k. Involves items known to be on the Commerce Control List by the Government Printing Office (GPO). The file is updated every 48 hours.
l. A member of the research team is a non-permanent resident foreign national.

If the research/data/product is classified as "fundamental research" or determined to be exempt from Federal Export Control or Deemed Export Control regulations then no special license(s) will be required. If controlled Exports/Deemed Exports are (or will be) involved, then specific Federal Licenses may be required.

RESEARCH PROJECT INFORMATION

Project Title: Detailing Real Play Experiences with Children of the Sun

*The Project Title must match all documents and IRBNet.

SUBJECT INFORMATION

Total Number of Participants (Estimate or Range): 4-8
Gender: Both Male and Female
Age of Participants: Minimum Age 7 Maximum Age 9

SUBJECT POPULATION

Check all that apply:

☐ Normal Adult Population (18 years or older)
☐ Students (18 years or older)
☒ Children (Minors)/Students (0-17 years)*
☐ Pregnant Women (Physical Experiments, Examinations, or Medical Research)*
☐ Prisoners*
☐ People with Diminished Capacities*
☐ Persons undergoing and/or receiving Health, Medical, Rehabilitative, Treatment/Services, etc. *
☐ Persons undergoing Social/Psychological Counseling*
☐ Other (Explain):

*Protected Population: This will require either Expedited or Full Board Review. Please explain the purpose of using this population:

The research subject is an educational video game created for this target audience.

SUBJECT RECRUITMENT

Will the research project be advertised on any media? ☐ Yes ☐ No
RECRUITMENT PROCEDURES
Describe your recruitment procedures:

Parental consent forms explaining the nature of the research will be given to the parents of children in [REDACTED]. Following parental
approval, assent from each child will be confirmed.

SUBJECT INCLUSION/EXCLUSION CRITERIA

Inclusion Criteria: A set of conditions that must be met in order for subject(s) to participate in the study (including age of the participants)
The subject is a student in [REDACTED]

Exclusion Criteria: A set of conditions that the subject(s) may not be allowed to participate in the study.
none

POTENTIAL RISKS/DISCOMFORTS TO THE SUBJECT(S)

Will there be any anticipated or potential risks or discomforts to the subject(s) during the study?
(The federal regulations (45 CFR 46) define minimal risk, "...the probability and magnitude of harm or discomfort anticipated in
the research are not greater in and of themselves that those ordinarily encountered in daily life or during the performance of
routine physical or psychological examinations or tests.")

DECEPTION/COERCION OF SUBJECT(S)

Deception- Witholding information for the purpose of the study.
Coercion- Intimidating, threatening, or force to participate.

Will this project involve either Deception or Coercion? Yes No

MINIMIZING THE SUBJECT(S) RISK

Will there be any precautions and safeguards required to minimize the risk(s) to the subject? Yes No

SUBJECT AND STUDY BENEFITS

Will there be any benefits to the subject and/or to the study? Yes No

If Yes, Explain: The subject may gain a better understanding of the lives of the Native Americans that lived in and around the Midwest
region.

PROJECT SITE LOCATION

Provide the following information where you will conduct your study (location of data collection, interviews, etc.)

Check all that apply:

☐ Ball State University Campus (including Burris Laboratory School)
☒ Off-Site Locations or Schools

Locations/Schools: [REDACTED]

☐ Internet (Be sure to read any policy regarding data ownership and protection)
☐ Online Survey Sites (Check all that apply)
☐ IU Ball Memorial Hospital (Contact Alfreda Bright- abright@iuhealth.org. BMH's IRB)
LETTER OF SUPPORT: Any research that is conducted at a non-BSU institutions or organizations is required to obtain a Letter of Support. The Letter of Support must be on the institution or organization's letterhead and signed by a person of authority to grant access to the site for the study (i.e., Director, Manager, Principal, Superintendent, etc.). The Letter of Support must be uploaded on IRBNet as part of your package submission. An email message is NOT sufficient to meet this requirement.

In cases where sites, agencies, etc., have not been identified yet (original submission), please indicate this in the Application and make sure to upload the letter on your IRBNet project number once the letter is obtained. This is handled as a Modification process once the project has been approved.

COLLABORATIVE/MULTI-SITE RESEARCH PROJECTS
Will the proposed research project be conducted as a collaborative research (i.e., research that involves two or more institutions/ organizations that hold Federalwide Assurances* and have duly authorized IRB's)?

*Federalwide Assurance- An institution committing to the Department of Health Human Services that will comply with the requirements in the HHS Protection of Human Subjects regulations at 45 CFR part 46.

☐ Yes  ☐ No

FUNDING
Have you applied for funding or have receive funding for your project?  ☐ Yes  ☐ No

SIGNIFICANT FINANCIAL CONFLICT OF INTEREST, CONFLICT OF INTEREST/CONFLICT OF COMMITMENT STATEMENT
If your research project is Federally Funded, either directly (ex., you are the grant recipient) or indirectly (ex., you are the sub-awardee), have you (PI) and your BSU research team members (faculty, staff, and/or students) filled the Annual Significant Financial Conflict of Interest (SFIC) Disclosure Form?

I and all applicable BSU research team members have also reviewed the BSU "Policy on Conflict of Interest and Conflict of Commitment" and have filed, or will file all necessary paperwork (if applicable). This includes student researchers. The policy can be found in the BSU Faculty and Professional Handbook.

DATA- COLLECTION, STORAGE, AND SECURITY
1. Will any information regarding the participant’s identity (e.g., name, DOB, SSN, ID Number, address, phone, etc.) be collected on Informed Consent(s) or Study Documents?

☐ Yes  ☐ No

If Yes, explain why and what security measures will be taken:

Subjects’ names will be recorded on Consent and assent forms

If you are collecting identifiable information, will the information be stored with the participant's responses?

☐ Yes  ☐ No

2. Are you planning on using the participant’s identifiable information on publications or publications?

☐ Yes  ☐ No
3. Will you be using Audio or Video Recording for your project?
   - Yes
   - No

Will the recordings be used for presentations or publications?
   - Yes
   - No

4. Where will the data (electronic/paper) be stored during and after the study is complete? (Check all that apply):
   - Locked Cabinet/Office
   - Password Protected Computer/Flash Drive/DVD/CD or other Storage Media
   - Home
   - Other

5. How long will you keep the data (raw and final)?
   3 years

If your data (raw and final) is retained indefinitely, please provide an explanation for why and make sure that you have an explanation on the informed consent:

6. Who will have access to the raw and final data besides yourself? (Check all that apply):
   - Faculty Advisor
   - Research Team (Co-PI, Research Assistant, Graduate Assistant, etc.)
   - Off Campus Collaborator or Consultant
   - Sponsor
   - Federal Agency (NIH, FDA, NSF, etc.)
   - Other

DATA CONFIDENTIALITY/ANONYMITY

Anonymous Data: Defined by where the researcher(s) may not identify the subject with his/her data at any time during the study.

Confidential Data: Defined by when coding the identity of the subject and his or her data by using personal identifiers, there exists a means for identifying the subject.

Indicate whether your data is Anonymous or Confidential and explain what provisions will be taken to maintain privacy and security:

Data will be anonymized and pseudonyms will be used in the final report.

SPECIAL TYPES OF DATA

1. Family Educational Rights and Privacy Act (FERPA)
   A. Will educational records or information found in educational records, as defined by FERPA be used?
      - Yes
      - No

2. Health Insurance Portability and Accountability Act (HIPAA)
   A. Will health, medical, or psychological records or information found in medical/health records, as defined under HIPAA be used?
      - Yes
      - No

COMPENSATION
1. Are subjects being paid or receiving incentives for participating in the study? (Yes) [ ] No
2. Are subjects being reimbursed for expenses (travel, gas, food, hotel, etc.)? (Yes) [ ] No
3. Will students receive extra credit for a course if they participate in the study? (Yes) [ ] No
4. Will students receive class or departmental research credit for their participation? (Yes) [ ] No
5. Is there a completion bonus? (Yes) [ ] No
6. Will there be compensation for research-related injury? (Yes) [ ] No
7. Other (Please Explain): 

If you are using BSU funds, you will need to contact the BSU Office of University Controller (765-285-8444) or visit their website for procedures and policies regarding tax information to be collected from participants.

**SUBJECT FINANCIAL EXPENSES**

Will subjects have any financial expenses to participate in the study (i.e., travel, gas, food, hotel, etc.)? (Yes) [ ] No

**NOTE:** If a subject has to travel to the location site to participate in the study via car, plane, train, bus, etc., they will incur financial expenses.

**STUDY PROTOCOL**

**STUDY PURPOSE**

State the objectives of the research and, when appropriate, any hypotheses you have developed for the research.

The purpose of this research is to examine how playing an educational video game about the Middle Mississippian alters how students articulate their knowledge and understanding of Middle Mississippian culture and life. These results along with the knowledge and involvement in the design process of the game will be analyzed together to determine how design decisions contributed to what the children learn from playing the game.

**RATIONALE**

Explain the need for the research. Describe the data that the project is expected to provide and how the data will contribute to existing information in the field. Provide a concise description of the previous work in the field. **NOTE:** If you are planning on using students in your class as research participants, please explain why you want to use them in your study.

Transfer of ideas from a game context to real-world context is hard to achieve. The skills and knowledge that a player obtains typically do not transfer outside the realm of games (McClarty et al. 2012) Despite this there are many that believe and provide evidence of the ability of games to teach us and make us better people (McGonigal 2011). The field of educational video games is a growing one, and more evidence and case studies will contribute to a better understanding of how to effectively design an educational video game. A study similar to the one being proposed was conducted on the educational video game Morgan's Raid which was also developed at Ball State University. The results of that study determined that the game met its educational goals and contributed to an increased understanding and empathy for the people living in the 1860s.

To better understand if Children of the Sun contributes to increased understanding of Middle Mississippian culture, research needs to be done. This project will provide information about 3rd grade students knowledge of the Middle Mississippians before they play the game and how they articulate anything they might learn after playing the game. This information will provide another case study in educational game design that researchers and game designers can refer to when researching or making educational games.

**REFERENCES/CITATIONS**

List any references/citations that you researched based on your study purpose and rationale for your project. If there are no references or citations used for your project, please explain why.


McGonigal, J. (2011). Reality is Broken: Why Games Make Us Better and How They Can Change the
METHODS AND PROCEDURES

Describe the study and design in detail and all procedures in which the subject will be asked to participate. If surveys and questionnaires are used for the study, how will they be returned to the researcher? If the research involves more than one visit to the research location, specify the procedures to take place at each session, the amount of time for each session, the amount of time between sessions, and the total duration of the sessions. If multiple researchers will be involved in the project, identify who will conduct which procedure(s).

Four participants will be asked simple questions about Native Americans and the Middle Mississippian in a semistructured interview format to establish their current level of understanding. Students will then play the game together on separate iPads that do not have access to the internet. Afterward, the participants will be asked more questions in the same format as before. The entire session will be recorded on video for analysis later.

INFORMED CONSENT

Please indicate what type(s) of Informed Consent (IC) will be used for this study? (Check all that apply)

☐ Adult (18 years or older)
☒ Parental Permission (Minors: 0-17 years old)
☒ Child Assent (Minors: 0-17 years old - This must be written in age appropriate language)

Informed Consent Process/Signature Waiver

Are you applying for an alteration of the Informed Consent process or a waiver of the Informed Consent signature requirement? ☐ Yes ☐ No

PLEASE NOTE: If English is NOT the primary language of the participants, then the Informed Consent must be also be translated in the participant's native language. Include the translated Informed Consent with your package and a statement as to how (or by whom) Informed Consent was translated.

PROJECT DOCUMENTS

Check the box(es) of ALL the documents you submitted for your project on IRBNet:

☒ Application and Protocol Form
☒ Adult Informed Consent(s)
☒ Parental Permission Consent (for Minors)
☒ Child Assent (for Minors)
☐ Recruitment Letter(s)
☒ Survey/Questionnaire/Interview Questions
☐ Data Collection Forms
☐ HIPAA/FERA Documents
☒ Media Permission Form(s)
☐ Letters of Support
☐ Debriefing Letter(s)
☐ CITI Training Certificates
☐ Other (Explain):

IRBNET ELECTRONIC SIGNATURE:

New package created for submission for your project must be electronically signed in IRBNet by you, the Principal Investigator (and Faculty Advisor, if you are a student). Your signature indicates your certification that the information provided in this document is accurate and current.
Parental Consent Form for Research Participation

Study Title
Detailing Real Play Experiences with *Children of the Sun*

Study Purpose and Rational
This study is designed to evaluate the learning outcomes of children after playing the educational video game *Children of Sun* which is about the Middle Mississippian Native Americans. The results of this study may be used to better design educational games in the future.

Inclusion/Exclusion Criteria
[REDACTED]

Participation Procedures and Duration
Participation will consist of a short interview before playing *Children of the Sun*; being observed by the researcher while playing the game; and another interview after playing the game. It will take approximately 30 minutes to complete the interviews and observation.

Audio and Video Recording
For purposes of accuracy and analysis later, the entire process from beginning interview through the end interview will be recorded on digital video.

Data Confidentiality / Anonymity
All data will be kept confidential and no personally identifying information will appear in any publications or presentations of the data.

Storage of Data
All data obtained will be stored on the researcher's password-protected computer for a period of three years and then deleted.

Risks or Discomforts
There are no perceived risks or discomforts from participating in this study.

Benefits
Your child may gain a better understanding of the lives of the Native Americans that lived in and around the Midwest region.

Voluntary Participation
Your child's participation in this study is completely voluntary and you are free to withdraw your
permission at any time for any reason without penalty or prejudice from the investigator. Please feel free to ask any questions of the investigator before signing this form and at any time during the study.

IRB Contact Information

For questions about your child's rights as a research subject, please contact Director, Office of Research Integrity, Ball State University, Muncie, IN 47306, 765-285-5070, irb@bsu.edu.

Parental Consent

I give permission for my child to participate in this research study entitled, "Detailing Real Play Experiences with Children of the Sun." I have had the study explained to me and my questions have been answered to my satisfaction. I understand that I will receive a copy of this informed consent form to keep for future reference.

Signature ___________________________ Date ______________

Child's Name (please print) ___________________________

Child's Gender (circle one) Female Male

Researcher Contact Information

Primary Researcher:

Steffan Byrne
Computer Science Department
Ball State University
Muncie, IN 47306
Telephone: 765-285-8641
Email: sjbyrne@bsu.edu

Advisor:

Paul V. Gestwicki, Ph.D.
Computer Science Department
Ball State University
Muncie, IN 47306
Telephone: 765-285-8668
Email: pvgestwicki@bsu.edu
Detailing Real Play Experiences with *Children of the Sun*
Assent Form

My name is Mr. Byrne. I am trying to learn about how to design better educational video games. Students at Ball State University designed a game called *Children of the Sun* about the Middle Mississippian Native Americans. If you would like, you can be in my study. If you decide you want to be in my study, you will get to play a video game with some classmates and then answer some questions. By playing this game you will get to learn about the village life of the Middle Mississippians and you will compete with your classmates.

Other people will not know if you are in my study. I will put things I learn about you together with things I learn about other children so no one can tell what things came from you. When I tell other people about my research, I will not use your name, so no one can tell who I am talking about.

Your parents or guardian have to say it’s OK for you to be in the study. After they decide, you get to choose if you want to do it too. If you don’t want to be in the study, no one will be mad at you. If you want to be in the study now and change your mind later, that’s OK. You can stop at any time.

My telephone number is 765-285-8641. You can call me if you have questions about the study or if you decide you don’t want to be in the study any more.

I will give you a copy of this form in case you want to ask questions later.

**Agreement**

I have decided to be in the study even though I know that I don’t have to do it. All of my questions have been answered.

________________________  __________________
Signature of Study Participant       Date

________________________  __________________
Signature of Researcher       Date
Detailing Real Play Experiences with *Children of the Sun*  
Assent Form

My name is Dr. Gestwicki. I am trying to learn about how to design better educational video games. Students at Ball State University designed a game called *Children of the Sun* about the Middle Mississippian Native Americans. If you would like, you can be in my study. If you decide you want to be in my study, you will answer some questions about Native Americans.

Other people will not know if you are in my study. I will put things I learn about you together with things I learn about other children so no one can tell what things came from you. When I tell other people about my research, I will not use your name, so no one can tell who I am talking about.

Your parents or guardian have to say it’s OK for you to be in the study. After they decide, you get to choose if you want to do it too. If you don’t want to be in the study, no one will be mad at you. If you want to be in the study now and change your mind later, that’s OK. You can stop at any time.

My telephone number is 765-285-8641. You can call me if you have questions about the study or if you decide you don’t want to be in the study any more.

I will give you a copy of this form in case you want to ask questions later.

**Agreement**

I have decided to be in the study even though I know that I don’t have to do it. All of my questions have been answered.

____________________
Signature of Study Participant
Date

____________________
Signature of Researcher
Date
**Media Permission for Research Uses**

**Title of Study:** Detailing Real Play Experiences with *Children of the Sun*

**Principal Investigator:** Steffan Byrne

I have had an opportunity to read, review and ask questions about the above named research project as part of the informed consent process. I understand that part of the research involves the use of various types of media (for example, audio recordings, videotaping, digital pictures, etc.). The following information was described to me by the researcher and in the informed consent form:

- The type or types of media to be used;
- How this media was to be used in the research project;
- Who would have access to it;
- What safeguards were to be used;
- What privacy and security precautions would be used (if applicable);
- How the media would be destroyed and when once the research was completed (if applicable);
- That I have the right to withdraw from the study at any time; and
- That I can receive a copy of both the informed consent form and this media release form for my records.

As such, I agree to allow the researcher to use the media described to me as part of the above named research project. This media will only be used for the above named project, unless I give the researcher written permission (see below) for other possible uses.

For questions about your rights as a research subject, please contact the Director, Office of Research Integrity, Ball State University, Muncie, IN 47306, (765) 285-5070 or at irb@bsu.edu.

_________________________________________  __________________________
Date                                           Signature

_________________________________________
Printed Name

**Permission to Contact for Follow-up Research Related Media Uses**

Research is an ever changing process. At times researchers may need to contact you about follow-up research uses for the media collected. The media that was collected for the research purpose(s) described in the Informed Consent form will not be used or disclosed for any purpose(s) that you did not agree to without your permission. Please initial any that apply.

I give permission to the research team to contact me about possible follow-up research uses of the media collected.
I do not give permission to the research team to contact me about possible follow-up research uses of the media collected.

I give permission to the research team to use my research related media for any future research uses without the need to contact me.

I do not want my research related media to be used for any future research or purpose(s) and I do not want to be contacted about possible follow-up uses.

**Note: This is completely optional and voluntary. You do not need to agree to this permission in order to take part in the proposed research.**

Date

Signature

Printed Name

Permission for Non-Research Related Ball State University Media Usage

The media that was collected for the research purpose(s) described in the Informed Consent form may also be appropriate for promotional, educational or other purposes that are consistent with Ball State University's mission to disseminate knowledge and good works for the common good.

If you are interested in learning more about this option or giving Ball State University permission to use your media for non-research related purposes, please ask the principle investigator for more information or a Ball State University Media Release form.

You can also contact the Director, Office of Research Integrity, Ball State University, Muncie, IN 47306, (765) 285-5070 or at irb@bsu.edu if you have any questions about this or your rights as a research participant.

On behalf of Ball State University, thank you for your consideration.
Semistructured Interview and Observation Script

1 Introduction

(Read through assent form with child)

Thank you for participating in the study. I am going to ask you some questions about history. After that I'm going to watch you play a video game. Afterward, I will ask you a few more questions. When I ask questions, I want you to talk to each other. You don’t have to raise your hands. If any questions make you uncomfortable or you feel like stopping at any time, you are welcome to do so. I will be recording our time together to make sure I remember everything that happens with our group today.

2 Pre-Observation Prompts

1. Who were the Native Americans.
2. What does being Native American mean?
3. Has anyone ever heard of the Middle Mississippians?
4. Has anyone ever read about Native Americans or been to a museum that talks about Native American history?
5. Has anyone heard of Angel Mounds or Cahokia?

3 Intervention

(Set up the game on iPads and distribute them to the students. Pick one student to make the game)

This is a game about the Middle Mississippians. You will all be playing together. The game lasts 5 minutes. You can stop playing at any time. As you play the game please try to “think out loud.” That is say what you are thinking as you play.

4 Post-Intervention Prompts

1. What was it like being the chief of a village?
2. Who experienced a raid? → Who was a raider? → Who got raided? → What that was like?
3. Who really wanted to build a big mound?
4. What did the Middle Mississippians do?
5. What do you think of the game you played?
6. Is there anything you would like to add that we did not talk about?
7. Do you have any questions for me?