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Gaming Classics: The Bard

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Gaming Classics: The Bard
By
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Introduction

Technological advancement is a driving influence in the development of today's culture. Upon the creation of electronic videogames, gaming has allowed players to not only experience new ideas previously unheard of in a gaming medium, but gaming is easily accessible to people throughout the world. Academia has begun studying games, checking the positive and negative effects videogames have on people. Might one of these positive effects be educational? If it was, college professors might use the game to help supplement their classes. The question this paper will be focused on is as follows: using the classics as our field of study, how can we build a videogame that simulates the development of cities in classical antiquity and increases a player's interest in the period? This paper will be in regards to the development of this game, including how the game came about, the process of developing it, playtesting the game, and any conclusions that might be drawn.

I. Background

The relevance of gaming in modern culture and education cannot be underestimated. Different types of games have shown to correlate with different types of effects on the mind. A study at the University of Rochester has shown the impact games can have on you physically [4]. People who played action videogames for a few hours a day for a month improved 20% in their visual acuity. Another study showed the influence games can have on your mental faculties [1]. Older adults improved on critical cognitive skills by playing a real time strategy game. In fact, games can even effect how people act socially. This third study has shown that people who play

games that are “pro-social” (meaning they focus on helping another character in the game) are significantly more likely to help others in a real life situation [3]. From these studies, one can begin to gather a sense that games can have a significant effect on people, physically, mentally, and socially. If this is the case, then games can be designed to impact people in a variety of ways.

The aim for this project is to develop a game that can impact peoples' eagerness to learn. Using antiquity as the theme of the game, how can a game be designed that increases a player's disposition towards antiquity? A greater understanding of antiquity, and increased motivation to learn about antiquity are the most important factors in being able to measure the player's disposition. There have been other studies attempting to look at the impact games have on historical education. Kurt Squire did research in a study called *Productive Gaming: the case for historiographical gameplay* [8]. In his research, he had students play the game Civilization III in group sessions after school to see the impact of playing historical scenarios on students, and whether an interest and understanding of history would emerge. In it, not only did he find that students do have an increased interest, but also an understanding of some of the fundamental “patterns of history,” which involved geographical and economic variables that influenced some of the great actions creating the modern world. Another study, *Games are made for fun*, looked at the difference between structured gameplay and unstructured gameplay [2]. The term “structured” is used to describe whether or not the player has a strict set of game mechanics that must be followed throughout gameplay. In educational games, this exists as a game that forces the player to play through events with no real impact on the events and their outcomes. What the study found is that games with less structure, which would allow the player to impact the game world and change the outcome of an event, actually led to an increased interest in the

history that surrounded the event. These two research projects provide insights into the design of a game based on antiquity, showing that content can not only have an impact, but allowing the player choice from within the context of the game will be the most effective way to increase interest in antiquity. These elements will be the basis of the game's design.

II. Development

Gameplay:

User Interface:

With these principals understood, gameplay mechanics could now be designed. First, the game needed a user interface that the player could understand. For ease and simplicity, a text based user interface was used. This text based interface must be able to convey to the player certain basic features of the game: where he/she is, what other objects are in that area, things that currently going on, and task assignments for the citizens of the village. The options to look at certain features will be offered numerically (starting at 0) in in the game. Lastly, the game is turn based, so all actions (deciding the outcome of a decision, actions performed by other objects) will occur in between turns.

Another day has passed in your village. It's day 3 0. Overview 1. Issues 2. Tasks 3. End Turn

Figure 1: Example of the main menu. The top line message displays the outcome to events happening in the player's previous turns. Here, the only news is that a day has past. Otherwise, we have four options. By selecting option 0, the player would check the overview, which tells the player about the current space he/she is in, including about the space itself and other objects that are there. By selecting option 1, the player would check the issues menu, which, if there is an issue available, would display something similar to figure 5. Option 2 provides the player with the tasks menu, which allows the player to assign citizens to perform certain tasks. This would display something similar to figure 4. Lastly, option 3 ends the turn, and executes any assigned tasks, along with executing the response to any issues selected.

Game Space:

Games are usually defined by the world in which they exist, commonly referred to as game space. Since the game is about history, the game space needs to represent the world. Every space will have specific features to reflect the planet earth. Topographical elements including elevation and terrain give a specific area of game space its unique features. By dividing up the world into a grid (which is a map of our game world), we can give specific positions in the grid distinct topographical features to create a simulation of the real world. Each grid location represents an area of land in the game world, and these locations have a certain amount of space available to be occupied by objects in the game.

Space 0,3 Objects: ~ Attributes ~	Space 1,3 Objects: ~ Attributes ~	Space 2,3 Objects: ~ Attributes ~	Space 3,3 Objects: ~ Attributes ~
Space 0,2 Objects: ~ Attributes ~	Space 1,2 Objects: ~ Attributes ~	Space 2,2 Objects: ~ Attributes ~	Space 3,2 Objects: ~ Attributes ~
Space 0,1 Objects: ~ Attributes ~	Space 1,1 Objects: ~ Attributes ~	Space 2,1 Objects: ~ Attributes ~	Space 3,1 Objects: ~ Attributes ~
Space 0,0 Objects: ~ Attributes ~	Space 1,0 Objects: ~ Attributes ~	Space 2,0 Objects: ~ Attributes ~	Space 3,0 Objects: ~ Attributes ~

Figure 2: An example of a map, with a cell size of 1 and maximum height and width of 3, creating 16 cells (also known as spaces). This is an example map. Maps of any size can be defined in the game. All spaces are connected (black arrows) to the neighboring 9 spaces, vertically, horizontally, and on the diagonals.

Space 2,2

Objects:

villageObject

waterObject

forestObject

peopleObject

Attributes:

Type: Plain

Elevation: 30

Space Available: 500

Figure 3: An example of a space. A space holds the objects that make up the game, and also have specific attributes that affects the behavior and attributes of the objects contained.

Objects:

Objects in the game make up the primary driving force of the content the player interacts with. Objects can be resources the player can use, people to perform actions, or entire cities to govern population. Some objects, including people and villages, are able to perform certain actions, and manipulate the game environment. This will change the behavior of other objects in the world and thus in turn manipulate the game environment. A common object is an object that represents people. Since we want our game to be historically accurate, and people require certain basic necessities, including food and water, to live, game mechanics needed to be designed for the people object which would allow it to model actual people from antiquity. To do this, boiling down the needs of life into a realistic, yet programmable model was the goal. For people to stay alive, they need food and water, so people need to have access to food and water on every turn. If they don't, they will slowly start to starve to death. For people to reproduce, and expand the population, they need to have extra food, and homes to accommodate, so extra resources are needed to be gathered to construct homes. Once the population has increased, we have more people available to work on tasks such as gathering resources, but also more mouths to feed. Beyond these basic elements of life in antiquity, issues were used to simulate the usual and unusual day-to-day problems a village might encounter.

<p>This is the tasks manager menu. What would you like your people to do?</p> <ol style="list-style-type: none">0. Order people to gather wood1. Order people to construct buildings2. Cancel orders of people3. Go back

Figure 4: Example of the tasks manager menu. In this menu, one can manage the people objects that are loyal to your city. The player can assign them to get resources, construct buildings, or stop their current work. This menu is important for the managing of the player's city and people, but specific only to people objects loyal to your city.

Issues:

With the underlying game mechanics manipulating variables of objects on a turn-by-turn basis, there was a need in the game's design to include one more element that would allow the game to be a more realistic historical simulator. Issues, or problems that occur on a day-to-day basis, are triggered when certain conditions are met by certain objects. Any object has the potential to have an issue related to it. If these conditions are met, then the issue is added to a list of possible issues that could be selected for the next turn. If the issue is selected, the player will be forced to make a choice in regards to the issue. By choosing an action, he will directly affect the attributes of objects in the game world, and the iterative process of updating attributes and responding to new issues will continue.

Issue: Bandit Problems:

Bandits have attacked our village and stolen our crops. What's to be done?

0. Send out a search party to find these bandits. Once we have their location we will decide what to do.
1. Offer a reward to anybody who gives us information regarding them.
2. Send out a search party to find them and kill them.
3. Consult the local priest.
4. I'm not ready to make a decision like this

Figure 5: This is an example issue, displayed as it would be in game. This event could trigger if a bandit object encounters the player's village. That being the problem, the numbered choices below are the available actions that can be attempted to solve it. These actions aren't guaranteed to be successful, so the player must make decisions that are relevant to the context of the situation, and played toward the strength of his/her village.

Content:

Passages from Livy [5], Plutarch [6], and Polybius [7] were used with as little modification as necessary to fit into the context of the game. Focusing on the foundation of a village somewhere in the Mediterranean basin, this initial version of the game is modeled after the legendary foundation of Rome. Therefore, many issues that the player might encounter at the

early stages of the game will be historical fiction, because not a lot of primary sources comes down to us on the events regarding the foundation of early cities. This is only a small problem, however, as there are primary sources in regard to these early foundations, including Book I from Livy's *Ab Urbe Condita*, and the life of Romulus and Theseus in Plutarch's *Lives*. The most important passages that can be drawn from these authors revolve around points where one man responded to a problem which caused a very specific outcome. The game will take passages like this and implement them in the form of an issue, providing alternative options to allow the player a sense of expanded control. Here is an example of a passage that could be used, as it appears in Plutarch's Life of Romulus:

“Not long after the first foundation of the city, they opened a sanctuary of refuge for all fugitives, which they called the temple of the god Asylaeus, where they received and protected all, delivering none back... and they could so maintain it by an order of the holy oracle; insomuch that the city grew presently very populous...”

This passage would be implemented in gameplay as a decision that could be made in an attempt to increase population. A prerequisite of this choice might be that the player's city has invested enough in religion, so that the player can “...maintain it by an order of the holy oracle.” In any case, implementing enough of these passages as an issue or response to an issue are the color that makes up the game's content, and the driving factor behind what makes the game interesting for the player.

Deciding it would be hasty to make an enemy out of someone who might be a friend, you raise your troops and arrange them for battle.

But before you give any signal for attack, you yourself ride out in the field and signal Latinus for a parley.

You eye each other from only a few yards away. Latinus is the first to break the silence, 'Who are you, from where have you come and what do you seek by building your village here?'

You respond in kind 'My name is Aeneas, son of Anchises and Venus, and our city has been burnt, and driven from our homes we are looking for a dwelling place where we might build a new city.'

Latinus, filled with wonder of your race, and your spirit, prepared alike for war or peace, offers you his right hand in a solemn pledge of lasting friendship.

As you draw up a treaty, both your troops and Latinus' begin to mingle, talk, and laugh. You have won yourself a friend today!

Figure 6: An snippet of text from the game, derived originally from Livy. This text would appear if the player chose, upon encountering a hostile enemy king, to parley with him.

Technology:

Game Loop:

Since the game is defined with objects that have attributes, which can travel in another object called a space, the game is object-oriented. Java being an object-oriented language made for a natural choice to develop in, not only due to its object-oriented nature, but also due to the experience the developer has had in Java before. Using a simple game loop, the world is initially populated with objects. The game then takes input from the player. This input is responded to by presenting or selecting the corresponding choice. For instance, selecting to check out an overview of the space presents text regarding the space, where as selecting a response to an issue queues that choice to have its outcome calculated during the next end turn. When a turn is ended, actions queued for the end turn are triggered, and object attributes are updated. This process begins anew next turn.

```

def endTurn()
{
    theTurn++;

    executeIssueActions();

    fireAdvanceTurnEvent();

    executeActionsObjects();

    turnBegin();
}

```

Figure 7: The two most important functions that make up the game loop are the endTurn and turnBegin functions. The endTurn function advances from the current turn to the next, executing any choices to any issues made, notifying and updating all objects that a turn has ended, and then executing any actions for any objects that have actions of their own to execute.

It then calls the turnBegin function, which displays all menus and reads in any inputs the player gives. Importantly, the player here decides when to end his turn, which call the end turn function and repeats this whole process.

```

def turnBegin();
{
    print menu

    int n = parseInput()

    if (n==0)
    {
        overview()
    }
    else if (n==1)
    {
        issues()
    }
    else if(n==2)
    {
        tasks()
    }
    else if (n==3)
    {
        endTurn()
    }
    else
    {
        print("invalid input")
        turnBegin();
    }
}

```

Design Patterns:

To implement these mechanics, a couple of design patterns have been utilized. To notify all objects when a turn, or any specific event, has been triggered, the game uses the observer pattern. This pattern allows for the end turn to independently update an unknown number of objects without knowing what or where they are. Another important pattern that is being used is the singleton pattern, which ensures that there is only one instance of a class, and that we have a global access point to it. Since there is only one instance needed of the game loop (in fact it

would be wrong to have more than one running), and we are constantly needing to reference the game loop, the singleton pattern is a staple of game design. Lastly, in processing the input from the user, a very basic regular expression was used to make sure the user inputted only positive integers, preventing input errors that could come from accidentally hitting a certain key.

Algorithms:

In programming actions for objects, some basic algorithms in regards to AI have been implemented. Three algorithms of importance will be addressed in terms of their function in gameplay. The simplest algorithm implemented is related to the movement of objects, and is called wander. The wander algorithm simply moves an object around the game's environment as if it were wandering, with no specific goal in mind; this algorithm is perfect to perform a basic search. Whenever an object needs to find something but does not know exactly where it is it needs to go, the wander algorithm is used.

The next algorithm is an implementation of A*. This movement algorithm calculates a path (using a heuristic to simplify calculations) of least resistance between one point and another. In a game environment where topography, terrain, and objects in the space can influence how much it will cost to move from one space to another, the A* algorithm returns an optimal path that can be used by an object, to simulate movements of actual people across an environment, from one point to another known point.

Lastly, influence mapping has been implemented. Influence maps gives meaning to objects and attributes for other objects in the game's environment. By using influence maps, the computer can figure out where it would be best to find wood, or build a farm. Influence maps compose some of the most basic elements of thought for the objects in the game.

Algorithms in action: The player needs wood for his/her village so, as seen in figure 4, the player assigns his/her people to gather wood. The first thing the people object will do is check its influence map for any locations it can navigate to that have wood. If an area is found, the A* algorithm is used to calculate the path of least resistance, getting the people there as quickly as possible. However, if no location is known, the people object will utilize the wander algorithm. This algorithm will navigate the computer through the games environment, updating the influence map with information regarding the wood content of these spaces traveled through, until one is found that does in fact contain wood.

Figure 8: An example of how algorithms are used in game.

III. Playtesting

Structure

Once the game reached a playable state, the first round of playtesting was done. With only a short period of development, the goal of these playtests was to figure out what works and what doesn't in the game so far. A secondary goal was to measure any increased interest in the classics. The structure of the beta test went as follows:

First, the participant was asked two preliminary questions.

1. Rank, on a scale from 1-10, your interest in antiquity.
2. What's your experience in text based games?

The two preliminary questions served to gauge the participants propensity to like the game. With the game's content focused on antiquity, it was relevant to know whether participants who had a higher or lower interest in antiquity were playing the game. Knowing whether or not the participants had played text based games before is also important, as experience in a text based game may translate into an easier time understanding the interface, and/or create a propensity to enjoy playing this text based game.

Following this, the participants playtested the game, with an observer taking notes of all the actions done by the participant during the playtest. This was straightforward, and the observer noted any places the player seemed frustrated, excited, or asked for help. These areas

are especially worth noting as they could be problem areas for other players, or good areas worth expanding or focusing on.

After the playtest was done, the participant was asked three more questions.

1. What were the weaknesses/what did you dislike about the game?
2. What were the strengths/what did you like about the game?
3. Rank, on a scale from 1-10, your interest in antiquity.

The first two questions are fairly straightforward. The participants were able to provide feedback for the game which would not be possible to attain by simply watching the participant play the game. The last question, which is a repeat of the first, is a way of quantifying the question, does this game increase interest in the classics? By comparing preliminary and post-test questions, the effectiveness of the game can be tested.

Results

Preliminary Questions:

In regards to the first question, “Rank, on a scale from 1-10, your interest in antiquity” there were a range of responses, with a 2 as the minimum and a 7 as the maximum. This range in answers corresponds logically with the participants interests, with the highest ranked response coming from a classics major, and the lowest interest response coming from a films study major.

The second question, “What's your experience in text based games?” was not a quantified question. It was a useful question to ask, however, as it showed that players who had experience playing text based games had an easier time understanding the game, and navigating the user interface. However, the users who had the least experience tended to give the most feedback later when it came to the interface of the game, and whether or not they had problems navigating it.

Observations

The first and most general observation made during the playtests was in regard to the user interface. While most participants found the interface intuitive at its most basic level, two participants did not understand at all what they were doing, so the observer had to tell them how to navigate the menus. Another common problem with the interface was the selection of menus. Participants had a problem with the numerical counting starting from 0, and many participants had the propensity to select option 1 when they meant to select option 0. Because of this, there were a couple of moments participants became quite frustrated and didn't understand what they were doing wrong. Lastly, the task manager menu seemed confusing to most participants. In every playtest the participants had trouble understanding how to construct buildings, and it took multiple turns to finally figure out how to construct a building. The participants also noted some grammatical errors and incorrect phrasings in some of the dialog.

There were some gameplay problems uncovered as well. One major problem was a glitch that caused the game to “crash.” While the code itself didn't crash and throw an error, there was a problem advancing to the next term, so that the participant wouldn't receive any new text to respond to. This problem stemmed from the decision tree regarding the construction of buildings. Specifically, the problem occurred when a building was assigned to be built, but there were no more resources left to build it. When this scenario happened, the game continued to look for available wood, and since there was none, it would get caught in a loop, effectively ending the game. Another minor problem noted by a participant was in regard to the game mechanics. This participant noted that it didn't seem logical how quickly tasks were completed.

Post-test questions

The first post interview question was “What were the weaknesses/what did you dislike

about the game?” The overwhelming problem that players had was a lack of direction. Many complained that they didn't understand what the purpose of the tasks were, including what the benefit of building houses and farms would be. In general, a tutorial of sorts, or at least a greater explanation of what some of the commands in the game are, was desired. Another problem uncovered was readability. One user complained that, without proper spacing, the game was almost illegible. Another user complained that the numerical system for numbering their options on the interface was hard to see, so that at first they didn't realize that there was a number corresponding to a choice. There were numerous other readability issues when it came to gameplay. A couple of participants complained of the “Unassigning Tasked Citizens” command. This command would find people who were performing a certain task, and from this menu could be ordered to stop. Unfortunately, the command didn't tell the participants what the people were actually doing, and this led to some frustrating moments where the participant had to go back and check what they were doing before unassigning them. Another common request was an option for a “go back” button, which doesn't exist in the current version of the game.

The next post-game question was, “What were the strengths/what did you like about the game?” All participants said they enjoyed the writing of the game. A couple of participants said they enjoyed thinking about managing a village as a “brain exercise,” and enjoyed the logical choices presented in regards to the issues, and the effects that could be seen in future. As one participant stated, “I enjoyed the points in the game that separated me from other players. Deciding to focus on the economy provided me a unique choice that would not have presented itself to other players who might have focused on something else.” The issues were described as being descriptive, imaginative, and believable. Some participants did enjoy the direct access they had in commanding their people to perform certain tasks. One participant mentioned that

upon getting past the learning curve, the game was intuitive and fun.

The final post interview question was “Rank, on a scale from 1-10, your interest in antiquity.” After answering this question for a second time, the answer was compared to the preliminary answer received before the playtest, to see if the participants' interests changed. Of the 12 participants, 6 had no change in interest in antiquity, while 6 had an increased interest in antiquity. No specific pattern followed those who had an increase in interest, as some people who preliminarily ranked a high interest in classics responded with no change, while others did have a positive change. This was also true for those who initially responded with a low interest. In any case, 50% of the participants in the study led to an increased interest in antiquity.

IV. Conclusion:

After the playtests, it is now possible to answer the question, “how can we build a videogame that simulates the development of cities in classical antiquity and increases player's interest about the period?” Before answering this question, however, two important facts must be made known. First, the game itself is still in an alpha stage of development, and does not accurately simulate the development of cities at this point. Second, the playtests only took place during one week, and with only a limited number of participants. With these faults known, some very positive outcomes can be concluded from this project. First, while still only a limited simulation, positive parallels can be drawn to actual problems in antiquity, including where to settle a village, managing and maintaining a small population of people, basic government structure, and diplomacy with other villages. The playtest survey shows that 50% of participants had an increased interest in antiquity after playing the game, which is significant in concluding the positive effects on students interest in antiquity.

Development of *The Bard* (which is the name of the game and title of this paper, after a

the bard Demodokus in Homer's *Odyssey*) will not end with the academic year. The project is planned to continue, and once the game reaches a point where a village can accurately be simulated, the game will expand to include governing of city-states, and eventually empires. An online version of the game is planned for as well. With the continued development of this game, the eventual goal of creating a game that not only simulates antiquity, but also increases a students drive to learn about the classics, may be possible. However, for today, one can conclude that games are having a huge impact on society, and educational games may one day become a staple of learning in the classroom.

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