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Milla Ginlund

Best Practices in Game Cartography

– A Comparison of Aesthetics and Functionality in
Game Cartography



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Best Practices in Game Cartography

– A Comparison of Aesthetics and Functionality in Game Cartography

Game maps are a part of an immersive gaming experience, and it is essential that navigating a game world is seamless and smooth. To achieve this, it is important that the map used focuses on qualities that the player values and finds the most useful. While it has been studied whether the size of the map or the way of generating it matters, very little research has been conducted into the visual qualities of an ideal map. The objective of this study was to compare aesthetics and functionality as qualities in game map creation.

To achieve this objective, an anonymous Google Forms -questionnaire was created where three different maps (aesthetic, functional and objectively ideal) were presented to a group of participants. The survey was distributed to the participants via the instant messaging application Discord. The participants were industry professionals, students and gaming enthusiasts. Total of 23 participants gave their comments on each map and voted for their preferred map during a two-week collecting period. While the hypothesis was that functionality would be preferred over aesthetics, the results concluded otherwise. Functionality was appreciated for specific uses, but aesthetics was overall more important to many participants.

This result highlights that visuals are important when creating cartography for a virtual world. Immersing oneself in a world is less about accumulating extensive information and technical details and more about staying true to the atmosphere of the game.

Keywords:

video games, video game art, game cartography, game map creation

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Pelikartografian parhaat käytännöt

- estetiikan ja toiminnallisuuden vertailu pelikartografiassa

Pelikartat ovat osa mukaansatempaavaa pelikokemusta, ja on tärkeää, että pelimaailmassa navigointi on saumatonta ja sujuvaa. Tämän saavuttamiseksi on tärkeää, että käytettävä kartta keskittyy ominaisuuksiin, joita pelaaja arvostaa ja kokee hyödylliseksi. Vaikka on tutkittu kartan koon ja sen luomistavan merkitystä, ihanteellisen kartan visuaalisia ominaisuuksia ei ole tutkittu riittävästi.

Tämä opinnäytetyö keskittyi vertaamaan estetiikkaa ja toimivuutta ominaisuuksina pelikarttojen luomisessa. Työssä luotiin anonyymi Google Forms -kyselylomake, jossa kolme erilaista karttaa (esteettinen, toiminnallinen ja objektiivisesti ihanteellinen) esitettiin osallistujaryhmälle. Kysely jaettiin osallistujille pikaviestintäsovellus Discordin kautta. Osallistajat olivat alan ammattilaisia, opiskelijoita ja peleistä kiinnostuneita henkilöitä. Yhteensä 23 osallistujaa kommentoi ja äänesti itselleen mieluisinta karttaa kahden viikon keräilyaikana. Vaikka hypoteesi oli, että toiminnallisuutta arvostettaisiin enemmän kuin esteettisyyttä, tulokset näyttivät toisin. Toimivuutta arvostettiin tietyissä käyttötarkoituksissa, estetiikka oli yleisesti ottaen tärkeämpää monille osallistujille.

Opinnäytetyön tuloksen perusteella voidaan sanoa, että visuaalisuus on tärkeää kartografiaa luotaessa virtuaalimaailmaan. Maailmaan uppoutuminen ei vaadi niinkään paljon tietoa ja teknisyyttä, vaan pääasia on pikemminkin pelin yleinen tunnelma.

Asiasanat:

videopelit, videopelitaide, pelikartografia, pelikarttojen luonti

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List of abbreviations

1 Introduction

According to an article by Grand View Research (2023) the video game industry is a multibillion-dollar industry with a \$217.1B global net worth in 2022. Different studios create games for entertainment and education, with the former gaining popularity over the past 5-8 years as e-sports tournaments platform. The video game industry is expanding every year with more people making a career out of it (Sayal, 2021). With the industry growing steadily, the games created have also become more advanced and extensive. This has led to game worlds requiring larger and better maps (Kylie, 2019) to navigate around the differently generated and various sized worlds. Game cartography has existed since the 80s and has become more popular during the 90s as game worlds became larger and technological advancements enabled the creation of more accurate maps. The need for accurate and user-friendly navigation within game worlds has been prevalent (Liu, 2023) and is becoming increasingly crucial as the gaming industry continues to grow.

Important cartography qualities vary between different genres and one way of generating a good map will not work for every game. Whereas a board game style map known as level hub (Figure 1) to navigate between levels as in Nintendo's Super Mario Bros works perfectly with games that have distinct levels (How to Make an RPG, 2017), this style of cartography would not work for an open-world, free roaming game (Gotlib & Chądzyńska, 2016) as Rockstar Games's Grand Theft Auto V that consists of one level and requires a realistic map that can be navigated in real time. There are still two understudied aspects of videogame cartography that determine the overall value of a good game map, utility, and aesthetics. What is the advantage of a purely functional map when being compared to a visually appealing map, or is there any? This study focuses on this topic by diving deep into the history of game cartography and by conducting a questionnaire where these two comparative qualities are put to the test.

In this thesis different terms will be used to describe different aspects of game cartography. The in-game 3D world will be referred to as the game world. The maps used for navigation within this environment will be called game maps. There is also a smaller and more simplified version of a game map called a mini-map.



Figure 1. Super Mario Bros 3, Level Hub.

The objective of this study is to determine if the functionality of the map outweighs aesthetics when creating a good game map. This objective will be achieved by choosing a conventionally considered good map that has both visual and functional qualities and choosing two more versions of it. One version will have only visual appeal, the second version will be purely utilitarian, and the third version is the original map with both qualities. These versions of the maps will then be compared by conducting a questionnaire, where participants can choose their preferred map and then justify their choice.

This thesis is structured as follows: Chapter 1 introduces the history of game cartography in general. Chapters 2 and 3 discuss previous studies, as well as the comparative qualities of game maps considering the scope of this study. Chapter 4 presents and justifies the methodology design of this study. The methodology is then described in Chapter 5 by going through the questionnaire and how it was distributed to as many participants as possible through different online channels. After that, in Chapter 6 the findings, conclusion and recommendations are then discussed and analysed based on all the acquired data.

2 Game cartography

According to the editors of Encyclopedia Britannica (2024), cartography is an ancient discipline that as a profession has existed for almost as long as humans have. Since it's such a widely practiced discipline we have copious amounts of knowledge about it and centuries of experience. Mapping territories to navigate them better could be described as a lifeline to humans and this is why it's crucial to know where you are and where you are going in a virtual environment as well. Our skill to perceive the world around and document it helps us help when creating maps for virtually generated worlds.

The history of game cartography dates back to the 1970s. This is the era when game maps and the different ways of generating them started to evolve from the infancy stage into proper cartography (Kylie, 2019). Without maps to navigate, the worlds the player indulges in, the gaming experience would be vastly different. Previous studies have concluded that game cartography is an understudied topic (Horbiński & Zagata et al., 2022) and slowly different aspects of it are being investigated and researched. Some of these topics include cartography interfaces (LaLone, Dugas & Alharthi et al., 2018), audiovisual implementations (Edler, Kühne, Keil & Dickmann et al., 2019) and the impact of 80s and 90s on multimedia cartography (Edler & Dickmann, 2017). These are just some examples of the versatility of the topic. As game cartography has now existed for over forty years, it's important to not forget the past, but to explore it and see how it has impacted the game industry that we exist in right now. In many cases, when the goal is to create accurate cartography, the focus is on functionality and information being transferred to the viewer as clearly and concisely as possible (Horbiński & Zagata, 2022). However, video games are in their own way an art form so the aesthetics can play a big part in how the game and its entirety is viewed and experienced by the player. Many games rely on their aesthetics (Plarium.com, 2023) and in those cases the visual appeal is very important. Video gaming gaining popularity over the years has led to demands and requirements getting bigger. By studying game cartography and

its impact on the gaming world, we can create even better and more user-friendly game maps in the future.

2.1 Comparative qualities of game cartography

This study focuses on two comparative qualities of game maps. Utility and aesthetics. These understudied aspects of game cartography are important when focusing on user-based game map creation that values the input of the average gamer or game map user instead of only focusing to the game designers' point of view (Toups Dugas, Lalone, Alharthi, Sharma & Webb et al., 2019). This study aims to let the people decide and determine which qualities define the best kind of game map.

Aesthetics include everything from video game graphics to the overall vibe and feel of the game. Without graphics any game would be impossible to navigate (Küçükarakurt, 2021). Game maps are usually part of the heads-up display of the UI system and work either as their own minigame within the game or as a separate element that can be viewed differently depending on the game. Some games might just have a PNG-file viewable from within the game just to illustrate where everything is and how the land is laid. Many games opt out to an interactive map that works more like a GPS with the player visible and different routes and points of interest shown when needed.

Functionality in video game maps becomes relevant when there are roads, locations, and points of interest within the game world (Filimowicz, 2023). This is the case for most video games since the game world usually must have some kind of substance to keep the player engaged (Schoenau-Fog, 2011). The way these points of interest are communicated to the player varies between games. Some game maps will have interactable points that the player can get some meaningful information out of. Some maps will only show the approximate location of different things to give the player a general idea of where to go. In these games the exploration part of the experience is usually more important than knowing where exactly you are in the world (Bozdağ, 2023).

In the game *Animal Crossing: New Horizons* made by Nintendo, the map (Figure 2) focuses on matching the overall style of the game. It gives you the necessary points to see where things are located on your island but doesn't expand its functionality any further. The map is considered visually pleasing and fits the style of the *Animal Crossing* universe.



Figure 2. *Animal Crossing: New Horizons* by Nintendo.

Although equipped with some level of visual appeal, Nintendo's earlier adaptations of *SimCity* (Figure 3) were clearly designed with functionality in mind. The game being a sandbox style game, it requires clear and concise objects to build with. This might lead to the map looking rather cluttered and ugly once enough objects are placed. However, when expansion, utility and optimization are the main goals, visuals merely play a role of distinguishing one object from another.



Figure 3. SimCity (1989) by Will Wright.

The hypothesis of this study is that functionality will be preferred over aesthetics since information and ease of navigation is so important in any map (Noor, 2023). The goal of this study is to determine if this theory is accurate and how these qualities weigh out when put against each other.

3 Research objects description

Conducting the study started by sifting through different maps from various games and eventually choosing the map from the game; The Elder Scrolls V: Skyrim by Bethesda Game Studios for its popularity and simplicity. The original map of the game (Figure 4) that you use to navigate and fast travel in the game is a 3D map that you fly around in. It could be described as a minigame within the original game. This map couldn't be used in its original form for this study since it couldn't be shown in its entirety in one picture. Three 2D variations of the 3D map were chosen.



Figure 4. The Elder Scrolls V: Skyrim. An image of the original in-game map.

The first map (Figure 5) was an image of the functionally appealing version of the map. This functional map made by user ChromedDragon on Reddit (2019) was chosen for its clear markings and informality that could help even someone less experienced with The Elder Scrolls V: Skyrim navigate the said game world. It focuses on the key points and getting the crucial information to the reader. It lacks visual appeal by being very simple and high contrast. It also doesn't fit the original mood and vibe of the game.

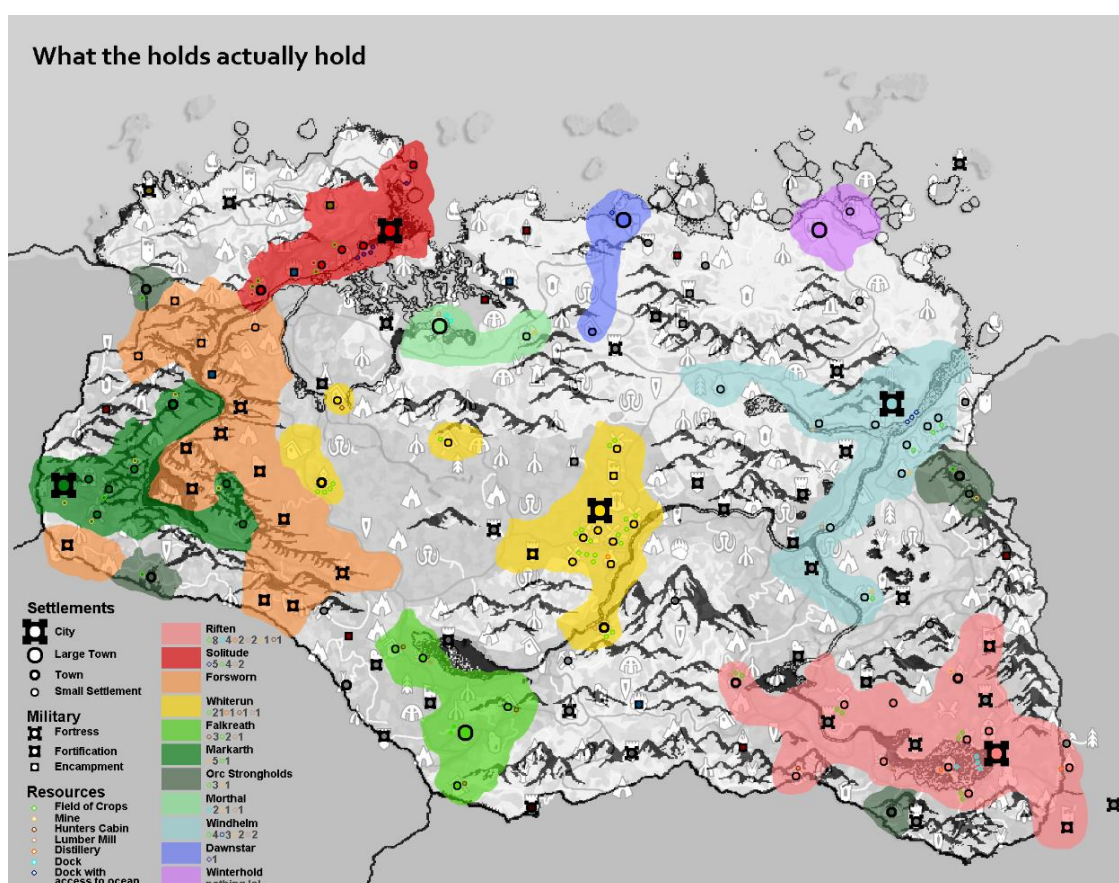


Figure 5. The chosen functional map by ChromedDragon on Reddit (2019).

The second map (Figure 6) was a version of the map that's visually pleasing. The aesthetically pleasing map chosen for this study was made by user Mirhayasu on DeviantArt (2021). It has all the qualities needed for a beautiful game map that is nice to look at like illustrations of the environment while not being the most functional for the lack of marked locations and points of interest. This map also has the focus on fitting the vibe and color scheme of the game.



Figure 6. The chosen aesthetic map by Mirhayasu on DeviantArt (2021).

Lastly, for the third map (Figure 7) an objectively ideal map with both aesthetics and functionality was chosen. This iteration of the map was made by user 7LegionArmy on Reddit (2019). It checks all the required qualities for a functional map that doesn't lose its visual advantages in the process. It is easy to navigate and has a lot of information while not overwhelming the viewer. This map is also nice to look at since the colors and aesthetics are consistent and fit the theme of the game. With these three iterations of the same map, a questionnaire to determine which map is objectively the best was created through Google Forms.



Figure 7. The chosen ideal map by 7LegionArmy on Reddit (2019).

4 Research protocol

This is an A/B/C testing study that makes use of electronically distributed questionnaires with both quantitative and qualitative questions to determine player preferences of game navigation maps. After finding the suitable maps, a Google Forms questionnaire was created. The questionnaire contained an image of each of the maps. These iterations of the map being the functional (Figure 5), aesthetic (Figure 6) and objectively ideal (Figure 7). Each followed by the same question. What do you like and don't like about this map and why? At the end of the questionnaire the participants got to choose their favourite iteration and add comments explaining their choice if they deemed it necessary. The form was distributed through different online channels like the communication service Discord for example. The open-ended questions were analysed and quantised according to repeating comments and terminology from the submitted responses.

The participants chosen for the study were engineering students and professionals, as well as people passionate about gaming and game cartography. In each of these participant profile categories are people of different ages with different backgrounds but a shared interest for gaming and creating. Over the course of two weeks, 23 answers were collected. The answers were then moved to a separate document where they were analysed by extracting a common consensus for the most repeated points. With the free form answers to the question attached to the images the most repeated answers got put in categories and organized in a way that shows what the participants collectively thought about the maps. Analysing the question about the map preference was simple. One of the three answers was voted above others. All the possible extra comments were written down and mentioned in the findings part of the thesis.

5 Findings and analysis

After two weeks of collecting entries a total of 23 responses were acquired. While the number of entries was not the largest, the input provided by the participants was remarkable. Many participants wrote long and descriptive answers to all questions and some even added extra comments. During the analysis, data saturation was reached, and no further data collection was deemed necessary. The submitted responses showed industry-knowledgeable terminology and it was clear that the participant profile was appropriate for the topic of the study. Some terms kept repeating themselves among different entries.

The most preferred map was the objectively ideal map with a good balance of aesthetics and practicality with 14 out of 23 participants choosing it (Figure 8). As a strong second came the aesthetically pleasing map. However, it is important to mention that some of the participants mentioned in the extra comment section that they would choose different maps for different things depending on what they were trying to achieve. Many agreed that the aesthetically pleasing map would be their choice when decorating their home or desktop wallpaper, while the functional map would be the best when trying to complete the game as fast as possible. Some also mentioned that being able to toggle some information on and off would help a lot when creating the perfect map for themselves.

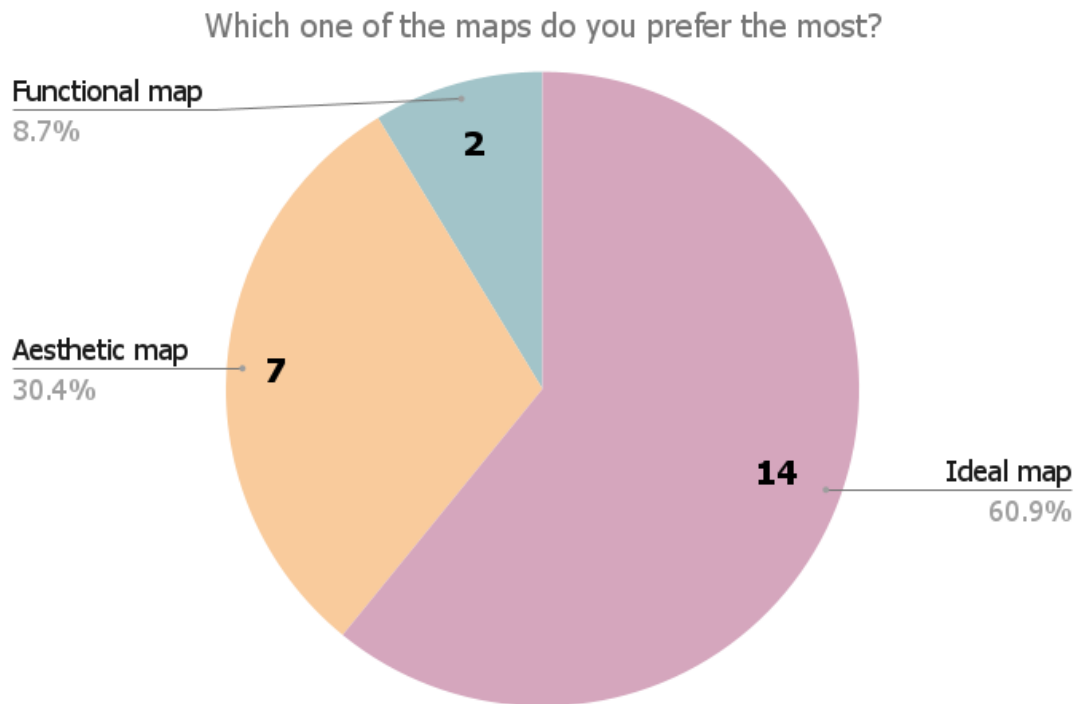


Figure 8. Count of preferred map among survey respondents.

With the aesthetic map, people were unanimous about their opinions. The map got praise for its simplicity and visually pleasing looks. Many entries talked about its advantages when it comes to being beautiful and having a coherent theme that also fits the vibe of the game it's designed for. It was also described as clean since it leaves out a lot of information. This was also talked about as a bad quality since the map lacks a lot of useful information that is crucial when talking about navigation. The map also got some negative feedback on its monotone color pallet and inaccuracies when compared to the original area that the map is based on. The strengths of this map were simplicity, aesthetics, and theme.

Quote: "I like the vibe of the map as an image, but functionally it's not very good for a game."

The functional map had few fans, but it still gathered a good number of opinions. Many participants described the map as very informative and clear on

where everything is on the map. According to some entries, the map could be useful depending on the use case. It would for example be good for finding specific things in the game world. The negative comments were prevalent with this map. It was described as confusing, cluttered, busy, chaotic, ugly, and hard to read. Some participants also didn't appreciate the fact that the map doesn't fit the theme of the game it is based off. The number of markings on the map were found to make the map messy and hard to read which is unfortunate since this map was specifically created to make navigation easier. Overall, this map got a lot of negative feedback for its busy composition and high contrast colors.

Quote: "I find this hard to get a grasp at all. Seems cluttered and I feel like I can't focus on any place. And it's kinda ugly."

The objectively ideal map got a lot of praise for being visually pleasing while showing an appropriate amount of information to successfully navigate the game world. It was described as clear, easy to read and pleasant to look at. The only negative feedback that kept repeating was that the color design is a bit muddy and flamboyant for the cold and dark style of the game, but overall people were pleased with how the map looked visually. The legend of the map was described as useful and easy to understand. According to many participants, this map had the perfect balance between aesthetics and practicality.

Quote: "Map is visually pleasing, has a coherent theme and provides useful information."

It's clear that aesthetics play a big role when it comes to creating maps that people actually want to use. In many cases, functionality might not be enough. Although people prefer different maps for different uses, it can still be noted that a good balance between good looks and good functionality is always appreciated. Table 1 outlines the pros and cons of the two qualities in maps.

Table 1. Summarized feedback on the aesthetic and the functional map.

Aesthetic		Functional	
Pros	Cons	Pros	Cons
simple	inaccurate	informative	overwhelming
clean	monotone	practical	ugly
clear	not suitable for navigation	useful for specific uses	cluttered
visually pleasing	not enough information		confusing

6 Conclusion and recommendations

This study aimed to explore best practices in game map generation and determine the preferred quality between aesthetics and functionality through a questionnaire. It hypothesized that functionality would outweigh aesthetics due to the importance of information and ease of navigation. The study concludes that when choosing a map to navigate a game world a good balance between functionality and aesthetics is always appreciated and when it comes to valuing one quality over the other, visuals play a significant part in composing a good map.

Three key recommendations emerge:

Consider Use Case: Acknowledge the influence of a map's intended use on navigation strategies.

Address Player Preferences: When designing a game, consider the navigation preferences of the target audience.

Conduct Comprehensive Testing: Ensure that both functionality and visual aspects of the navigation system are thoroughly evaluated through test-runs.

Notwithstanding, different qualities matter to different player types and no map is a perfect fit for all. This study emphasizes the importance of achieving a harmonious balance between functionality and aesthetics in game map design.

6.1 Limitations and future directions

In terms of methodology in this study, the lack of variation within the categorised maps could have affected the results of the study. Giving participants more maps to choose from in each of the categories could have taken the study to a different direction. For example, having three different function-focused and three aesthetics-focused maps instead of just one for each would have given more options to compare and choose from. Not every functional map has the

same goal and reason to exist. Having more time to conduct research with a larger participant pool would allow for more data to be collected and analysed and would most likely lead to a more quantitative and accurate result.

For future research into the best practices in game cartography it would be important to study aspects of game map generation that were not expanded on in this thesis. For example, different customisation possibilities within the game map were briefly mentioned and could have the potential to enhance the navigation experience. Giving the player more control over their navigation experience would give the power to the player to choose the qualities that they value in a good map.

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