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'Yedikule Bostans': A Serious Game For Cultural Heritage

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ABSTRACT

Serious games with their educational or skill development purposes besides entertainment, have been used in various fields such as architecture, landscape architecture, urban planning, cultural heritage, and learning of language and culture, easing the data absorption process of the specific topic for the user. The use of serious games in the cultural heritage or cultural landscape, as a subtopic, can have a role in its preservation in addition to the information transition ability. *Yedikule Bostans* is a serious game designed for cultural heritage, its importance, and maintenance ways. The case study of this article is the İstanbul's market gardens, existing plenty of them in İstanbul, which have remained since ancient times surviving despite the difficulties of urbanization. This research is focusing on the *Yedikule Bostanları* with their 1500-year history which are associated with the *Theodosian Walls*, registered in the list of historic areas of İstanbul in UNESCO. The serious game presented in this research with its immersive text-based time-traveling theme about these gardens aims to attract the public's attention to their perishing danger. Thanks to the abilities of the Twine software used in the game's development, we provide a charming journey to the users throughout the game to increase their awareness of the inherited farming culture and more comprehensively the cultural heritage and cultural landscape, meanwhile.

Keywords: Serious games, Cultural heritage, Yedikule Bostanları.

1. INTRODUCTION

Serious games term refers to the use of games for other purposes besides entertainment. Being audiovisual enables the educational aspect of the games, facilitating the data absorption action in memory (De Freitas & Liarokapis, 2011). The game-based learning approach is being trendy at a high pace via serious games, played aside from the spare time (Anderson et al., 2009; Becker, 2007; De Freitas & Liarokapis, 2011). These games can be used to engage the user in learning a specific topic or developing skills for various professions including landscape architecture and architecture (Örnek & Seçkin, 2016).

By considering the educational potentials of serious games, this study proposes a digital game about cultural heritage. This value, as tangible and intangible, respectively is inherited ancient objects or buildings, and skills, traditions, and knowledge from the preceding generations which is now in danger of perishing and its preservation is vital for the next generations (Marnerideset al., 2020). Furthermore, the cultural landscape, which according to UNESCO (2020), refers to the output of the interaction between human beings and the natural environment, should also be preserved due to the ability of it in terms of maintaining the biological diversity of that region and the development of its natural value. The cultural landscape approach also demonstrates the sustainable methods which should be used in a particular district according to its specifications (UNESCO, 2020).

The cultural heritage case of this article is the İstanbul's market gardens named as *bostan* in Turkish (Turan, 2015), existing plenty of them in İstanbul remained since ancient times surviving despite the difficulties of urbanization. However, the focus point of the research is the *Yedikule Bostanları* which are associated with the *Theodosian Walls,* referred to as *Kara Surları* in Turkish (Figure 1). According to Turan (2015), these gardens with their 1500-year history are currently in danger of perishing. Due to their tangled relation with the *Kara Surları*, which are registered in the list of historic areas of İstanbul in UNESCO, the culture of gardening continuing there, their place in the people's memory, and their integration with the everyday life of citizens for centuries (Turan, 2015), they can be referred to as İstanbul's Cultural Landscape and worth being protected and paid attention to.

Figure 1. Yedikule Bostanları and Theodosian Walls (Kanbak, 2016).

This research presents a serious game, which is designed with an immersive text-based narrative with the aim of cultural heritage maintenance and preservation. The objectives through which this aim is addressed are to increase public awareness and inform the users in terms of farming culture, inherited

from previous generations (Turan, 2015), with a non-linear story letting the player discover various endings by frequently playing as its initial outcome. Additionally, it imposes a more holistic attitude of protecting and reviving the surviving urban green infrastructure and urban productive landscape. In this research, we used Twine software (2020) to develop the game, which is an open-source platform enabling us to approach our goals throughout a charming storytelling journey without requiring almost any coding skills.

2. LITERATURE REVIEW

Regarding the previous works in serious games topic, there is a broad literature. *The Oregon Trail* which aims to demonstrate the difficulties of the pioneer life in the 19th on the Oregon Trail (Regalado, 2017) has been played by elementary schools since the mid-1980s for around twenty years (Slater, 2017). This cultural heritage game appears in the big majority of the studies on the serious game topic (Becker, 2007; Bigelow, 1997; Caftori & Paprzycki, 1997; Kane, 2020; Regalado, 2017; Slater, 2017). In the historical landscape topic*, The Fort Ross Virtual Warehouse* is a serious game that aims to transmit the cultural heritage of the region by immersing the player in a cultural virtual environment to promote the player's consciousness of the providing data (Lercari et al., 2015). This game was developed based on the agreement of the California State Parks and the University of California Merced to educate the visitors and the students about Fort Ross in March 2011 (Forte et al., 2012). A classic example of urban planning discipline is *SimCity* which allows players to design and develop a settlement by managing the city dynamics in terms of energy, waste, economy (Poplin, 2011). Furthermore, there are serious games developed to leverage the learning of language and culture. *Tactical Languages and Culture Training Systems* is a great sample of it teaching the players to communicate and speak in foreign languages as courses in the form of immersive gameplays using AI. This game engages the user in communications to learn the preferred language based on his/her own pace by making them speak to pass the stages of the game (Johnson & Valente, 2009).

Figuring out the existing literature, there is not a serious game regarding our case study, *Yedikule Bostanları.* The lack of attention to the *Yedikule Bostanları* and its cultural heritage and the lack of such a game with this topic drew us through the development of the *Yedikule Bostans* game.

3. RESEARCH

As a cultural heritage game, history review includes a prominent part of the study to gather the required data which the game aims to transmit to the user. For this regard, we conduct a wide literature review besides skimming the available news about the area in the newspapers or any other medium.

3.1 History

According to Kanbak (2016), from the Byzantine period until the second half of the twentieth century, the orchards which met the vegetable needs of Istanbul (Kart Aktaş & Yıldız Dönmez, 2018), spread throughout the city, both in the inner part of the city and on both sides of the Bosphorus. Indeed, each of these gardens in various locations differs according to the methods they apply, the variety of products they specialize in, and even the seasons they produce. For instance, *Yedikule Bostanları* were famous for their soft and greasy lettuce (Kaldjian, 2004).

Talking specifically about the history of *Yedikule Bostanları*, according to Aleksandar Shopov and Ayhan Han (2013), the most precise information is written in an ancient notebook from 1735. Due to that information, there are 344 gardens in the *Theodosian Walls*' vicinity nine of which are located in the *Yedikule* area with 52 farmers working on them. With the population increase towards the end of the 20th century, agricultural production areas expanded through the *Yedikule* walls, and these lands

turned into agricultural production sites. To be more explicit, from the end of the Ottoman Empire to the 1950s, that is, until the migration from the rural areas to the city, the gardens remained almost unchanged, while the change gradually emerged in the 1970s, it reached a serious level in the 1980s. However, while the housing supply that did not meet the population increase due to migration and political corruption in the early 1980s caused the emergence of new settlements in the periphery of the city, losses began to occur in agricultural lands (Kanbak, 2016; Kart Aktaş & Yıldız Dönmez, 2018).

Overall, while some of the *Yedikule Bostanları* were demolished in the 1960s, most of them faced the danger of extinction in the summer of 1999, 2004, and 2013 (Figure 2). The beginning of the inclusion of *Yedikule* Gardens in the building construction processes coincides with December 2011. Most of the *Yedikule Bostanları* were piled in rubble and unqualified soil within the scope of the park project between 5 and 17 July 2013, making them infertile. Hence, 27 decares of the 60 decares productive lands in the city walls were lost. Additionally, the excavations done along the historical *Theodosian Walls* during these interventions led to the destruction of the archaeological texture of the area. Then the project of the urban park was revised in a way that the 800 square meters of the gardens be protected but as hobby gardens. Finally, in 2016, the demolition of the *Yedikule Bostanları* turned into a hot topic again, and the gardeners' barracks started to be demolished by the municipal teams (Kanbak, 2016).

Figure 2. Map of Yedikule Bostanları in 1966;
The Red Parts show the Gardens' Current Situation (Aykan & Başyurt, 2019).

Nonetheless, there are some striking incidents in the *Yedikule*'s history which are the milestones generating the changes that occurred in this area from its existence since the *Theodosian Walls'* establishment in the 5th century by the *II. Theodosius* (Aykan & Başyurt, 2019). Firstly, the conquest of İstanbul in 1453 and the urbanization after it beyond the walls by the settlement of the people engaged with the agricultural activities to the *Yedikule* neighborhood led to the expansion of urban gardens along and beyond the walls generating the linear green area in the 17th century (Durusoy & Cihanger, 2016; Sarı, 2014). Then, the establishment of the *Vatan* and *Millet* streets in 1956-60 and the *Fevzipaşa* boulevard in 1958 expanding the urbanization toward the *Yedikule* area (İlter, & Pilehvarian, 2018) and the inscription of the historic areas of İstanbul by UNESCO as a world heritage site in 1985 (Aykan & Başyurt, 2019; Durusoy & Cihanger, 2016) which salvage these gardens in contrary with the other demolished gardens. However, the *Yedikule* farming culture and the gardens themselves should also be preserved the same as the walls according to Aykan and Başyurt (2019). On the other hand, *Yedikule Bostanları* have a prominent role today in İstanbul in the current pandemic

situation in which access to food and the production of the food by the city itself is a challenge due to the Covid-19 restrictions according to Aslihan Demirtaş and Yıldız Salman (İstanbul Hepimizin, 2020) and this fact make the protection of these gardens more important than ever.

Generally, the *Yedikule Bostanları* have a high production rate thanks to the land, seasonal characteristics, and effective use of natural resources, producing 15-20 kinds of vegetables in a year. Product diversity and flexibility are among the distinctive features of the orchards that reflect the characteristics of *Mediterranean* agriculture (Kaldjian, 2004). At the same time, in this type of agriculture where biodiversity is not lost, gardeners both reduce the risks of their products and maximize their products with more than one harvest and mixed cultivation ways. In this way, environmental and market risks have been minimized by continuously harvesting for months. The gardeners working on these orchards originated from various ethnicities and all inherited the gardening methods to their next-generation (Kanbak, 2016). Furthermore, the towers of the *Theodosian Walls* were used as storing places by the farmers for their agricultural tools (Durusoy & Cihanger, 2016) and the income of the gardeners provided a budget for the repair of the *Theodosian Walls*. In other words, gardeners provided support for the walls to survive (Kanbak, 2016). The skill of the gardeners has ensured that vegetable production is carried out at a low cost and the negative consequences of large-scale competition can be minimized. Different products are obtained in different seasons throughout the year. The gardens, wells, and water pools within the *Yedikule* area date back to very old times. Today's gardeners also produce with the same technique. The production model brought by the orchards and gardeners until today has been under the threat of urbanization due to the changing conditions (Kanbak, 2016).

3.2 Game Design

As mentioned before, the *Yedikule Bostans* game is designed with an immersive text-based narrative focusing on the cultural heritage gathered from the literature review, based on *Yedikule Bostanları* and *Kara Surları*. According to the main aim of the game, we made a broad mind mapping to fully transmit all the information we want, to a user, engagingly (Figure 3). However, according to the time limits the game is in its alpha version and we just devised its first stage.
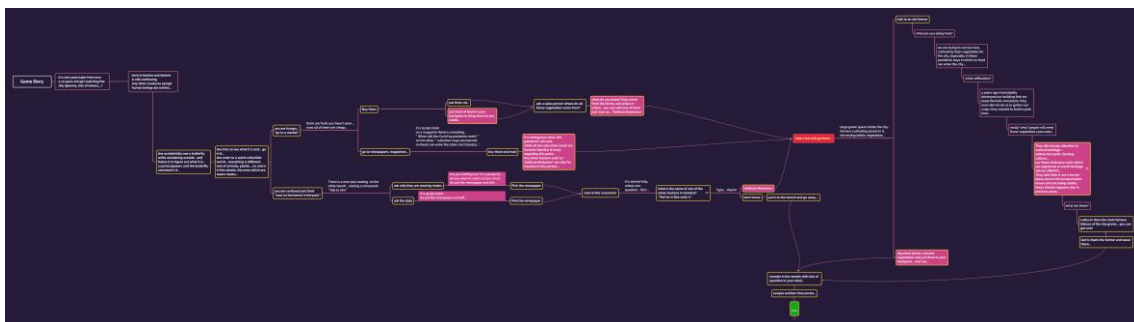

Figure 3. Mind Mapping for the First Stage of the Game

The game has a time-traveling theme, in which the first-character commutes among different periods via a time portal. In this journey, the player experiences a dystopian future world at first, then goes back through 1760 years ago, gathering various information about past events meanwhile. The character will try to change her world via the decisions she makes during her journey back home and the objects she brings with herself from the past. Figure 4 demonstrates the timeline in which the game occurs. At the beginning of the game, a 10-year-old girl leaving in 2220 will appear in a dystopian world, which is famine, and all the plant and animal species have been extinct. She is being transmitted to 2020 by a portal. In this period, the girl confronts various dilemmas in selecting different options to figure where and when she is and assemble valuable data and objects for the rest of her journey. Covid

pandemic, banned intercity paths, gardens' role, and farmers' difficulties are among the things that happen in this period. Afterward, she will travel to 1985, 1650, 1460, and 460, respectively, to understand how the initial gardens were and what are the reasons that caused their current state.
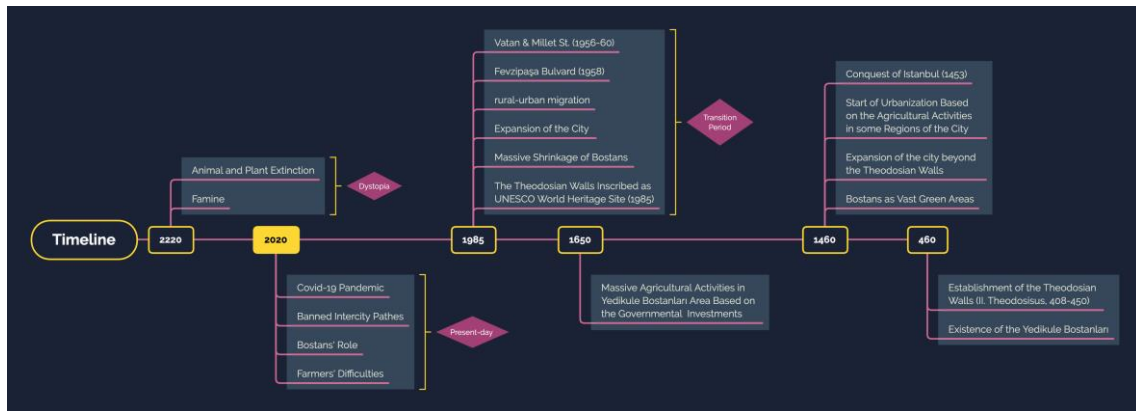

Figure 4. Timeline of the Game

In this research, we used Twine software to develop the game, which is an open-source platform enabling us to approach our goals throughout a charming storytelling journey without requiring almost any coding skills. Figure 5 depicts the platform and multiple choices just for the first traveling period. While, the Twine platform has the ability to publish and export the game as an HTML file, which enables us to play it in any browser, for now, the game is in its alpha version and available just locally. Furthermore, as an alpha version, only initial parts of the game are ready as videos and the rest of it is available in its text-based version.
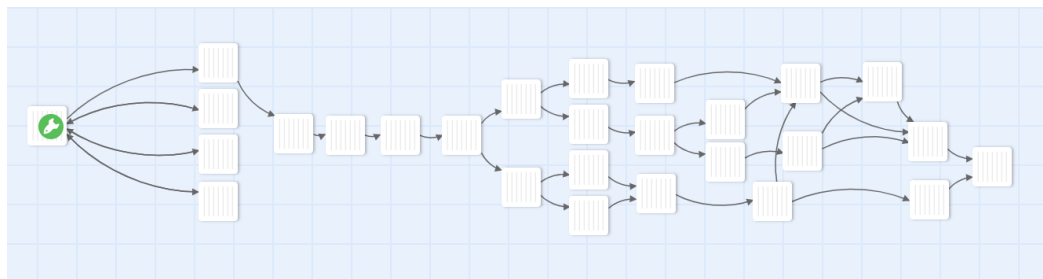

Figure 5. Twine Platform

However, despite the text-based nature of the Twine platform, which allowed us to expand our story and provide multiple choices for the user, influencing the outcome of the game, the player will face an attractive audio-visual interface (figure 6).

Figure 6. Gameplay Screen

As the game continues among challenging various selections for the player, the player may encounter some mini-games, fill in the blanks, finding hidden objects, etc. As shown in Figure 7, if the player enters a wrong answer, he/she will face a different scene than the right answer. After the player goes to the *Yedikule Bostanları*, which is the striking point of the game, there will be a conversation between her and a farmer, which will give lots of hints and information to her in order to use it in the rest of the game. Indeed, there are parts in the game in which the player can gain some objects, such as fruits, which the player is able to see on top of the screen, as achievements. Finally, the user after passing through all periods, as seen in the timeline, the character comes back to her era, facing varied outcomes based on her selections and gained objects.
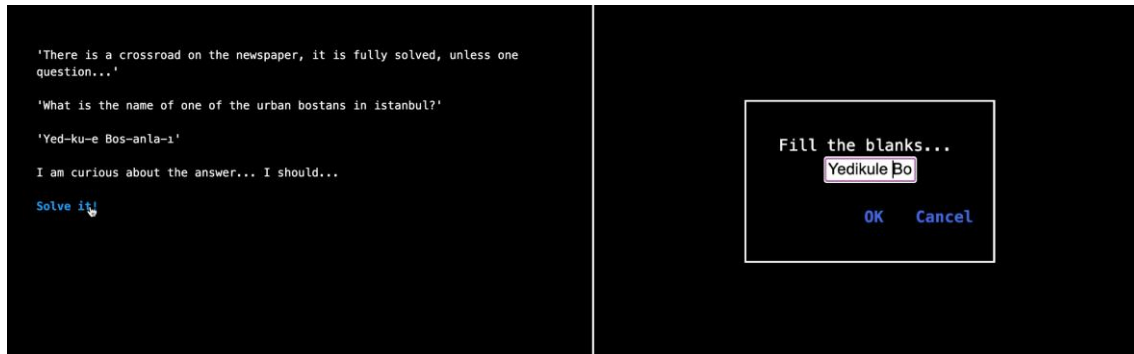

Figure 7. Fill in the Blanks

4. CONCLUSION

To conclude the research, this paper aims to introduce the role of serious games in education and talking more detailed, about the cultural heritage topic. Considering this topic, in addition to its educational capacity, games could also cooperate in the cultural heritage preservation duty. In this regard, increasing public awareness according to the topic is the initial focus of the study. The case of this article is the *Yedikule Bostanları* which are gardens in İstanbul meeting the city's vegetable needs since 1500 years ago. These gardens which are associated with the *Theodosian Walls* are being destroyed and decreased in terms of area. *Yedikule Bostans* is a serious game that we designed to inform the players regarding the farming culture inherited from the previous generations. The game with its text-based nature, designed with the Twine platform, enables us to provide multiple choices for the user to experience different endings as a future era simulation in each playtime based on his/her selections during the game. In a more holistic view, the game tries to direct the public's attention towards the cultural heritage, urban green infrastructure, and urban productive landscape, their importance, and preservation ways. Overall, a serious game is a medium in which the professionals and the researchers could more take its advantage in any field of education. As mentioned before, due to the time limitations the game is in its alpha version. Hence, as a further study, the game has the potential of being expanded and published to be played in schools in order to raise the next generations' consideration of the topic.

5. ACKNOWLEDGEMENTS

6. REFERENCES

[1] Anderson, E.F.; Mcloughlin, L.; Liarokapis, F.; Peters, C.; Petridis, C.; De Freitas, S.: Serious games in cultural heritage, 2009.

[2] Aykan, B.; Başyurt, İ: 'Yeşil Alan'dan Geleneğe: Somut/Somut Olmayan Kültürel Miras Dikotomisi, Kültürel Peyzaj ve Yedikule Bostancılığını Dünya Mirası Olarak Korumak From 'Green Space' to Tradition: Tangible/Intangible Cultural Heritage Dichotomy, Cultural Landscape and Protecting, 2019.

[3] Becker, K.: Digital game-based learning once removed: Teaching teachers, British Journal of Educational Technology, 38(3), 2007, 478-488.

[4] Bigelow, B.: On the road to cultural bias: A critique of The Oregon Trail CD-ROM, Language Arts, 74(2), 1997, 84-93.

[5] Caftori, N.; Paprzycki, M.: The design, evaluation and usage of educational software, In Society for Information Technology & Teacher Education International Conference, Association for the Advancement of Computing in Education (AACE), 1997, 23-27.

[6] De Freitas, S.; Liarokapis, F.: Serious games: a new paradigm for education?, In Serious games and edutainment applications, Springer, London, 2011, 9-23.

[7] Durusoy, E.; Cihanger, D.: Historic landscape vs. urban commodity?: The case of Yedikule urban gardens, İstanbul, Megaron, 11(1), 2016.

[8] Forte, M.; Lercari, N.; Onsurez, L.; Issavi, J.; Prather, E.: The Fort Ross virtual warehouse project: a serious game for research and education, In the 18th International Conference on Virtual Systems and Multimedia, IEEE, 2012, 315-322.

[9] İlter, F.; Pilehvarian, N. K.: Fatih Fevzipaşa Caddesi'nin Açılışı ve İstanbul'un Kentsel Gelişimindeki Yeri, 2018.

[10] İstanbul Hepimizin. (2020, September 9). Şehir Hepimizin : Kültürel miras olarak Yedikule Bostanları – Tarihi, bugünü, yarını [Video]. Youtube. https://www.youtube.com/watch?v= 1lHlVsb6-qQ

[11] Johnson, W. L.; Valente, A.: Tactical language and culture training systems: Using AI to teach foreign languages and cultures, AI magazine, 30(2), 2009, 72-72.

[12] Kaldjian, P. J.: Istanbul's bostans: a millennium of market gardens, Geographical Review, 94(3), 2004, 284-304.

[13] Kanbak, A.: İstanbul Yedikule bostanları: Bir yerinden üretim pratiği, 2016.

[14] Kane, M.: A Comparison of Online and Offline Measures of Metacognition: Featuring The Silk Road Game, 2020.

[15] Kart Aktaş, N.; Yıldız Dönmez, N.: Tarihi Kent Peyzajlarında Üretken Peyzaj İzleri, International Eurasian Conference On Science, Engineering And Technology (Eurasian Scientech 2018), Ankara, Turkey, 2018, 1519-1528.

[16] Lercari, N.; Onsurez, L.; Forte, M.: M. Multimodal Strategies for Virtual Reconstruction of Landscapes for Serious Heritage Games, ACM Journal on Computing and Cultural Heritage, 2015.

[17] Marnerides, D.; Hulusic; V.; Debattista, K.: High Dynamic Range in Cultural Heritage Applications, In Visual Computing for Cultural Heritage, Springer, Cham, 2020, 43-62.

[18] Örnek, M. A.; Seçkin, Y. Ç.: Development of an Educational Video Game for the Teaching of Landscape Grading Principles, Journal of Digital Landscape Architecture, 2016, 308-315.

[19] Poplin, A.: Games and serious games in urban planning: study cases, In the International Conference on Computational Science and Its Applications, Springer, Berlin, Heidelberg, 2011, 1-14.

[20] Regalado, A.M.: A Think-Aloud Assessment of Metacognition in 8th Grade Students: Using The Oregon Trail, 2017.

[21] Sari, T.: Sinir (siz)-Yer (siz)-Mekân (siz): İstanbul Kara Surlarinin Kentsel Dokudaki Temsil Sorunsalina İlişkin Bir Okuma, iii. Türkiye Lisansüstü Çalişmalar Kongresi, 2014.

[22] Shopov, A.; Han, A.: Osmanlı İstanbul'unda kent içi tarımsal toprak kullanımı ve dönüşümleri: Yedikule Bostanları, Toplumsal Tarih, 236, 2013, 34-38.

[23] Slater, K.: Who Gets to Die of Dysentery?: Ideology, Geography, and The Oregon Trail, Children's Literature Association Quarterly, 42(4), 2017, 374-395.

[24] Turan, E.: Gardens of resistance: Urban agriculture in the Yedikule Market Gardens, Istanbul, Doctoral dissertation, İstanbul Bilgi Üniversitesi, 2015.

[25] Twine (2020). An open-source tool for telling interactive, nonlinear stories. Retrieved 10 October 2020, from http://twinery.org/

[25] UNESCO (2020). Cultural Landscapes. Retrieved 10 October 2020, from https://whc.unesco.org/en/culturallandscape/