*Research Article/Araştırma Makalesi*

# Games for Urban Planning

Ayşe AKBULUT[1]

**Abstract**
The aim of the study is to describe the function of gaming tool for in urban planning. The problem question that can direct the study is: can gaming tool be used effectively in the urban planning process? Technic is based on literature review, testing all of the games in literature and finally summing up all of the knowledge for planning in terms of positive and critique views. In conclusion, there are direct outputs (participation, interaction, realistic visualization, learning effect and knowledge transfer) and indirect outputs (visualization of urban growth mechanisms, urban planning education tool, governance, advertising of the city or cultural heritage) are found.

## 1. Introduction

More than half part of the people in the world live in the cities since 2002 (World Bank,2002). This changes in urban dynamics in last few years are reflected on urban planning process and selecting tools for it too. But especially participatory planning tools are still limited (Foth et al., 2009). Foth (2009) also says: "conventional ways to engage people in participatory planning exercises are limited in reach and scope at the same time, socio-cultural trends and technology innovation offer opportunities to re-think the traditions in urban planning". At this point, Information and Communication Technology (ICT) subject becomes necessary for the understanding whole picture of the innovations and its effect on urban planning. Gaming tool of ICT is getting more popular participation and education way in developed countries especially in U.S.A and Germany. Although it looks like a part of funny things, professionals and academicians have been using it as a scientific tool in the urban planning process since 1969. In the light of this knowledge, the aim of the study is to describe the function of gaming tool for participation in urban planning and to deduce positive and negative aspects on samples that is previously applied. Research questions of the study are listed as follows:

- What is the relationship among ICT, games and urban planning?

- Which types of games available today in use?

- Which purposes are the games used in the planning process for?

[1] Corresponding Author. Nigde Omer Halisdemir University, City and Regional Planning Department, ayseakbulut@ohu.edu.tr

- How are the results considered?

Technic is based on firstly literature review knowledge, secondly testing all of the games in literature as an urban planner researcher and finally summing up all of the knowledge for planning in terms of positive and critique views about this tool. This subject has been studying since 1969 (increasing after 2011 and peek level in 2011) in the world with 561 academic articles (https://scopus.com,accessed on 16.04.15) This paper does not aim at only researching by itself but also it intends to create a discussion platform for urban planners for using innovative tools.

"Information and communication technology (ICT) has significant roles for designing, shaping and making policies in urban planning" (Foth 2009; Castells 2004; Graham, 2004; Mitchell, 1995; Graham & Marvin, 2001). And according to Foth (2009): "ICT has contributed to the globalization of cities and facilitated increased contacts between places and people at both global and local levels. It can play a positive role in the development of knowledge regions and creative cities (Landry 2000; 2006; Florida 1995; 2002; Bajracharya & Allison, 2008)".

The use of information and communication technology in urban planning has changed over time with both the rapid change in the technology itself and shifting perspectives of urban planning (Landry, 2000). According to Foth (2009) and his friends study, Klosterman (2001) argues that over the last four decades, the planning paradigm has shifted from the applied science perspectives in the 1960s to the political approach in the 1970s, to focus on communication and participation in the 1980s, and to collaborative planning and design approaches in the 1990s and beyond. This parallels the development of ICT and its changing role in urban planning. Especially after spreading of internet connection all over the world paradigms and tools of urban planning has been started to criticize for innovating and developing it. According to Scopus search, analyze (https://scopus.com, accessed on 16.04.15) games tool emerged in 1969 but it can be said that after 2011 it started to argue and use effectively.

## 2. Games and Urban Planning

The development and implementation of games in urban planning is an emerging research and application area. It can be also confirmed in the scientific world while searching "Urban planning in games" as a title, keyword and abstract in literature. When it is analyzed in the academic area, there are 561 academic papers found since 1969. At the beginning of 2001, the number of articles related to games and urban planning are increased and it reached the top level in 2011. It can be also said that this subject is still studying for the next years by the researchers (see fig1) (https://scopus.com , accessed on 16.04.15).

**Figure 1.** Number of articles by year for "games in urban planning" subject
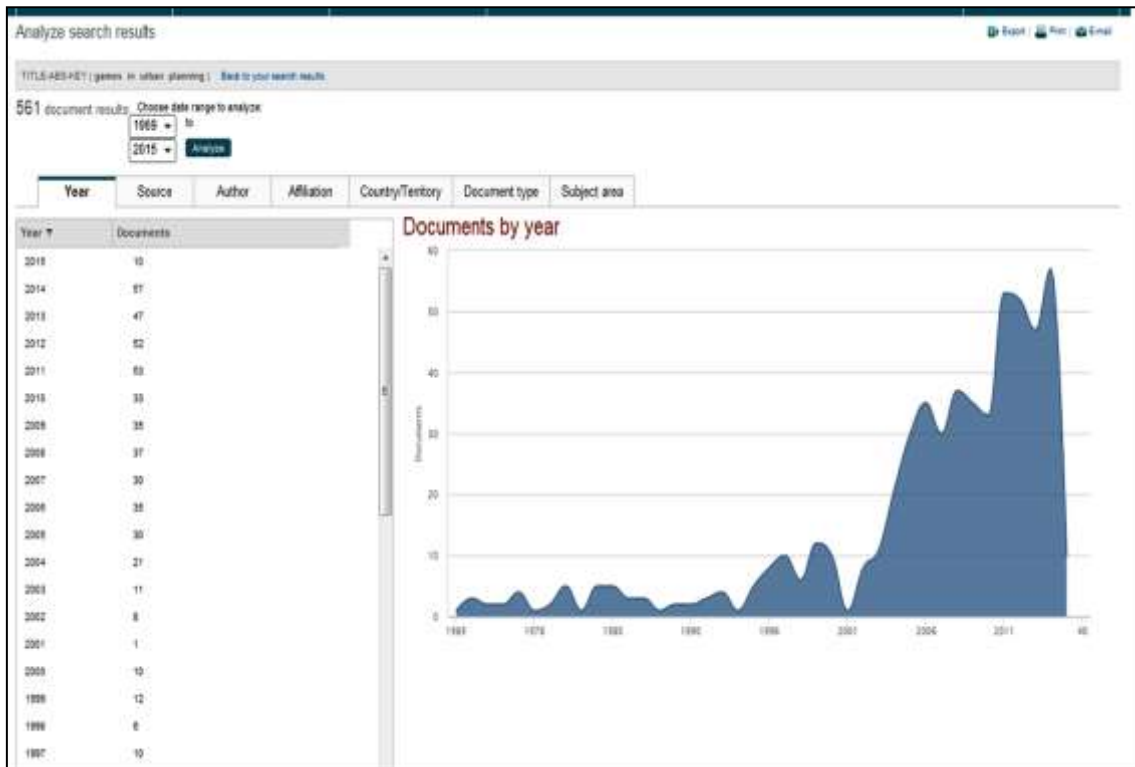


Games can show abstract and very specific planning processes in a playful way. Players can take on different roles in a game and act according to the unique requirements and rules of the game. For example, an environmental activist and a real estate investor can make different decisions due to their different roles in an urban planning process.

According to Reinard&Poplin s (2014) research about games in urban planning, they discuss the use of games for attracting people to participate and learn about urban planning processes in a playful way. On the one hand, "it can be seen as an advantage in which games can enable players to make decisions in an experimental, game-based environment" (Foth,2009; Sanoff 2000). On the other hand, "games are also often criticized because they predominantly implicate fun" (Reinart & Poplin,2014). These are the most common and popular games which have purely an amusement function. Furthermore, there are serious games, which include in addition to entertainment serious aspects.

## 2.1. Categories and definitions of games in urban planning

In the literature according to Çatak (2011), the games types can be categorized related to the literature review in 3 categories mainly (see table1).

**Table 1.** Main categories of games (adapted from Çatak, 2011)

| Serious games | **Persuasion games** |
|---|---|
| | Social impact games |
| Entertaining Games | For fun games |
| Entertaining and Educational Games | Edutainment games |
| | Edugaming |

The first one is serious games, the second one is entertaining games and the last one is which combining entertaining and educational types together. Serious games can be defined branch out, gain worldwide marketing acceptance, usually teach about general life without using school education or materials and the most distinguishable thing that this kind of games has very various user profile typology. Because this types usually has a serious purpose such as directing civil society awareness about breast cancer or making propaganda for gaining democrats in elections or using as a commercial and marketing a new brand (Prensky, 2002). Entertaining games refers to using games completely for fun. The last catery is entertaining and educational games. It can be divided into two types again (Çatak,2011, (Prensky, 2002): edutainment and edugaming. Edutainment term is created by education and entertainment words. It refers to a didactic way of education. The game is using a tool of learning in this type. Edugaming has differentiated learning way from edutainment. In this type; the most important thing that for users is having fun in the game. It uses teaching after it and sometimes subliminal (Çatak,2011, Prensky, 2002).

But this classifying can be found very general and it's hard to find linkages with urban planning. Due to this reason in this paper, it is distinguished among 2 categories of games related to urban planning: digital and pervasive games (see table2). In the literature some researchers (Reinart & Poplin, 2014), use 3 categories included non-digital/traditional games too. But it is limited in this study for ICT concept.

**Table2.** Categories of games related to urban planning (adapted from Reinart Poplin,(2014)

| | | The Name of the Games |
|---|---|---|
| Categories of Games | Digital PC Games | Anno |
| | | City one |
| | | Civilisation |
| | | Community PlanIt |
| | | Green sight city |
| | | Minecraft/block by block |
| | | Plasticity |
| | | Securing Syndney's Urban Planning |
| | | SimCity |
| | | Surfing global change |
| | | Urban plans |
| | Pervasive Games | MOGI |
| | | Pacmanhattan |
| | | REXplorer |

Digital games, which use desktop computers or PC, come to the fore in urban planning (Reinart & Poplin, (2014), Poplin 2012). Digital games users have to need

an electronic device and may sometimes need to an internet connection for using it. This connection also offers multi-player choice or team working for them. Most of the popular games such as SimCity are pc games for urban planning.

The third category includes pervasive games, which got popular since the invention of the internet and its fusion with GPS-capable many types of electronic devices. In these games, the borders between virtual and physical almost disappear. According to Montola (2009): "The family of pervasive games is diverse, including individual games ranging from simple single player mobile phone games to artistically and politically ambitious mixed reality events".

### 2.1.1. Digital PC Games:

According to Reinard & Poplin (2014) study's, there are ten different games determined which deal with urban planning aspects. They are Anno, City One, Civilisation, Community PlanIt, Green Sight City, Minecraft/Block by block, Plasticity, SimCity and Surfing Global Change.

**Table 3.** Examples and brief information of digital pc games

| Games | Date | Aim | Presentation of city | Website |
|---|---|---|---|---|
| Anno | 1998 | Simulate economic systems by building a city and satisfying people's needs to achieve optimum city planning | An island colonize getting more complex and looks similar today by upgrading civilization levels and changing city's mission | (http://us.anno-online.com/en-US, (accessed on 01.05.15) |
| CityOne | 2010 | With real-world scenarios, it aimed to feel the users as an urban planner or government agency, how to deal with problems in the city and also balancing the main components (ecology, economy, equity) of it. | Users play the game in the real city by choosing and using alternative energy sources, balancing using the water or creating more green cities with limited budget etc. | http://www-05.ibm.com/tr/cityonegame/ (accessed on,01.05.15) |
| Civilisation | 1991 | Achieving level up from neolithic era to today by increasing urban growth, military force, and money. | Players can see the changes of a city in history. Social interactions related to level can change and negotiations with government agencies about urban planning needs at upper levels in the game. | https://www.civilization.com/en/home/ (accessed on,01.05.15) |
| Community y PlanIt | 2013 | Providing local participation, introducing urban planning processes for all stakeholders and sharing knowledge transfer all of these. | All of the places, decision-making processes and actors are real in urban planning. | https://communityplanit.org/ (accessed on,01.05.15) |

| Games | Date | Aim | Presentation of city | Website |
|---|---|---|---|---|
| Green Sight City | 2011 | Users are supposed to rebuild an ecological city form from the existing one. By this way, users can have general knowledge about components, implementations and policy regulations of the green city. | Today's cities visual is used at the early levels, it can change into greener up to users green sight city decisions. | http://www.emercedesbenz.com/autos/mercedes-benz/corporate-news/greensight-city-is-a-new-simulation-game-developed-by-daimler-ag-and-zone-2-connect/ (accessed on,01.05.15) |
| Minecraft | 2011 | Since 2013 company has been collaborating with UN-Habitat with one of their product. Designing public places, expressing opinions of their cities'problems by citizens can be said as an aim of the game. | Real world visuality is used because the results of the game are supposed to evaluate from the institutional partners. | https://minecraft.net/ , http://unhabitat.org/wp-content/uploads/2015/01/Using-ICT-for-youth-participation-in-the-design-of-public-space-projects.pdf (accessed on,01.05.15) |
| Plasticty | 2004 | It was created for the Bradford city and mainly focused on 2 things. one of is to provide interactions between urban planning authorities and citizens. And the other one is to explore their urban environment by changing planning decisions and architectural structures to all people. | Real world visuality and real planning tools are used for the game. And it can provide real-time dialogue with other gamers. | http://creativegames.org.uk/art/plasticity/index.htm (accessed on,01.05.15) |

**Table 4.** Examples and brief information of digital pc games (continued)

| Games | Date | Aim | Presentation of city | Website |
|---|---|---|---|---|
| SimCity | 1989 | The aim of the game is to create a prosper city by living in a story and acting as an instructor. It has different types of science fiction characters, futuristic city, green city or it can fix itself on real-time geographical information according to your location. | It shows a virtual city environment but has similar components like the real ones. | http://www.simcity.com/ (accessed on,01.05.15) |
| Surfing Global Change | 2003 | The aim of the game is based on education. It provides users to learn about social interactions in the planning process and also directly effects of urban planning procedures. | Its free version is couldn't find and experienced. At the same time literature doesn't explain any information about its visuality. | No accessed on directly to the game for information: http://www.igi-global.com/article/web-supported-negotiation-game-surfing/65741 (accessed on, 01.05.15) |

| Games | Date | Aim | Presentation of city | Website |
|---|---|---|---|---|
| Urban Plans | 2011 | the main objective of the game is to reach the highest possible population for the city | Basic urban artificial and natural elements used in a virtual world of the game. According to users planning decisions, population and the money of the city change. Users can gain new planning tools related to urbanization levels. | http://www.owensworld.com/games/strategy/urban-plans (accessed on, 01.05.15) |

## 2.1.2. Pervasive Games: Games in Urban Environment

According to Reinart & Poplin (2014), another category of the games is te pervasive games. This type of games creates hyper-reality environment that it is hard to distinguish the physical and artificial borders in it. Related to spread internet connection all over the world and using GPS technology simultaneously with games via internet this type of games get popular.

**Table 5:** Examples and brief information on pervasive games

| Games | Date | Aim | Presentation of city | Website |
|---|---|---|---|---|
| Mogi | 2000 | It is a kind of location-based role playing game which can be used as multiplayer. The aim of the study is to explore and examine the new social interaction ways. And also it aims to promote tourism for Japan by $360^0$ tour. | In this geocaching game streets of Japan is shown in real time and user live itself as a geocacher. | No accessed on directly to the game for information: http://ethnorelativity.wikispaces.com/file/view/japanese+mobile+gaming.pdf (accessed on, 01.05.15) |
| Pac Manhattan | 1980 | Using a labyrinth in Manhattan city, introducing and promoting it organize the aim of the game. It is a real life and location-based game with GPS. | In this game real streets of Manhattan can be watched while Pacman try to eat dots for achieving levels. | No accessed on directly to the game for information: http://gamecenter.nyu.edu/pac-manhattan/ (accessed on, 01.05.15) |
| REXplorer | 2007 | This game is produced for tourists for enjoying their times while they visit historical sites, cultural .areas. | All of the gamers visit and learn by themselves by being interactive with iconic buildings, city map or events in the city of Regensburg in Germany. | No accessed on directly to the game for information: http://dl.acm.org/citation.cfm?id=1240927, (accessed on, 01.05.15) |

## 2.2. The outputs of games and urban planning

At the beginning of the study, the question that directs the study is: can gaming tool be used effectively in the urban planning process? In this context, according to Reinart &Poplin, (2014), Poplin (2011) and Williams (2011), there are several outputs of the games, but they need to be classified for the purpose of the researchers. In this view article study; the outputs can be summarized in two class. First one is direct, the other one is indirect outputs. Directly outputs can be defined

as directly feelings, information or material that users have after gaming. In other words, the outputs which have passively effect on urban planning and need to re-evaluate for using in the process. The other class can be defined: although they are indirectly outputs of the game, they can directly use in urban planning issues (see fig 2).

**Figure 2.** The outputs of games and relationship between urban planning
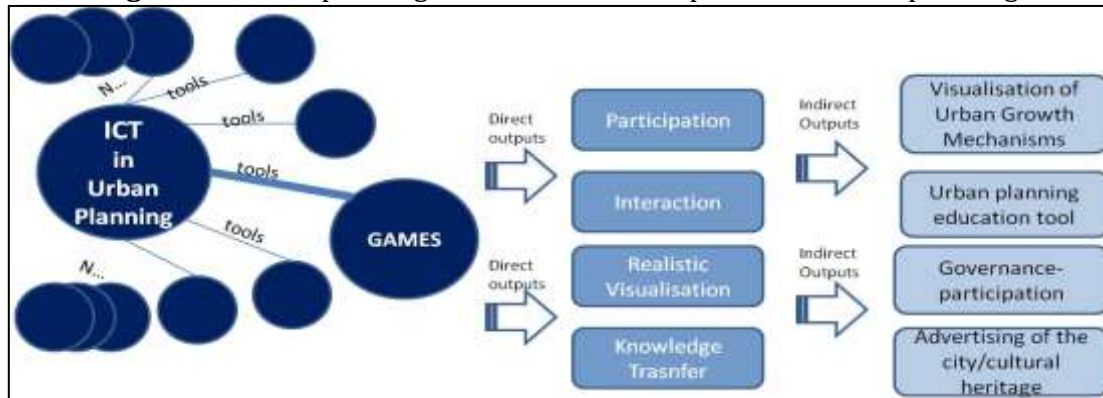


In conclusion, the areas that output the games related to urban planning can be listed as follows:

- Understanding or teaching urban growth mechanisms by visualization such as exploring the relationship between different land use choices and people's urban life of the real world through the virtual one.

- Using games as a tool for urban planning education

- Providing governance with game's participation aspect at different levels of urban planning

- Advertising of the city, cultural heritage site or somewhere that concerned institution.

## 3. Discussion and Conclusion

This paper does not only focus on examining the games and relations between urban planning it also intends to discuss innovative tools for legality in urban planning and education. In terms of this view, there are some positive effects and critiques determined after experienced all of the game samples in the literature.

**Table 6.** The results of the gaming experiences

| Positive effects | Critiques |
|---|---|
| Some of the games are created for planning or education directly. | All of the games can be transformed for providing urban planning issue but indeed they don't aim to integrate citizens and real-world planning process directly. |
| Games as an innovative education tool can develop teaching system at the urban planning departments. | It is hard to distinguish and regulate the line between entertainment and utility. |
| It helps the citizens to upgrade their interactions and communication skills. | Pervasive games only focused on entertainment although they use the most effective technologic opportunities and integrating it with the real city. |
| Some of the games outputs already used effectively such as surfing global change, urban plans. | Using realistic visualization of the city level is generally low in all of the games especially fort he pc games. |
| | Using its direct or indirect outputs is up to users, generally, games don't interested in benefiting users participation in urban planning. |

At the end of the study, some positive aspects and critiques evaluated together. Results of the examining the games show that using it in the planning discipline still needs to some regulations. Because direct outputs of the games don't allow to use in the process efficiency and some of the games can be played just for fun it is hard to distinguish the line between seriousness. But still it has a hope and open to discussion for urban planning. In coming years it looks still has a significant topic for ICT in urban planning.

## References

ACM Digital Library website (2015),Information about REXplorer Game, http://dl.acm.org/citation.cfm?id=1240927, (accessed on, 01.05.15)

Ahamer G., (2012), The Web-Supported Negotiation Game "Surfing Global Change": Rules, History and Experiences, International Journal Of Online Pedagogy And Course Design, Volume 2, Issue 2, http://www.igi-global.com/article/web-supported-negotiation-game-surfing/65741 (accessed on, 01.05.15)

Anno Officail website (2015), (http://us.anno-online.com/en-US, (accessed on 01.05.15)

Çatak G., (2011) Oynarken Tasarlamak: Dijital Tasarım Oyunları, Sigma, (3,) pp. 385-391.

Chan C., (2008), Convergence, Connectivity, and the Case of Japanese Mobile Gaming, Games and Culture, Volume 3 Number 1, pp.13-25. http://ethnorelativity.wikispaces.com/file/view/japanese+mobile+gaming.pdf (accessed on, 01.05.15)

CityOne Official website (2015), (http://www-05.ibm.com/tr/cityonegame/ (accessed on,01.05.15)

Civilization Official website (2015), https://www.civilization.com/en/home/ (accessed on,01.05.15)

Community PlanIt Official website (2015), https://communityplanit.org/ (accessed on,01.05.15)

Foth, M. and Bajracharya B. and Brown R. and Gregory H., (2009) The Second Life of urban planning? Using neogeography tools for community engagement. Journal of Location Based Services, 3(2), pp. 97-117.

Game Center website (2015), Information about Pac-Manhattan Game, http://gamecenter.nyu.edu/pac-manhattan/ (accessed on, 01.05.15)

Gordon E., Schirra S., (2011), Playing with empathy: digital role-playing games in public meetings. In Proceedings of the 5th International Conference on Communities and Technologies (C&T '11). ACM, New York, NY, USA, pp. 179-185.

Gordon E., Schirra S., (2014), "Game-based Civic Learning in Public Participation Processes." In *Media Literacy Education in Action: Theoretical and Pedagogical Perspectives*. New York: Routledge,pp. 153–159.

Green Sight City Official website (2015), http://www.emercedesbenz.com/autos/mercedes-benz/corporate-news/greensight-city-is-a-new-simulation-game-developed-by-daimler-ag-and-zone-2-connect/ (accessed on,01.05.15)

King, C. and Cazessus, M., (2014), Teaching with AudaCity: A Board Game for Urban Studies. In Sociology Faculty Publications. Pp. 23)

Minecraft website (2015), https://minecraft.net/ (accessed on,01.05.15) ,

Owens World website (2015), Information about Urban Plans Game http://www.owensworld.com/games/strategy/urban-plans (accessed on, 01.05.15)

Plasticity website (2015), http://creativegames.org.uk/art/plasticity/index.htm (accessed on,01.05.15)

Poplin A.,(2012), Games and Serious Games in Urban Planning Study Cases, https://www.hcuhamburg.de/fileadmin/documents/Professoren_und_Mi tarbeiter/Alenka_Poplin/Poplin_article_CTP_2011_final.pdf , (accessed on 16.04.15)

Prensky, M. (2002). The motivation of gameplay or, the real 21st century learning revolution. On the Horizon, 10(1), 1-14.

Reinart B., Poplin A., (2014), Games in urban planning – a comparative study, Real Corp Conference: Clever Plans For Smart Cities Proceedings, Tagungsband, pp.1-10.

Scopus Official website (2015), https://scopus.com , (accessed on 16.04.15)

Simcity website (2015), http://www.simcity.com/ (accessed on,01.05.15)

UN-HABITAT web site, (2015), Using ICT for youth participation in the design of public space projects, http://unhabitat.org/wp-content/uploads/2015/01/Using-ICT-for-youth-participation-in-the-design-of-public-space-projects.pdf (accessed on,01.05.15)

Williams A., (2011), Participatory Planning Game Brings Diversity And Transparency To Citywide Visioning Process,APA Technology Division,101, pp.1-10.

World Bank, (2002), World Development Report 2002, http://elibrary.worldbank.org/doi/pdf/10.1596/0-8213-5016-1, (accessed on 12.12.2011).