

# Potential of Games in the Field of Urban Planning

*Eszter Tóth<sup>1</sup>*

*HafenCity University Hamburg*

**Abstract:** The implementation of games and game principles has been a specific approach in the context of urban planning and development for a long time. There has been an increasing number of games specifically designed for supporting decision-making and public participation in planning processes, as well as in the education of urban planners. Yet, there is a lack of analysis of urban games as it relates to their possible contribution to the field of urban planning. This paper provides a summary of the main developments of games in the urban context with an overview of recent examples, and explores interrelations of game genres and platforms, and potential fields of implementation.

**Keywords:** urban planning, urban games, game genres, application fields, games for planning, games for participation, games for learning

## **Introduction**

The act of playing is intrinsically tied to human life. As Johan Huizinga stated in his influential work on the role and importance of play in culture and society, play is an essential condition for the formation of culture (Huizinga, 1938). Although he argues that play is not a serious activity, he notes that it has a “significant function” and imparts meaning to action. Play in his definition is spatially and temporally isolated from real life, embedded in a self-contained system of rules, which he calls the magic circle. But does the meaning of play only relate to the action of play without having any impact on the rest of daily life?

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<sup>1</sup> Contact: eszter.toth@hcu-hamburg.de

On the other hand, since the end of the 19<sup>th</sup> century, function-centric theorists have emphasized the biological or social functions of play (Flitner, 2002). Psychologists tried to find empirical evidence for the beneficial effects of play, whether relating to the release of energy, to practice moral or cognitive skills, or to strengthen players' self-awareness (Sutton-Smith, 1997). These theories describe play as merely a tool for accomplishing certain functions, but they are not able to explain why people like to play (Rodriguez, 2006).

In the second half of the 20<sup>th</sup> century, several research studies were conducted in the field of developmental and social psychology, focusing on the phenomenon of play experience. The sensation of fun, pleasure and engagement, which Csíkszentmihályi defines as the state of flow, proved to be an essential quality of games (Csíkszentmihályi, 1990). Flow experience can foster intrinsic motivation and therefore has a reinforcing effect in learning processes (Gee, 2003). In parallel with the growing number of empirical results on the impact of play on performance, attitude, motivation and social behavior, games were introduced into different fields of education and training. Framed in a formalized set of rules, these games built upon the motivational and cognitive effects of play. More and more games were designed for serious purposes, for "a purpose beyond play" (Klopfer, Osterweil, & Salen, 2009, p. 1). Nowadays, games are conceived as established tools in different fields, such as learning and education, prevention or therapy (Wiemeyer & Göbel, 2011). New domains are emerging, ready for the involvement of games for everyday practices. Games attract more and more attention in the field of urban planning as well. An increasing number of games are designed specifically for supporting decision-making and the participation of residents in planning processes, as well as in the education of urban planners.

This paper examines the potential of games and game principles in the field of urban planning. First, I will explore the relevance and suitability of games as tools in the process of urban planning. This will be followed by a short historical overview on game principles implemented in urban planning processes. Then I will examine how games can contribute to urban planning by analyzing recent games designed for this specific purpose. Finally, I will conclude by discussing the possible improvement of the implementation of games and game principles in urban planning, with potential directions for further research.

### **Relevance and suitability of games in the field of urban planning**

In order to explore the rationale for games in the context of urban planning, it is necessary to define the term *game* as the object of investigation. As a large body of research on games shows, there is not one prevalent definition (Huizinga,

1938; Callois, 1961; Abt, 1970; Sutton-Smith, 1997; Salen & Zimmerman, 2003). The way we define games always depends on the specific context in which games are examined. In this study, I apply the definition of Salen and Zimmerman (2003), who define a game “as a system in which players engage in an artificial conflict by rules, that results in a quantifiable outcome” (p. 80). Thus, games can be understood as systems which consist of a set of parts, such as game elements or attributes, and as interrelations of these elements within the context of a game. These elements interrelate to a whole complex system.

Considering games as complex systems and as “procedural representations of aspects of reality” (Salen & Zimmerman, 2003, p. 55) generates the bridge towards urban environments. Cities encompass simple components that interact within a complex system involving both physical and social systems. By relating game components with those of an urban environment, they can simulate mechanisms and dynamics of the urban space. Moreover, they can create a space to experience real situations compressed in time, communicate and visualize very complex data, and experiment with ideas without any consequences in real life. Thus, they permit “learning about the process of change in a dynamic environment requiring periodic decisions” (Sanoff, 1979, p. 1).

But more than just being simulations of reality providing an enjoyable experience, games can engage and motivate people in activities for an extended period of time. The experience of pleasure results from a challenging activity and the clear goals of the game, the clear and ongoing feedback resulting in consequences for the progress, and the paradox of having control in an uncertain situation, among other elements. The psychologist Csíkszentmihályi (1990) refers to this exceptional state of mind as the optimal experience, which he calls flow. In the state of flow, players can immerse themselves in concentration and they are fully engaged with their activity. However, flow is not unique to digital games. It is an essential characteristic of the activity of play. Thus, games can increase motivation and strengthen positive attitude through the optimal experience.

Based on these considerations, games have been part of a specific approach in the context of urban planning and development for a long time. This paper provides a summary of the main developments in the field of urban games, with an overview of recent examples, and reflects potential areas of implementation and directions of further research.

### **The history of games in the field of urban planning**

Game elements found their way into the field of urban planning as civilian applications of simulation games as early as the 1950s. At that time, simulation

gaming – already an established training and planning tool in the military field – opened up to new domains like education and business management training. Referring to the functionality and practical implementation of those games, contemporary sources use the term “operational gaming” (e.g. Abt, 1970; Armstrong & Hobson, 1972; Duke, 1964, 2011). Many of the early games implemented in the field of urban planning were “products of local needs”, developed at universities on the commission of local municipalities, and had been played only a couple of times without being published (Mayer, Bekebrede, Bilsen, & Zhou, 2009, p. 170). The early examples of simulation games in the field of urban planning served mainly to support stakeholders’ understanding of the complexities of urban planning processes. The game sessions were addressed mainly to professionals and decision makers, and had a very tight link to reality: the simulations were generally based on real data and players often represented their own role in a game. Games focused mainly on city management, land use, and resource management. From this perspective, these early examples of urban planning games can be considered simulations rather than games.

Two of the first pioneers to introduce the concept of simulation games in urban planning and policy were Richard Meier and Richard Duke. Commissioned by the Lansing, Michigan, City Council, Duke developed a simulation game on communal budgeting issues in order to support consensus finding processes amongst members of the municipality (Duke, 1964). He developed a playfully structured process known as *Metropolis* that simulated the city budget decision sequence. In subsequent years, as Director of the Environmental Simulation Lab (ESL) at the University of Michigan he had the opportunity to work with Meier on the refinement of his game concept and to develop a more sophisticated computer driven game called *Metro*. This computer simulation was later further developed, and under the name *Apex* it is still in use in the practice of urban planning (Duke, 2011).

In 1960, *CLUG (The Cornell Land Use Game)*, one of the first board games designed for planning purposes, was published. *CLUG* was developed by Allan Feldt and colleagues, and it is also still in use in the education and practice of urban planning.

Despite successful implementations, games could not break into this field. Armstrong and Hobson (1972) noted that apart from military and training there are still only a few examples of the use of games for planning purposes. In the same year, Schran (1972) claimed that even though Richard Duke presented his *Metropolis* to a seminar in Berlin as early as 1967, it took more than a decade in Germany to find a broader recognition for the implementation of games for plan-

ning purposes. Armstrong and Hobson (1972) see the reason for disregarding games in the delusion that they are not able to produce forecasts of future trends and events, a goal essential to planners. In their article, they argue, however, that operational games can indicate the types of different planning objectives and support understanding of the various interest groups involved. Hence, they can be an effective tool for supporting planning processes. Based on these concerns, they developed a number of simulation games in the context of regional planning at the Institute of Local Government Studies at the University of Birmingham, and defined an assessment model for operational games.

In the 1970s, in parallel with the proliferation of public participation, simulation games were increasingly implemented in order to engage residents and support open urban planning processes. Planners and developers built upon the motivational effects of games. By implementing game elements and playful processes in decision-making, they aimed to engage a broader audience in participation. These games, however, often consisted of the typical rules of public meetings, supplemented by a set of game rules. *Simpolis*, developed by Clark C. Abt, was implemented in New York in order to assess possible reactions, crises and consequences of urban planning decisions with local residents. *Simpolis* was played in the public space of the Central Park Mall, where participants could take optional roles, representing the different sectors of city administration, business and civil society and discuss real or devised conflict situations. New aspects and arguments that arose during the simulation widened the perspective of the participants and delivered tangible results for local politics. Abt described this role-playing game in his influential book *Serious Games*, published in 1970 (Abt, 1970). Abt Associates developed a number of simulation games for planning purposes, such as *Trade-off* from 1968, where St. Louis residents could prepare a redevelopment plan for their city within a certain budget, or *Fair City* (1970) incorporated into the U.S. federal Model City Program.

In 1979, Henry Sanoff published a collection of urban planning games in his book *Design Games* (Sanoff, 1979). These games aim to provide a way to explore environmental issues and engage people in discussions about planning situations. Sanoff describes a great variety of games, divided into different categories according to their field of implementation: to generate ideas, support individuals to make specific design choices or facilitate group consensus decisions. They can be considered more as playful exercises or, in some cases, decision-making simulations than games.

From the seventies on, there were two relevant development fields for urban gaming: on the one hand, the rise of the commercial game market (e.g. Sid

Sackson's *Metropolis*), and on the other hand, the evolution of system dynamics (Mayer et al., 2009). System dynamics is an approach that aims to understand the behavior of complex systems like cities (Forrester, 1969). This approach influenced not only urban planning professionals but also game designers. Will Wright, inspired by the systems dynamics, developed the game *SimCity*, where players have to think about cities as complex systems. Players step into the role of an omnipotent mayor and build, develop and manage their city. Meanwhile, they experience how each of their choices exert influence on the whole urban system. The game was published in 1989 and enjoyed immediate success among the broader audience. Although it was intended as an entertainment game, it is highly appreciated among urban planners and teachers as well. *SimCity* is widely used as a didactic and modelling tool in educational and professional circumstances (Rufat & Minassian 2009; Mayer et al. 2009). Meanwhile, sim-like, open-ended city builder games have captured the market (e.g. *SimCity*, *CivCity Rome*, *City Life*), and keep influencing the design of games developed for planning purposes.

The proliferation of digital games and novel technologies has opened new ways of playful urban planning. The new possibilities offered by videogames, computer and mobile games concerned with communication, interconnection of spaces, visualization and experimentation changed the character of games and gamespace. Furthermore, they exert influence on how we perceive and experience the urban space. Digital games are considered spatial representations (Borries, Böttger, & Walz, 2007). Spaces created by digital games range from two dimensional abstractions of spaces to complex constructions of social communities. These digital spaces combined with the interactive systems of games make digital games a powerful tool for modelling and simulating complex systems of urban space. *Zone 63065* was one of the earliest examples of computer games developed especially for planning purposes. The 3D real-time interactive adventure game was launched in 1999. Players were able to follow the changes of urban spaces in Offenbach, Germany, and by acting and experimenting in the virtual city learn new ways of dealing with their own living environment (Grüttner, 2005).

Due to technological developments like wireless, mobile or GPS, digital games became mobile and pervasive. They advanced the development of a new type of space, engendered through superimposition of the physical and the virtual spaces (Borries et al., 2007). In the so called "Alternate Reality Games", physical and virtual space interconnects, opening up new possibilities for urban planning games. *Participatory Chinatown* is a 3D multiplayer game, developed to support the communication process on the new master plan for Boston's Chi-

natown neighborhood. It is meant to be played in the shared physical space of a traditional master planning meeting and the virtual game, thus emphasizing “the simultaneity of face-to-face and virtual situations” (Gordon & Schirra, 2011, p. 180). *Participatory Chinatown* aims to motivate a broader audience to take part in the discussion of community issues through the creation of an engaging, ludic reality.

In recent years, numerous examples of participatory games have been designed for and implemented in urban planning processes. Especially in the field of public participation, the implementation of games is increasing, with the interactive and engaging quality of games employed to motivate and involve different target groups (e.g. Beckett & Shaffer, 2005; Bagley & Shaffer, 2011; Gordon & Koo, 2008; Gordon & Schirra, 2008; Poplin, 2011, 2012, 2013; Tóth & Poplin 2013, 2014).

## **Method**

A comprehensive survey of games designed between 1999 and 2013 in the context of urban planning was conducted in order to explore the interrelations between the aims, the field of implementation within the planning process and the genre of games. I analyzed 19 games on the basis of different sources of information, including empirical and conceptual articles, conference proceedings and websites. Games selected for the analysis include analog, digital and pervasive games. Each of these games has been designed to support urban planning and development. Predefined criteria of the analysis are the following:

- purpose of the game relating to urban planning
- field of application within the planning process
- genre
- technology
- target group
- location
- empirical results on the effectiveness

First, the aims of a game were collected, e.g. understanding the complexity of urban planning processes, fostering civic thinking, raising awareness of a certain topic or involving a certain target group into the planning process). By analyzing declared purposes of the selected urban planning games, the following main categories could be defined: education, professional education, awareness raising, communication among stakeholders, citizen engagement and data collection. Then the selected games were assigned systematically and thematically to one

of the categories. Subsequently, genre (e.g. role-play, strategy, adventure game), technology (digital, analog or mixed), target group and location were identified. Additionally, it was checked whether there were existing empirical results regarding the effectiveness of those games. Then I analyzed interrelations between the purpose of the games and their genres and platforms, in order to explore and formulate guidelines for the design of urban games.

GAME	FIELD OF APPLICATION	GENRE	TECHNOLOGY	TARGET GROUP	DATE	LOCATION
PARTICIPATORY CHINATOWN	citizen engagement	role-play	mixed	local community	2010	Boston
HUB2	citizen engagement	second life	mixed	local community	2008	Boston
STADTSPIELER	communication	strategy game	analog	stakeholders	2009	none
STADT SPIELT STADT	data collection	simulation	digital	youth	2004	Görlitz, Germany
B3	data collection	simulation	digital	local community	2011	Hamburg
BLOCK BY BLOCK	data collection	second life	digital	youth	2013	Nairobi and diverse
KARL ÄRGERE DICH NICHT	data collection	role-play	analog	youth	2012	Berlin
URBAN SCIENCE	education	role-play	mixed	students	2006	Madison, Wisconsin
ZONE 63065	education	adventure	digital	local community	1999	Offenbach, Germany
POP-UP PEST	education	strategy	analog	youth	2012	Budapest
PARTICIPÉCS	education	strategy	analog	youth	2014	Pécs, Hungary
CITYONE	professional education	simulation	digital	urban planning students and professionals	2010	none
MADISON 2200	professional education	role-play	mixed	urban planning students	2003	Madison, Wisconsin
QUAG	professional education	role-play	digital	urban planning students and professionals	2008	none
SECURING SYDNEY'S URBAN PLANNING	professional education	simulation	digital	urban planning students and professionals	2013	Sydney
TYGRON SERIOUS GAMES	professional education	simulation	digital	stakeholders	since 2005	none
BIG URBAN GAME	awareness raising	racing	pervasive	local community	2003	none
CAN YOU SEE ME NOW?	awareness raising	racing	mixed	local community	2003	none
REZONE PLAYFUL INTERVENTIONS	awareness raising	miscellaneous	pervasive	local community	2014	Den Bosch

Figure 1. Results of the analyses of selected urban games

## Results

Fig. 1 shows the results of the analyses of selected urban games based on the predefined criteria. Games have been clustered according to the main cat-



egories relating to their purpose: education, professional education, awareness raising, communication among stakeholders, citizen engagement and data collection. Additional categories helped to identify interrelations between the purpose of the games and their genre, technology and the focus on specific target groups or locations. A short summary of each of the categories follows.

### *Games for raising awareness*

An increasing number of urban games are designed to raise people's awareness of urban issues. The design of games which aim to raise the awareness of location specific issues and promote active civic engagement in the co-creation of the urban space is tightly linked to a certain urban environment. Those games generally have no specific target group, instead striving to reach a broader audience and involve as many people as possible. Thus, *pervasive games* in particular are well suited to achieve these goals, taking place in given public spaces and open to play for everyone. Montola, Stenros and Waern define pervasive game as "a game that has one or more salient features that expand the contractual magic circle of play spatially, temporally or socially" (2009, p. 12). In pervasive urban games, gamespace and real space overlap, as game activities happen in real public spaces, involving spaces, objects and people outside of the magic circle and in real time. "Pervasive games pervade, bend, and blur the traditional boundaries of game, bleeding from the domain of the game to the domain of the ordinary" (Montola, Stenros, & Waern, 2009, p. 12). Thus, pervasive urban games can involve the broader public somewhat "accidentally" in gaming experiences dealing with serious urban issues.

These kinds of urban games usually promote informal, bottom-up initiatives and encourage people into active participation in shaping the urban environment. They are not usually linked to formal planning processes. Due to their open format, it is hard to gain empirical data regarding the effectiveness of those games, or data from participants. One of the most well-known pervasive urban game, the *Big Urban Game (BUG)*, was created in 2003 by the University of Minnesota's Design Institute. The *BUG* aimed to promote awareness of the built environment of the twin cities Minneapolis and Saint Paul and raise novel perceptions for considering new strategies for improvements by encouraging people to move huge pieces through the city (Lantz, 2007). Another example, the location-based games created within the project *Rezone Playful Interventions* in 2013, aimed to "involve visitors and stakeholders through play to the issue of abandoned post-industrial heritage, and strengthen their sense of 'ownership'" (de Lange, 2014).

### *Games fostering citizen engagement*

Several games have been designed to empower a specific target group and foster active participation in the co-creation of the urban space. Tied to a growing demand for the integration of disadvantaged social groups in participatory urban planning that are usually under-represented in traditional forms of public participation (Fürst & Scholles, 2008, p. 162), these games aim to foster citizen engagement among diverse social groups such as children and youth, elderly people or migrants. These games build upon the motivational effects of a playful, engaging environment and provide positive experiences relating to urban issues. They promote a civic attitude and values by engaging players in the ludic solution of complex civic problems. Thus, **problem-solving** and **simulation games** in particular are appropriate for the purpose of fostering civic engagement in which a player can experience active participation in a safe and closed environment, learn via models, as well as trial and error and explore different ways of contribution and co-creation. Relating these experiences to real-life situations through reflection can strengthen the feeling of self-efficacy, an essential precondition of civic engagement. These games have a strong local focus, in order to strengthen identity and the commitment to the community. These games are mostly **collaborative** or **cooperative**, based on collaborative problem-solving rather than competition. They can be implemented at the initial stage of a formal urban planning process in order to explore the needs of local residents. Both digital and analog games can be suitable tools for this purpose.

The Boston-based Engagement Game Lab has developed a number of games with the above mentioned purpose, involving novel technologies and platforms. Gordon and Koo argue, for example, that “that the immersive, playful, and social qualities of the virtual world **Second Life** are uniquely appropriate to engage people in dialogue about their communities” (2008:204). The authors emphasize the possibility for sharing experiences of a collectively planned space and “having the opportunity to deliberate over, comment on, and alter that space” (2008:204). Their game called *Hub2* is based on the platform *Second Life*, in which participants can explore, rethink, rebuild and comment on the selected neighborhood in Boston. *Hub2* aims to engage local youth in the planning of a neighborhood park, by offering a different, more ludic space than a traditional community planning meeting. *Hub2*, similar to *Participatory Chinatown*, a more recent game by Engagement Game Lab, is meant to be played in the shared physical space of a traditional master planning meeting. The game designers call this approach **augmented deliberation** which emphasizes the simultaneity of face-to-face and virtual situations (Gordon & Schirra, 2008).

Studies conducted on both games indicated that game sessions were successful in attracting the predefined target groups (Gordon & Koo, 2008, Gordon & Schirra, 2008). Playing computer games embedded in a real participatory situation developed an understanding in players about local issues and made them feel more connected to the community. However, the empathy developed within the game *Participatory Chinatown* “did not convincingly transfer outside of the magic circle to effect decisions made at the meeting immediately after engaging with the game” (Gordon & Schirra, 2008, p. 180).

#### *Fostering communication among stakeholders*

Experiences related to the implementation of **simulation games** in the context of urban planning have shown how games can support the communication process among stakeholders. Simulation games can develop the understanding in participants of the complexity of the planning process, sensitize them to other perspectives and create space for experimenting with different ideas without any immediate consequences in the real world (Diekman & Leppert, 1978). Thus, simulation games have been implemented in planning processes in order to foster communication among stakeholders (see early urban planning simulation games, such as *CLUG*, *Simpolis*, *Trade-off*, etc.). Another game genre applied in professional urban planning is **role-play**, in which players assume the roles of characters – such as stakeholders, planners or decision-makers – in the fictional setting of a planning process (e.g. *QUAG*, *Madison2000*). These games have a discursive character and generally address students, planners, decision-makers or representatives of different interest groups familiar with the planning situation. They can either be related to a specific planning situation, based on real-world data and related to a specific location, or embedded in a more abstract game context complemented by diverse playful elements.

A recent example is the board game *Stadtspieler*, developed by Netzwerk Agens e.V. and published in 2009. *Stadtspieler* invites players to share and discuss their ideas by modeling them in clay on the playing field. They can take on different roles such as investor, citizen and urban planner, commenting on and evaluating their ideas from different perspectives. The game can be used for educational purposes, and as a tool in real-world planning situations, which facilitates communication between stakeholders.

#### *Games for collecting data from citizens*

Games can be a supportive tool in decision-making processes for gathering data from different stakeholders. Considering games as procedural represen-

tations of aspects of reality indicates that interactions of players within the game, the way they act and react to certain situations, strategies or plans can serve as meaningful information for planners and decision-makers. Games designed for the purpose of supporting participation in planning processes are interactive systems, which collect information about players' preferences, needs and ideas relating to a certain urban development project or plan. Therefore, these games have to reflect and represent a concrete situation. They have to be linked to a specific location and often embed context-specific guidelines or parameters. Either analog or digital **simulation games** or **collaborative design environments** (such as *Second Life*, for example in the case of the game *Block By Block*) can serve this purpose, if the feedback of the players is made available for planners and decision-makers to embed in masterplans. However, in parallel with the proliferation of information and communications technology-supported participation (also called e-participation), more and more digital games are designed to support public participation. *B3* is an example of a 3D **online computer game** which aims to involve the broader public in a specific planning process. *B3*, developed by students of the HafenCity University in Hamburg, enables players to design their marketplace in Billstedt in the city of Hamburg. The game creates a playful online platform for players to design their own market place and discuss their suggestions with other citizens and urban planners.

### *Games for professional education*

Simulation games can impart procedural knowledge regarding the planning and decision-making processes. Players have to deal with complex conflict situations within a given time-frame, motivating them to think creatively and forcing them to comprehend and analyze the situation quickly (Diekman & Leppert, 1978). Therefore, **simulation games** have been an established tool in the academic education of urban planners. Due to technological development, more and more **videogames** are applied as didactical tools in urban planning education (Adams, 1998; Squire, 2004; Gaber, 2007; Gordon & Koo, 2008). Moreover, some urban systems modelling software, e.g. *MacSim*, have shifted into games (Mayer et al., 2009). Several, mostly city-builder-like simulation games have been developed in order to train urban planning students and professionals, such as the game *CityOne* from IBM or the series of *Tygron Serious Games* in the Netherlands (IBM, 2014; Tygron 2015). These games aim to support professionals in real-world problem-solving situations.

### *Games for education*

Despite the proliferation of game-based learning in different content areas, I discovered a lack of games designed specifically for learning about urban issues, urban planning or public participation. Most of the games mentioned before have an incidental or secondary educational value, but there are only a few examples that were designed specifically for educational use and which link pedagogical theories to the design of urban planning games. As research from the field of game-based learning shows, different learning goals require different strategies of learning, and in consequence, in the case of game-based learning, different game design (Schrader & McCreery, 2012). In the context of learning about urban planning and urban space, Shaffer (2006) suggests implementation of **epistemic games**. Based on the theory of situative learning and communities of practice, he introduced epistemic games, “based on the ways in which professionals acquire their epistemic frames” (p. 233). Epistemic frames comprise practice, identity, interest, understanding and epistemology. It determines how a community understands the world – and each community has a different epistemic frame. In what Shaffer calls epistemic games, players act like real world professionals and learn in authentic environments the epistemic frames of a certain profession (Shaffer, 2006, p. 233). Shaffer and his colleagues developed the games *Madison 2200* and *Urban Science* at the University of Wisconsin, Minnesota (Beckett & Shaffer, 2005; Bagley & Shaffer, 2011). Both games can be considered **augmented by reality** learning environments, a combination of urban planning simulation tools based on geographic information system (GIS) and real-world urban planning practices. By playing the game, high school students had to reshape a certain area of their city by taking on the role of an urban planner. Their research showed that epistemic games helped to develop students’ understanding of complex urban issues.

In order to contribute to the field of educational games in the context of urban planning, I conducted a design-based educational research project in Pécs, Hungary, between 2013 and 2015. A **cooperative** educational board game called *ParticiPécs* was developed in a collaborative design process involving youth and young experts. The aim of this research is to relate pedagogical theories on cooperative learning with the theories on game design and contribute to the field of educational games in the context of urban planning. *ParticiPécs* imparts patterns of action for active participation and aims to foster learning about the co-creation of urban space by simulating real-world small-scale urban interventions. It aims to raise the awareness of children and young people about urban issues and to empower them to be active participants in

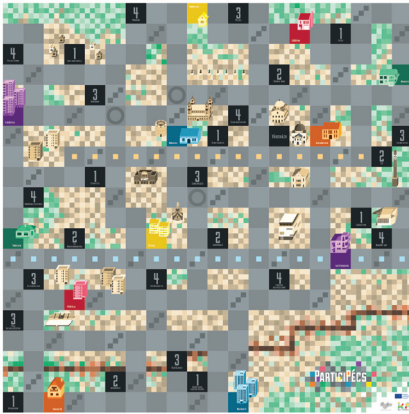


Figure 2. The game *ParticiPécs*

shaping the built environment. Fig. 2 shows the playing field which represents the extended downtown of Pécs.

During game design workshops, a cyclical optimizing of the prototype took place. This part of the research incorporated cycles of analyses, design and development of prototypes, formative evaluation and revision. The systematic analyses of the design process will provide knowledge about the essential characteristics of an intervention, as well as procedural knowledge about the set of design activities useful and efficient for the development of such an intervention (Plomp, 2007). In order to draw meaningful conclusions about a relationship between the educational game *ParticiPécs* and the learning outcome of participants, I plan to implement a learning experiment. This experiment will be conducted in classroom contexts. A traditional design based on pre-testing and post-testing will be implemented in order to provide evidence of students' learning achievements relating to an urban space and co-creation of a built environment resulting from a game session.

## Conclusion

Games have a lot of potential in the field of urban planning. Due to their ludic and engaging quality, they can raise people's awareness of urban issues and involve different social groups' participatory planning processes. Games can contribute to real-world decision-making processes by fostering communication amongst different stakeholders and supporting data collection from citizens. Furthermore, games and game principles can be implemented effectively in education, as well as in the professional training of urban planners. For

different purposes, different game genres with specific qualities and technology can be implemented.

There are a growing number of games designed specifically for planning purposes. Nevertheless, there is a lack of empirical data on the outcomes of such playful planning processes. On the one hand, more quantitative data is needed relating to the effectiveness of urban planning games, on the other hand more qualitative data would be needed in order to understand how exactly games can work in this specific context.

However, there are several good practices and procedures that can serve as a direction for future research and development of urban games. Through further analyses of games designed for the context of urban development, guidelines for game design with specific purposes can be formulated.

Despite the popularization of playful urban planning and game-based learning, urban games have not yet been able to establish themselves in the field of education. One reason for that could be the lack of linkage of this specific content to the curriculum. Knowledge related to the urban space is only rarely connected explicitly to the curriculum. This makes the introduction of urban games into classroom contexts more difficult. However, there is available research on the adaptation of urban games into institutional learning environments (Beckett & Shaffer 2005; Bagley & Shaffer, 2009; Kuntz, 1999). More research is needed on the effectiveness of urban games relating to students' learning outcome and attitude, as well as thematic linkages to the curriculum.

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