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# Pop-up Pest: An Educational Game for Active Participation of Children and Youth in Urban Planning

*Eszter Tóth, Alenka Poplin*

(Eszter Tóth M.A., HafenCity University Hamburg, Averhoffstraße 38 D-22085 Hamburg, eszter.toth@hcu-hamburg.de)
(Prof. Dr.-Ing. Alenka Poplin MBA, HafenCity University Hamburg, Winterhuder Weg 29 22085 Hamburg, alenka.poplin@hcu-hamburg.de)

## 1 ABSTRACT

This paper focuses on the design of a cooperative game for engaging children and youth in creating sustainable living environments. In cooperative games players achieve their goals acting together, collaborating with other players and helping each other. In addition to acquiring new knowledge, and expressing their own ideas and aspirations regarding their living environment, players acquire social competences essential for the coexistence and work in the community. In order to test the possibilities for designing a collaborative game for children we designed and implemented the Pop-up Pest game. It aims to support children in learning about their environment, understanding possible changes in urban spaces, and acquiring skills for active participation. The Pop-up Pest game was designed within a 25 m² large playing area which depicts Pest side downtown of the Hugarian capital Budapest. The players are divided into three groups striving to improve urban traffic, to establish more green spaces in the city, and to initiate a variety of cultural activities. The first version of the Pop-up Pest game was presented in September 2012. A total of 167 players from all age groups played the game. In addition, the game has been tested with 14 and 17 year old pupils as well as with a group of university students. This article presents the motivation for the game, the game story, design, concept and the first results of testing. We conclude the paper with a critical discussion and further research directions.

## 2 INTRODUCTION

The living environment greatly affects the child's development process, which should include the architectural design and space. This environment has an impact on the socialization processes, the formation of identity, as well as on the development of the child´s cognitive skills and competences. The research in the fields of psychology and social studies related to children's experiences of their living environment and the significance of built environment for their development and socialization (Muchow 1938/1978; Zinnecker 1979) reveals that their demands and needs and their involvement in urban planning processes need to be taken in account.

Current planning practices are characterized by an increasing demand for the qualitative integration of underpriviledged social groups. The limitations and shortcomings of established participative methods have emerged in the last decades, especially regarding the selective nature of the inhabitants participating (Fürst and Scholles 2008). For example, specific groups often participate because of their educational background, their ability to articulate or their availability at a particular time. Other social groups, such as children and adolescents, or the poor and under-represented, have little or no influence on local decision-making procedures. In the last few years we can observe the growing importance of children's participation in urban planning practices. New planning tools have been developed which strive to include children in planning. An example is the so called "Spielleitplannung" developed in Rhineland-Palatinate, Germany, which integrates child-friendly activities and children's participation in city planning. Several pilot projects took place in Germany in the last ten years and these experiences are described in several volumes and project documentations (e.g. Kultusministerium und Wirtschaftsministerium 2005; Reicher et al. 2006, Studio Urbane Landschaften 2009; Gaus-Hegner et al. 2009). Most of these projects concentrate on summarizing the participatory framework requirements and the results of the participatory processes from a planner's perspective. Applied participatory methods are rarely placed in a theoretical educational context and have not been studied from the perspective of the educational sciences. A substantial work still needs to be done related to age-appropiate methods for children and young people, how these practices can help to support learning, and whether educational processes are needed to accompany the participation process or not.

Developmental psychology focuses on the design of appropriate forms of participation in terms of skills and competencies of different age groups. Researchers have concentrated on the development of spatial perception of children (Piaget and Inhelder 1971), on the way children reproduce their everyday spatial experiences (Hart 1979), and on the development of their ability to participate in political, planning and

design issues (Oerter 1992). Richard Schröder's experiments (1995) with preschool and elementary school children showed that age-appropriate forms of participation have to be defined and developed in order to enable the children to participate. He based his research on the conclusions of developmental psychology, specifically addressing how preschool and primary school children are able to make decisions regarding their living environment, recognizing that their expressions and views differ greatly from those of adults. He investigated whether children are able to work with models to express their opinions and suggestions regarding their living environment. According to the results of his study, modeling is a suitable method for primary school children, as they have the ability to express ideas by means of spatial design, rather than verbalizing or visualizing them graphically. Their abilities and competencies to verbally or graphically express their ideas develop later. Schröder's research results also showed that in the case of older, 12-14 year old children, modeling seem to lose its appeal, especially for boys. His research clearly demonstrates that participation processes with children should be designed differently than those for adults, and they have to be differenciated even between different age-groups of children. The methods used in participatory processes should be adapted to the needs, interests and abilities of the children (and even of the particular age-group), in order to ensure the efficiency and sustainability of the participatory process.

In this paper we focus on the design and implementation of a collaborative game which aims to support learning about the environment and participation in planning for children. The Pop-up Pest collaborative game addresses 12-18 year olds. Its main goal is to stimulate them to formulate their needs and wants regarding public places in the city of Budapest, specifically in the Pest areas. The Pop-up Pest game enables the children/players to express their opinions concerning city development, and the game supports the development of a sense of responsibility for open spaces, and facilitates their ideas about further development of these places. The players can acquire skills for active participation in an engaged and playful way. We tested the Pop-up Pest game with 167 children and young people in Budapest during the European Mobility Week in 2012. In addition, the game has been tested with 14 and 17 year old pupils and a group of university students. The aim of the preliminary testing was to identify whether the game, as a method and as a concept of a collaborative game, is appropriate and successful in conveying the learning content. In the testing of Pop-up Pest we concentrated on the evaluation of the gameplay and the game experience. We present a short summary of the testing results and conclude the paper with a critical discussion and our further research directions.

## 3 GAMES FOR PARTICIPATION IN PLANNING

### 3.1 Design games for community planning

Sanoff in his work Design Games published in 1979 (Sanoff 1979; Sanoff 1990) introduced the idea of games for community participation in urban planning. These games are ideally suited for community workshops and aim to enable the involved parties to express their opinions and – often competing – interests. Since then researchers increasingly used maps as a representation of the focused or contested territory. Such games are intended to reconcile urban planning issues while playing out various scenarios (Sanoff 2000). Author Clark Abt (1970), in his book "Serious Games" described a serious game for urban planning. It was titled Simpolis, developed in 1967 and focused on major urban planning problems in New York City. The Simpolis game concentrated on some major urban problems such as education, housing, civil rights, poverty, crime, and pollution. The main goal was to educate the citizens about these issues and to suggest and communicate possible responses and consequences of different decisions. The game involved a controlled role-play in which the players received their profiles and specific constraints within which they had to operate. In contrast to that, free role-play enables the players to act and decide about their strategies and moves freely without any limitations. Since the 1970s the game concept has been often used in urban planning. A recent example is The Big Urban Game (2003) which was created by the Design Institute of the University of Minnesota with the goal of encouraging the residents of Minneapolis and St. Paul to think about the design of urban spaces. The Stadtspieler game Stadtspieler (2009), a recent German example, invites the players to discuss urban planning issues. The players can build the city according to their wishes and ideas and prepare a fictive urban plan. They use modeling clay and design their own city elements. In this way they also take on different roles in the city such as investor, citizen and neighbor, or an urban planner, and learn these perspectives related to the design of city environment.

### 3.2 Motivation for designing a participation game

Games have a potential to facilitate deep and sustained learning (Gee 2003) and cooperative problem-solving skills offering "several different levels of learning simultaneously to students of different abilities" (Abt 1970:23). Malone and Lepper (Malone 1981; Malone and Lepper 1987) developed a taxonomy of motivations in the context of educational/learning games for children, with four motivational categories: challenge, fantasy, curiosity, and control. Additionally, games enable learning through experimentation with alternative possible solutions and strategies played in a changing and sometimes also competitive environment. Within a safe, controlled realm, a player gets feedback from each experimental iteration, accumulating knowledge from the game system (Abt 1970; Cheng 1999). Games provide playful and engaging environments; they can motivate the players with the help of playful elements integrated in the concept of the game (Krek 2008; Poplin 2011; Poplin 2012). Games may stimulate "internal listening", which "acknowledges the importance of listening as a strategy for children to make sense of their world. Listening is, therefore, not just an avenue for other people receiving information but a reflective process for children to consider meanings, make discoveries and new connections and express understandings" (Clark 2005:17). Games may allow and even encourage taking on different roles; they enable the children to take on new roles, to lead and design the process, and to be in charge. They allow a shift in a relationship between the adults and children to the point of "accepting the place of the unexpected" (Clark 2005:25). "The advantages of accepting a shifting in power are a release from the need for adults to 'know all the answers'" (Clark 2005:25). Games also offer multisensory communication tools and means and are not limited to written and/or oral skills of the children; they offer new ways of learning and communicating.

### 3.3 Learning theory and pedagogical concepts

Cooperative learning greatly emphasizes the activity of learners and facilitates communicative processes between learners with different backgrounds. This pedagogical approach is based on structured divisions of positive interdependence, individual accountability, equal participation and parallel interactions (Kagan 2001). Positive interdependence refers to the positive relationship between the development of groups or individuals. In learning situations characterized by strong interdependence amongst learners, everyone is responsible for one's own work and for the performance of the whole group at the same time. Common aims promote individual responsibility and improve learning performance (Kagan 2001). Due to the equal sharing of responsibilities everyone has the responsibility for one part of the whole task. This not only strengthens the sense of responsibility but also promotes equal participation.

Accentuated learning aims to have an impact on the players' mindset. The learning process should be designed to procure new ideas and approaches regarding the overall theme that learners focus on; it aims to connect to their existing cognitive structures. The new knowledge needs to be embedded in the learners' real living environment and everyday situations. New information does not simply flow into the recipient, but the recipient has to construct it himself, or rather integrate the new material to his cognitive system. Ideally, a teacher or tutor has to be open and approach learning with constructive and encouraging attitudes, which allows the individual knowledge acquisition and an active role of the students in the learning process (Nahalka 1997).

Our work is influenced by the so called jigsaw method, developed by Elliot Aronson and his colleagues (Aronson, Patnoe 1997). Their aim was to reduce competition between pupils in the classroom. In their experiments, Aronson and his colleagues analyzed a fifth-grade class, which was studying the biography of Joseph Pulitzer. The researchers divided the Pulitzer biography into six equal parts, so that each of the important turning-points of his life was on a separate worksheet. Each child received a part of Pulitzer's life; just like in a jigsaw game, every child had a detail of the biography, but in order to be able to get acquainted with the whole learning matter, or the complete life, everybody needed the knowledge the others had. Results showed that when using the jigsaw method, children learned to pay attention to each other in the learning situation in which everyone's contribution is needed. Due to the mutual dependence, children became more acquainted with each other and accepted each other's point of view – independent from their social or ethnic background (Aronson 2004).


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# 4 POP-UP PEST: A COOPERATIVE GAME FOR CHILDREN AND YOUTH

## 4.1 Background

The game Pop-up Pest was developed as part of a PhD project at HafenCity University Hamburg, Germany. The game is meant to be a preliminary study for the research project "Playful Children's Participation in Urban Planning." The game development took place in Budapest, Hungary, in the summer of 2012 and the first tests were conducted in the autumn of 2012. The development and the implementation of the Pop-up Pest game was accompanied and supported by the kultúrAktív Association, the first organization in Hungary dedicated to education about built environments. The project got financial support from the Hungarian Ministry of National Resources and the National Institute for Family and Social Affairs, as well as the Kunsthalle Budapest. The Pop-up Pest game was presented in September 2012 during the centenary celebrations of the Ernst Museum (the exhibition venue of the Kunsthalle Budapest), and also during the European Mobility Week. The tests with school groups and one university group took place at Balint Jewish Community Center in Budapest, Hungary.

## 4.2 Aims

The main goal was to design and implement a collaborative game for children and youth from downtown Budapest. The Pop-up Pest game aims to facilitate learning about their living environment and to support them to develop ideas for changes and improvements. Playing the game, children and young people explored the characteristics of the chosen districts from different perspectives and became aware of the current planning conditions and deficiencies. The game also aims to improve their orientation and to support the acquisition of competences regarding the use of urban space and the improvement of the quality of community life. The Pop-up Pest game primarily focuses on three areas in which local children and youth could proactively take part in shaping their living environment: the environment, transportation, and culture.

The long-term goal of the game is to promote an active children engagement in urban development. In addition, a further aim of the game is to enable the players to learn about contemporary urban concepts by presenting existing examples from their living environment such as guerilla gardening, community gardens, street art, public art, advocacy, etc. A great importance is given to social skills reinforced by players during the game such as positive attitudes and behaviors towards others, tolerance and “advanced communication”. Advance communication means to be able to communicate within the group, to understand complex communicative processes and to have the ability to be consistent with others and to be able to understand and interpret different viewpoints.

## 4.3 Location

The game is located in the Pest side downtown of the Hungarian capital Budapest. It concentrates on large parts of the 6th and 7th districts, as well as on the edge of the 8th district of the downtown area in Budapest (Fig. 2). Figure 1 shows the area depicted on the play-ground of the game. All three districts were developed in the 19th century around the former city wall, and surround the Grand Boulevard. This area is one of the main tourist destinations of Budapest and includes some famous attractions. The Andrássy Avenue is a UNESCO World Heritage Site surrounded by spectacular eclectic mansions and numerous monuments, museums, theaters and cultural institutions as well as restaurants and coffee houses. It is also the most densely populated area in Budapest, and includes an extended apartment quarter characterized by deficient open spaces, green areas, and places for play and interaction. The so-called Jewish Quarter, with a lively religious community, is located in the 6th and 7th districts. The 8th district, called the "Roma District”, is the densest and the poorest area in Budapest, inhabited in large part by the Roma or gypsy minority. Thus the selected parts of the city for our study are both a marvelous touristic attraction with an outstanding cultural heritage, and a deprived area with social issues and urban deficiencies. Blue, red and green markers on Figure 2 designate the so-called “priority sites”, indicated on the playing field on Figure 1 by the same colors. Yellow markers highlight the Ernst Museum and the Balint Jewish Community Center, locations where testing of the game took place.

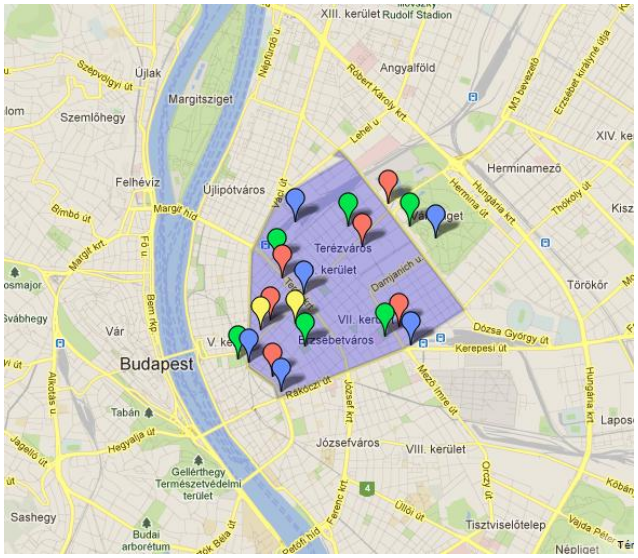


Fig. 1: The playing field of Pop-up Pest designed by Dóri Sirály (left)

Fig. 2: The selected area on the map of Budapest (right)

### 4.4 Target Group

The game addresses 12-17 year old children and young people living in the selected districts of Budapest. This age group is able to explore the urban environment on their own and they are important users of public places, wherein a large part of their social interactions with other children take place. As result of an unpublished survey done in 2011 we discovered that children and young people living in the selected area of the capital of Hungary have very sparse knowledge of their own living environment. The study was done within an internship at LudwigInsert, an experimental art space of Ludwig Museum Budapest in the 8th district. During various educational programs, we made a survey on the spatial knowledge of pupils at local schools. In most cases, the children and young people interviewed only knew about the micro-environment of their school and home, the shopping centers and transport hubs. Signs of isolation and their preferences staying at home were observed. For these reasons, we chose the mentioned target group. We aim to enable them to gain an access to their own living environment and to learn more about it. An important consideration regarding the target group was the variety of religious, national, ethnic, cultural, social and economic backgrounds. The integration of social skills, especially (in)tolerance, and a variety of communication patterns, had to be taken into account in the Pop-up Pest game development.

### 4.5 Format

The game consists of a 25 m² large playing area. As the game board lies on the floor, players can move on it as living game pieces or counters (Fig. 3). In this way the children/players can get active – not only mentally, but physically as well. The continuous motion and the variety of sensory perceptions make the gaming experience more intense and at the same time it can support the learning process. The action, in this case each of the possible urban interventions, is symbolized by a 50 cm x 30 cm building block, each with different patterns (Fig. 4). The four different kinds of building blocks are related to traffic: bicycle stands, ramps, bicycle paths, and parking places. Following them, in the second row on Figure 4, are the building blocks related to the topic culture. They represent a monument, street furniture, public art work and a festival promenade. Below them are the building blocks related to the natural environment and green spaces in the city, which includes the park, recycle bins, alleys and the community garden. The children/players can place the building blocks on the playing field. This activity represents a direct action in the environment, sometimes referred to as an intervention in the urban space.

Fig. 3: Playing Pop-up Pest

Fig. 4: Building blocks, designed by Dóri Sirály

### 4.6 Game Design

The players of the Pop-up Pest game are divided into three groups and strive to collaboratively improve city services, to establish more green spaces and to create a variety of cultural activities in order to improve life in the center of the city. The three groups – environmental, transport, and culture – have a common goal: they aim to improve their living environment through urban interventions. Besides having this common goal, each of the groups has its own mission to fulfill. Sometimes the individual and group goals can possibly conflict with the other groups' interests. An example of a possible conflict is the available public spaces. The players that are quicker and can cooperate better have the chance to realize their interventions faster. They can, for example, place a bench, a bicycle stand or a recycle bin around the corner faster than the members that are not willing to cooperate.

Figure 5 shows the different individual missions, different possible interventions within the three groups. The environment group strives to gain more importance for the environmental concerns and create additional green spaces in the districts. The transport group stands for a better, more ecological transportation, accessible also for handicapped citizens. The culture group strives to broaden the cultural activities and the preservation of cultural values.

| Environment group | Transport group | Culture group |
|---|---|---|
| alley | bicycle path | festival promenade |
| recycle bin | bicycle stand | street furniture |
| community garden | parking | monument |
| park | ramp | public art |

Fig. 5: Individual missions within the groups

Each of the groups has four players with individual missions thematically linked to the higher group goal. Each of the players has control over three building blocks contributing to his or her individual mission. The players have to first select one building block and then place it on the playing field. The players fulfill their missions when they manage to place all three building blocks on selected spots on the playground. In order to do so, the children/players have to complete different tasks and go through a variety of steps.

- Site-visit

At the beginning of the game the players have to visit a "priority site" related to their group´s goal. This can be a park, a museum, a railway station or any other famous and important place marked on the playing field. Priority sites are marked with the color of the concerned group; parks and green areas with the green of the

environment group, transportation hubs, and railway stations with the blue of the traffic group, and cultural organizations with red of the culture group. Priority sites are graphed and marked with an inscription on the fields in order to strengthen nodes and landmarks in the selected areas. Arriving at the priority site, the children/players get an information card. These cards are individual, which means that each player has his or her own set of cards (Fig. 7). The cards contain a very short description of the urban intervention connected to concrete places or phenomena in the chosen districts.

The interventions are related to the individual mission of the player and they can be either constructive or deconstructive. A possible constructive intervention for the player belonging to the environmental group (in the mission "community garden") is to create an herb garden in the yard of the apartment building. An example for a deconstructive action is to neglect the maintenance of the parcel the player rents in the community garden. Another example for a constructive intervention from the mission "public art" is to make guerilla knitting in an unattractive public place, and for a deconstructive act is to draw a graffiti wall. In the case of the mission "bicycle stand" (Fig. 6), one possible constructive intervention is to collect signs for creating bicycle stands in front of the cinemas, and something deconstructive is to lock the bicycle in places where people with wheelchairs or prams cannot cross the street. In case there is a constructive intervention on the card, the player gets a building block. In contrast, if there is a deconstructive intervention, the player has to visit another priority site and take a new card.


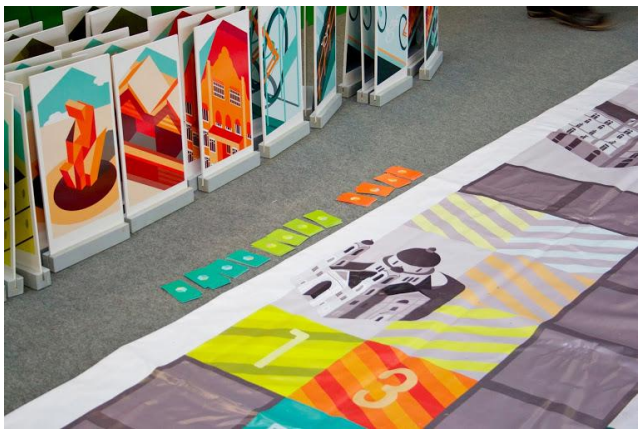

Fig. 6: Information card "bicycle stand". Fig. 7: Individualized information cards

- Intervention

In the next step, the obtained building block has to be placed on a free building area marked with striped patterns on the playing field. Different colors symbolize different kinds of building areas appropriate for diverse interventions. There are less building areas available to the players then the building blocks, therefore the players, need to be quick in placing them on the suitable field.

- Visting the other groups

After each intervention, the players need to visit a priority site or a fulfilled intervention of another team. For example, a player of the transport team needs to rest in a green space, an existing park or a green site created by the environment group or may enjoy a cultural event organized by an existing cultural institution or the culture group. Thus, each intervention can have a positive impact on the progress of the other players. The more environmental, vehicular or cultural elements are placed on the playing field, the easier it is to perform the obligatory visits, and the faster players can accomplish their individual missions.

- Cooperation

Players from a certain group can help the children/players from a competing group or the players within the same group. The Pop-up Pest game encourages the players to collaborate in accomplishing their individual and group goals. For example, once the player acquires a building block, she can ask a group mate to place it to a designated site, if she is closer to the area or has already completed her mission. On the other hand, when the player already completed the individual mission, she can reserve a free building area for her group mates. In the Pop-up Pest game, the players are motivated to cooperate with each other. Following Aronson's jigsaw method (Aronson and Patnoe 1997), we divided them into three different groups, and created a reciprocal dependence among them. The players can achieve their goals only by collaborating with their

team-mates. The game ends as soon as one group achieves its objectives. In order to win the game, every player of the group has to fulfill his or her own individual mission. Therefore, if someone progresses slowly, it is in the interests of her team-mates to support her. Just as in the case of a jigsaw puzzle, in the Pop-up Pest game, all players have to contribute in order to be able to renew the extensive, overall picture of the district.

### 4.7 Learning content and approach

Following the deductive approach of the constructivist learning theory, the Pop-up Pest game has as overriding objective – the idea of active participation in urban development. This idea has to be evident and understandable for all players of the game. The next level of learning consists of general patterns of action that players can perform in terms of the overall concept of participation. This content appears at the level of the players' activities and focuses on three thematic fields: environment, transport, and culture. Embedded patterns of action are examples for urban interventions, which players are able to realize beyond the context of the game as well (e.g. plant trees, place bicycle stands, advocate for the conservation of listed buildings). The third level of learning consists of real options for action and factual knowledge, both linked to the players' living environment. Embedded in the information cards which regulate the players' activities, these contents are integral parts of the game. The Pop-up Pest game draws attention to the existing interventions and changes in public places. Playing the game enables the players to acquire new knowledge, adding it to their existing knowledge, and to comprehend the options of practical applications and its effects.

The pedagogical concept of the Pop-up Pest game is based on a deductive approach, contextualization of the learning content and active learning (Nahalka 1997). It was influenced by the jigsaw method, developed by Elliot Aronson (Aronson, Patnoe 1997). Based on the results of the jigsaw method we proceeded on the assumption that this teaching method contributes to strengthening the players' senses of responsibility for their own environment as well as the development of empathy towards other residents and user groups, all of which encourages players to actively participate in urban development processes. Consequently, the Pop-up Pest game applies this method in the context of urban coexistence of children from different backgrounds, and districts.

## 5 EVALUATION OF THE POP-UP PEST GAME

An extensive evaluation of educational games or game-based learning requires a variety of criteria and methods: in general research focuses on the learning outcomes. Breuer (2011) in his study on digital game-based learning emphasizes the necessity to integrate the evaluation of both; the learning objectives or learning content and the gameplay. We aimed to integrate both aspects while testing the Pop-up Pest game in a variety of testing experiments.

In the first part of the test phase we presented the Pop-up Pest game at two open-air festivals in Budapest. The game was first presented in September 2012 during the centenary celebrations of the Ernst Museum, as well as during the European Mobility Week. Both festivals took place in public spaces of the 7th district in Budapest. This situation enabled the residents of the district to participate freely, independently from their age or social and educational backgrounds. Residents were able to join, quit, interrupt or repeat the Pop-up Pest game spontaneously. In the test phase, we investigated whether the concept of the presented Pop-up Pest game was appropriate for children engagement in planning, and whether children of the age-group 12-18 could accept Pop-up Pest as an interesting game. During the preliminary study we worked with questionnaires and interviews, in order to obtain the subjective opinions of the children/players.

From both festivals, a total of 167 players from all age groups played the game and 47 people answered the questionnaire. The quantitative survey included questions regarding the format of the game, gameplay and learning content. Most of the questions referred to the playful elements, subdivided into game dynamics and thrill, collaboration and personal achievement, motivation and reward, and visual representation as a sensory delight in the way as defined in Ritterfeld, Wagner (2006). The questionnaire included 28 different statements and the players had to decide to what extent they agree with the statements and marked their opinions on a 1 to 5 scale in which 1 meant "do not agree at all" and 5 meant "totally agree". In this way we were able to measure the attitude of the players related to certain issues.

In the preliminary evaluation of the survey, we sorted the responses by age groups. The preliminary results show that the target group accepted the game very well. Participants enjoyed playing in groups, they appreciated the graphic design and they were motivated to interact in the represented urban space. As Figure

7 shows, the players were very satisfied with the format of the game. Children 7-12 years, and young adults of 19-26 fully agree with the statement "I like the format of the game". The target group of the game, age 12-18 years, on average evaluated the format with a 4.3, which is still between good and very good. Regarding the format and design of the game, there were critical comments in relation to the design of the building blocks: "not practical", "they have been knocked over by the wind". They were also critical about the selected colors of the groups, which "should differ more from each other".

Figure 8 shows the attitude regarding the dynamics and activity of the Pop-up Pest game. The scale demonstrates that children between 7-12 were content with the dynamics. The need for activity increases with the age. The questions on collaboration within the group were valued most positively. On Figure 9 it can be seen that all children and young people up to age 25 agreed with the statement "I enjoyed playing in a group". The average value for the evaluation of this question in all questionnaires was the highest for this question.

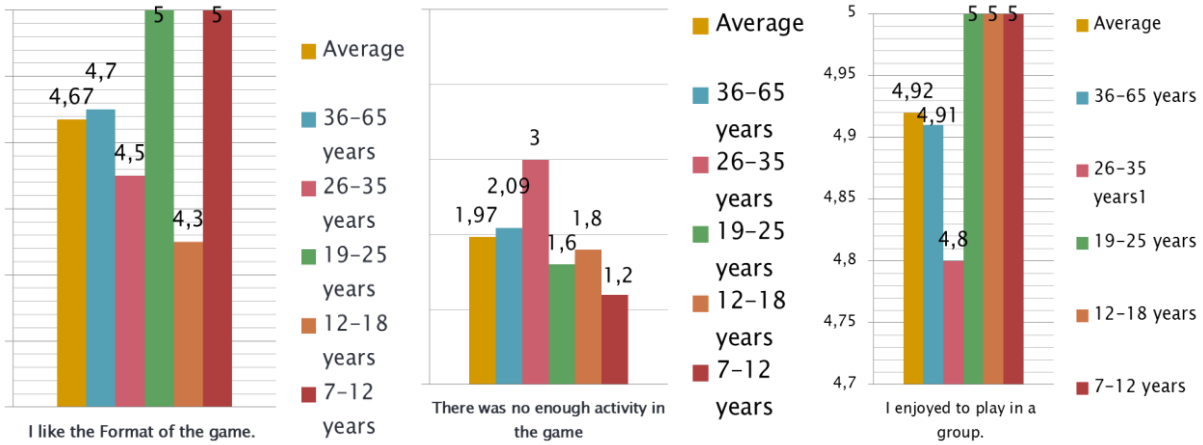


Fig. 7: “I like the format of the game”. Fig. 8: “There was not enough activity in the game”. Fig. 9: “I enjoyed playing in a group”

In the second part of the test phase, we tested the Pop-up Pest game with 14 and 17 year old pupils and a group of university students. We are going to continue with the second phase of testing during spring 2013 by placing the emphasis on the learning content and learning objectives. The survey will concentrate on the effectiveness and efficiency from the learning perspective.

## 6 CONCLUSIONS

This article summarizes the concepts and the implementation of the Pop-up Pest game for children and youth. Our main goal was to create a cooperative educational game for children which aims to facilitate learning about the environment, and to understand planned changes in this environment and their consequences on the quality of life in the city. The Pop-up Pest game was implemented for three districts of Budapest, but the main concept of the game could be used for other cities as well. Collaboration is an important part of this game; the children/players are encouraged to collaborate with members of competitive teams in order to accomplish their tasks. Only one team can win the game. In spite of that, winning is only one of the goals of the Pop-up Pest game. Learning how to collaborate and help the players of competing teams is also one of the central goals of this game. Children and youth can gain new awareness about the meaning of collaboration and can compete and collaborate at the same time in order to become co-creators of their living environment.

Besides the aspect of collaboration and co-creation, games also can empower children and youth; their voices and opinions can be expressed while playing the game. Inclusion of children in planning has been neglected for too long. Thus it is important to develop methods which can foster children’s participation in planning. Games are just one possible framework, a concept that can possibly encourage children`s participation in planning. We are testing different game concepts and designs in order to understand better the possibilities of this method on one hand and the role they could play by the inclusion of children in urban planning participation. Currently we are working on the quantitative and qualitative evaluation of the developed Pop-up Pest game. Additional evaluations will be done in a set of experiments with children of different age groups. We are interested in differences among these age groups of children and young people. Can the same or similar game concepts be developed for several age groups? How differentiated

collaborative, participation games should be in order to be able to motivate and include children from different age groups? We will set up testing experiments in the way that will enable us to accomplish research related to these relevant questions.

Games for children have yet another interesting aspect which needs additional research; they are often led by adults, but aim to involve children. Clark (2005) addresses the issue of power in communication with children in both situations: in "adults imparting 'knowledge' to children or children communicating their ideas to adults". The issue is how to deal with the differences in their status, especially when adults work with children. Clark (2005:25) suggests that "Viewing young children as weak, powerless and vulnerable may lead to high expectations of the adults' role in terms of protection and nurture but low expectations of children in terms of how they can express their perspectives, priorities and interests. Viewing young children as competent and valuable communicators requires researchers and practitioners to readdress their relationship with young children and therefore their respective roles. Games can help to change the roles by providing alternative, novel environments where the classical roles of an adult and a child "dissolve"; they can become just players and learners in a game that engages them all in topics that can help to create better, sustainable environments in which they, the adults and children, can co-exist and co-create together.

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