Housing Estate Game V.2.0 - Ideas for Design of Housing Estates’ Density Models - The Case Study of Urbanism Workshops Game Created for Science Promotion

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Abstract. The article presents the main principles of HOUSING ESTATE GAME 2.0 - a game proposed by the author for the purpose of promoting science among children and adolescents. The game allows creative implementation of residential housing models according to predetermined rules. The accepted score and rules of the game coincide with the assumptions of the compact city idea and draw attention to the problems of modern housing estate implementation. Particular attention was paid to selected urban indicators such as: housing density, the amount of biologically active area, number of trees, number of parking spaces. The principles of the game are consistent with the real-life design principles and address a true challenge: how to provide compact dense housing estate and high-quality housing environment. The game, in its current form, is the result of its several years of improvements. Version 2.0 of the game was tested during the NIGHT OF RESEARCH at the Silesian University of Technology in Gliwice, while other editions of the game were presented during the Science Festival in Katowice. The article discusses the main theoretical and methodological assumptions for the implementation of the game. The author presents both a 'game manual' to promote it and conclusions from the last edition of the workshop which may be useful for formulating educational assumptions about the creation of habitats. The article shows contemporary challenges in housing estates' design, the conclusions may be useful for architects, urban designers, academics in the field of architecture and urbanism, public participation practitioners. The author is an academic researcher, an architect and a professionally active urban designer, and actively promotes science through workshops and other activities.

1. Introduction
The fundamental assumption for this article can be one that contemporary habitats should make a compact city. And so the actual tendency in the housing estate theory and part of the housing market shows the inclination towards multiplication, intensification, more compact settlements. On the other hand, what many Europeans still prefer is low-density single-family housing rather than multi-family housing that is often associated with big multi-family blocks. The mass 'American dream': semi-detached houses with private gardens result locally in many low-density realizations, and globally in suburbanization and land consumption. Since such a preference has been observed, it seems to be important to emphasize that multi-family housing is more sustainable and more efficient. Many researchers show that architectural and urban education of young people may be effective. The following modes of education can be effective: lectures, workshops, board games, computer games,
virtual reality, augmented reality. The basic level of education for young people can be realized by workshops. Momirski states that The workshop remains a continuous learning program and an ideal mix of practice and research, also balancing situations in which the transfer of practice into faculty programs influences the development of education in the form of an architecture [10]. Like Momirsky, many researchers and practitioners report frameworks and effects of workshops for students who might be presumed professionals.

Architectural and urban knowledge can be taught and popularized in many ways. The actual research shows that games, cards, design thinking methodologies and frameworks are very common nowadays. Some researchers argue that digital games can play a major role in teaching. Jan Ślyk states that play is a human activity which requires the creation of a convention, obeying the rules, and which leads to a result that can be evaluated in the light of established criteria [11]. Ślyk adds that there is a tendency powered by the growing importance of virtual reality [11]. Anastasiadis et al. [12] state that digital game-based learning and serious games, in general, offer a lot of benefits, enhance education and have a dramatic impact on modern life, so they can be considered a positive direction for education and society. However, Harvey Allison states that if considering the use of digital games for teaching and learning, it is also valuable to consider whether the skills, ideas, and approaches the educator seeks to model can be achieved through analogue modes, which have the advantage of being less expensive and time-consuming to design than digital games [5]. According to an advisor of good promotion practices [2], games and experiments that do not require explanation are a particularly tempting element of scientific events organized for individuals. These include tasks explained using posters or leaflets, so that participants can implement them at their own pace and according to their interests [2]. One of the best examples of game promotion is a game for cities initiative which is currently realized in the Netherlands. It is a platform that publishes, realizes, coordinates and shares many different kind of games, frameworks and know-how on education on cities. One of the reasons for using games in solving urban issues is a dose of humor. In modern pedagogy, the use of humor is considered an effective strategy in formal and informal learning. In terms of the communication function, humour provides a way to present oneself, a topic, a lecture. [8]. With or without humor, Playthecity.nl is probably the most developed platform for games and its experience has been presented by Ekim Tan in Play the City: Games Informing the Urban Development [4].

There are many types of methodologies used for workshops for the purpose of public consultations. These very often help in the decision-making process and understanding of planning. One example can be: Methodgame for cities, designed in 2016 by Ola Möller & Jordan Lane [9]. MethodKit for Cities transforms the essential building blocks of a city into a deck of cards. This creates a common ‘language’ for discussions around city-planning which are often concealed in one-sided citizen dialogues and professional jargon [9]. A set of 105 cards (that show many basic general elements of the city and general principles for making a good city) can provide a framework for people to build workshops, conversations and ideas around.

Many of the games use roles for future decision-making. There are many published and unpublished examples. The general rule states that cards represent (or are used for) different roles or actors in the planning process: inhabitants, local authorities, developers, environmental activists etc.

One of the exemplary published items are cards for architectural education for students, published by the a+t research group [1]. The series of cards published so far include building types and card forms of quarters [see Figure 1]. Eldredge Barbara states that "The cards were created as a thinking tool, offering up alternatives and inspiration for architecture and city planning projects. The fact that the forms are displayed on cards (as opposed to, say, the pages of a bound book) makes them easy to lay out, pin up, group, compare, and debate."[7]
2. Housing Estate Game Framework

Housing estate game version 2.0 has been inspired by the experience of the author. A series of workshops were developed by Barbara Uherek-Bradecka and Tomasz Bradecki. Originally, it was a workshop framework entitled ‘Let’s build a city together’. The aim of the workshops was to build a model of a city that resembles an average city and has all the elements and uses of one. The aim of the workshops was to present the basic knowledge in the field through active participation and teamwork with physical models (mockups) (by hands-on modelling). During the hands-on workshop sessions, a virtual plan of a city was drawn on joined large 8 sheets of paper (8 x 50 x 70cm). After instructions were given to the pupils, each sheet of paper (each city plan) was given to a different group. [3]. In the typical workshops formula, nearly no rules were explained, as long as the models resembled typical city elements: different types of buildings, roads, greenery etc. By the end of the workshops, separate parts were set aside to form (or not to form, depending on the participants’ input) a city as one whole.

The idea of making a game out of the workshop formula has been inspired by the playing cards that have been published by the a+t publisher as a tool for teaching students or young people about professional case study prototypes [see Figure 1]. The authors’ first impression was that similar cards can be prepared for a card game for children and this can be used during workshops for non-professionals. This brought the author to the cards showing prototypes of simple urban block mockups with dwelling units. The idea seems to be very obvious since everyone lives or has a dream kind of a dwelling and understands the structural advantages and disadvantages of every dwelling. These can be reflected in urban indicators and so each idea can be valued and marked with points.

35 persons took part in the workshops, of the age from 9 to 15. At the beginning, a short introductory lecture was presented. The lecture explained the basic rules of creating proper housing estates, showing real housing estates’ images as well as illustrations of models that resemble housing estates on the images. That has been prepared in order to show the virtual models working based on the same rules as a real-life situation. Example game cards were shown to the participants to show the possible solutions and numbers of points that can be gained through proper design [see Figure 2].

Figure 1. Two examples of cards proposed by the author, source: https://aplust.net/tienda/otros/Serie%20Densidad/50-Urban-Blocks-Cartas/
Figure 2. Two examples of game cards proposed by the author with Marta Cabaj, graphic design: Marta Cabaj

These game cards were shown in a slide presentation during the workshops, and also their printed copies were distributed among the participants. Questions were asked and answers were provided. The vacant plots of urban blocks as made of cardboard of ca. 28x40cm were set aside. They were second-hand boxes from a grocery store. Also, materials for mockups were handed out, such as matchboxes standing for dwellings, green paper for greenery, blue paper (for circulation routes), yellow paper for other uses. The urban block size and matchboxes are no coincidence: The maxbox size 53 x 36 x 16 mm may be considered a virtual model of a dwelling in the scale of 1:200 and that makes a dwelling of ca. 60 sq meters net (10.6x7.2m of gross floor area). If we assume that the model reflects the scale of 1:250, we can estimate that one box can stand for one apartment and part of circulation routes or for one a small semi-detached dwelling. At the same time, the rules state that: the urban blocks 40x30 cm stand for a small urban block (or plot) of the size of 80x60m in 1:200 or 100x75m in the scale of 1:250. The primary idea was to set the entire mockup and game in scale, without stressing the participants out too much, so they could easily concentrate on the creative task [see Figure 3].

Figure 3. Images showing the scale and basic idea of a matchbox and progress of the work during workshops. Images: Tomasz Bradecki
Upon an announcement, all the participants took the materials to work in groups of 2, 3 or 4. They had ca. 60 minutes to think of and build the urban block with the following rules and points:

- Undeveloped areas = 0; green: green areas, colored paper, 1 point for every 20% of greenery (we estimate it); trees (base of size of parking area + stick + tree symbol): 1 tree = on the surface of 1st parking place, playground = 2 parking spaces, blue: areas of circulation (parking spaces, bicycle parking, bus stops): one flat = 1 parking space, for each 2 commercial uses = 1 parking space, the number of parking spaces can be reduced by half if a bus stop, a bus lane or a bike lane is provided, parking spaces must be located next to roads, parking spaces can be implemented in car parks, underground/ services, apartments and other housing (cubic capacity) must be made with full boxes: apartments / houses; empty boxes: services: shops, minibuses, no more than 1 service per 30 houses, flats must have a minimum of one or two-sided lighting, the distance between the buildings must be equal to their height.

The points table was as follows: 1 flat = 1 point, 1 flat = 1 parking space, 1 tree = 1 parking space = 2 points, 1 bicycle parking (overall 1 parking space) = -2 parking spaces, 2 bicycle parking = the necessity to implement a bicycle path, 1 service = 3 points.

All the points were counted and entered on blank cards after implementation of the model [see Figure 4]. Some of the mockups were not exactly of the expected form, but still all the works were unified.

3. Results and discussions

The workshops’ real-time framework (Table 2) was dramatically different from the optimal framework (Table 1). The introduction was realized according to plan, but then it was necessary to provide explanations and answer questions which took nearly until the end of the workshops. Some of the participants were finishing their models until the end of workshops to make the model more...
effective. The most significant problem was counting points and settling the total score. The team were doing it by themselves very quickly and not necessarily correctly, to get most points and possibly win.

**Table 1.** Workshops’ optimum timeline framework with phases (time in minutes) 1-Introduction lecture, 2-Rules explanation, 3-Questions and answers, 4-Workshops, 5-Total points count, Winner selection, justification

|       | 0-15 | 15-20 | 20-30 | 30-80 | 80-90 |
|-------|------|-------|-------|-------|-------|
|       |      |       |       |       |       |
| 1     |      |       |       |       |       |
| 2     |      |       |       |       |       |
| 3     |      |       |       |       |       |
| 4     |      |       |       |       |       |
| 5     |      |       |       |       |       |

**Table 2.** Workshops real timeline of conducted workshops with phases (time in minutes) 1-Introduction lecture, 2-Rules explanation, 3-Questions and answers, 4-Workshops, 5-Total points count, Winner selection, justification

|       | 0-15 | 15-20 | 20-30 | 30-80 | 80-90 |
|-------|------|-------|-------|-------|-------|
|       |      |       |       |       |       |
| 1     |      |       |       |       |       |
| 2     |      |       |       |       |       |
| 3     |      |       |       |       |       |
| 4     |      |       |       |       |       |
| 5     |      |       |       |       |       |

The results turned out to be surprisingly effective. Once the deadline for work submission passed, the participants started to join different mockups to form a model of 12 quasi-urban blocks laying next to each other [see Figure 5]. This moment shows whether the participants understood the idea of the estate as a common good and if the roads and blocks are connected to each other.

One of the most surprising effects was that the game worked: participants truly aimed at winning the challenge following the competition rules. The authors believe that this is a success, as the workshops were truly stimulating.

**4. Conclusions**

The main conclusions of the study show that both tools used in the experiment were successful. The conducted experiment showed that targeted workshops conducted in the form of a game with winning of possible prizes can be effective. The game made participants think about the real possibilities of making a truly compact city. Questions and answers were rised during introduction lecture and workshops. The presenters were asking whether participants understood the solutions that they were proposing and whether they were aware of such solutions.

Although the experiment worked, the author has several remarks about the workshops: the rules were either too complicated or some participants were too young to implement them properly. There
was too little time for checking the number of collected points on the basis of the design proposal. Remarks for future editions of the workshops are as follows: provide more time for the workshops: ca. 120 minutes instead of 90 minutes. Reserve more time for conclusion and discussion. The next edition of the game card workshops is planned during the next event called The Night of the Scientists in October 2019. The housing estate game v.2.1: GREEN PEDESTRIAN-FRIENDLY ESTATE will make some rules easier in order to emphasize the role of greenery and walkability in cities. This goes along with current trends and ongoing revitalization processes in contemporary developing cities.

![Image: Tomasz Bradecki](https://youtu.be/796meKTCOgs)

**Figure 5.** Final result of the workshop: set of several urban blocks that form a quasi-urban quarter.

The authors hope that these kinds of games and their possible successors may be more broadly continued and promoted, thus contributing to better education of young people in the most basic scope of urban planning and architecture.

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and implementation. Urbanmodel.org is a part of the Chair of urban and Spatial Planning at the Faculty of Architecture, Silesian University of Technology.

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