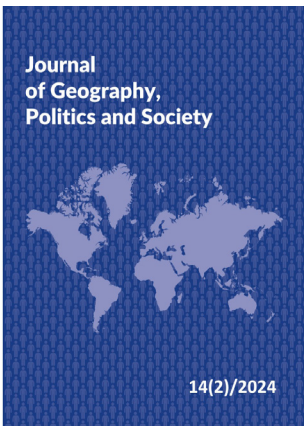

Journal of Geography, Politics and Society
2024, 14(2), 53–67
https://doi.org/10.26881/jpgs.2024.2.05

USE OF MINECRAFT IN SPATIAL PLANNING (AN EXAMPLE OF A FORMER SUGAR FACTORY IN PRUSZCZ GDAŃSKI)

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Citation
Świech M., Michalski T., 2024, Use of Minecraft in spatial planning (an example of a former sugar factory in Pruszcz Gdański), *Journal of Geography, Politics and Society*, 14(2), 53-67.

Abstract
Minecraft is a sandbox video game that provides an excellent tool for supporting social participation in spatial planning. Minecraft is used as a tool under the Block-by-Block initiative to invite people who otherwise would not participate in spatial planning with the use of classical forms of social participation. The main goal is to examine how possible social participation based on the Block-by-Block idea of using the Minecraft game can be in Polish realities. This was based on the example of a former sugar factory in Pruszcz Gdański. Young people and children showed considerable skills in constructing architectural objects and in spatial development on the premises of the former sugar factory in Pruszcz Gdański. In addition, the workshop participants were open to learning about and getting acquainted with the principles of correct spatial planning. Therefore, the advantage of Minecraft lies in involving young people in the processes of spatial changes, as well as in acting as a tool used to educate future users of given space. The limitation lies in the necessity to build a virtual environment, which is very labour-intensive.

Key words
Minecraft, Block by Block, social participation, Pruszcz Gdański.

Received: 26 July 2024 **Accepted**: 09 November 2024 **Published**: 31 December 2024

1. Introduction

Video games are very widely used, not only in the field of entertainment. They can be used for many other purposes. For example, they play an important role in developing coordination, which, as research indicates, may contribute to greater precision in surgeons who have played from a young age (Green, Bavelier, 2004). Another use may also be to simulate flying an airplane or a jet, helping to educate future pilots (Macedonia, 2002). Simulation in games can also refer to military activities. This is because a strategic approach and management of available resources is indispensable for the proper functioning of a military unit. Games allow creating various combat scenarios in diverse geographical conditions (Smith, 2010).

From the point of view of this paper, the most important function is the use of video games in space management processes. There is a lot of potential here, especially in two games: Cities: Skylines and Minecraft. The first one was used in Poland, among others, to improve the design of the Kraków Mistrzejowice interchange, which was supposed to connect the S7 and S52 bypasses. However, the design proved to be defective and could potentially

cause significant traffic jams in the Kraków area. A user called «Polish Motorways» published all the details, including the flaws of the project, on YouTube in the form of a video by using simulations from the game Cities: Skylines. It was enough for the General Directorate for National Roads and Motorways to ask for an additional expert report from the Cracow University of Technology, which confirmed the imperfections of the project presented by the author of the film (George Lanington, 2022).

In turn, Minecraft, is a game that is an excellent tool supporting social participation in the field of spatial planning, especially among people unfamiliar with this topic. The game allows users to create three-dimensional models of cities and their fragments in a virtual environment. This allows for easy visualization of ideas and thus for active participation in the process of shaping public space (Minecraft, 2013). Most often, such a use of Minecraft is associated with the Block-by-Block initiative promoted by UN-Habitat (Olesen, Stenudd Ermeklint, 2015).

The main purpose of this study is to show, in the Polish reality, the implementation of the Block-by-Block program using Minecraft. This was based on the example of a former sugar factory in Pruszcz Gdański. On should note, however, that the activities and the situation in the simulation only approximately meet the requirements defined by UN-Habitat. The main discrepancies concern the formal side of the entire project.

2. Minecraft and Block-by-Block Initiative

2.1. Minecraft game

Minecraft was created by Marcus Persson, who worked at Jalbum company in 2009, while creating his own game in his free time (Mac et al., 2015). Inspired by the games «Dwarf fortress» and «Infiniminer», he decided to create a virtual world on his own terms. «Dwarf fortress», which is a graphically minimalist game, but an extensive simulator of the procedurally generated world, inspired Marcus to world openness (tvgry.pl, 2019). «Infiniminer» and an innovative way of representing Zachary Barth's world, inspired Marcus to implement the method of creating the world from simple, autonomous cube-shaped structures in Minecraft. Therefore, Minecraft is a combination of several ideas taken from other game developers and put together into one whole. It is a video game in which the world is created from cubic blocks and is procedurally generated (Nebel et al., 2016).

Minecraft has undergone many changes since its release, starting with the alpha version, which operated until 2010 to move on to the beta version, and finally, on November 18, 2011, the game was released as a full version (Java Edition..., n.d.). The proper development of the game was ensured by a team assembled by Marcus to create Mojang company. A great role in this process was also played by the community of players who expressed their needs and expectations, and Marcus (under the pseudonym Notch) often communicated with them on online forums (Mac et al., 2015).

The popularity of the game continued to grow until it reached the status of one of the best-selling games in the world (Curry, 2023). This caused Mojang to become the subject of interest of large companies looking for investment opportunities (Mac et al., 2015). Ultimately, in 2014, Mojang was acquired by Microsoft.

Minecraft is a game with simple gameplay assumptions and relatively simple graphics. It is a sandbox video game in which we do not have a clearly defined goal of the game, and the player can invent their own game assumptions. Sandbox games give an opportunity to interact freely with the generated world, which translates into players' great creativity in inventing alternative goals (Ocio, Brugos, 2009). In addition, sandbox games, such as Minecraft, are characterised by the implementation of the Concept of Open World, which allows for freedom in exploration and in-game activities.

In Minecraft, we enter a world which is presented in a graphically simple design represented in the form of cubic blocks. The blocks represent various types of elements of nature or man-made structures in order to simulate the real environment (Duncan, 2011). The graphics are very simple, which translates into many advantages. The most important of them include (1) small hardware requirements, hence the game can be installed on more devices, (2) compatibility of the blocks with one another in the game world (Kuhn, 2018).

Minecraft has two game modes: the survival mode and the creative mode In the survival mode, the player is thrown into a virtual world in which their main task is to survive in any way possible. The hero has life points and a hunger indicator that the player must take care of. From the perspective of this study, the creative mode is more important; the player gets unlimited access to resources as well as additional functionalities in this mode. In the creative mode, the player does not have to worry about health or hunger and gains the ability to fly. This is a mode adapted for freer, creative work in which the player can build anything. This experience can be compared to playing with LEGO bricks, but it happens in a virtual environment, thanks to which the resources and possibilities of building are unlimited (Duncan, 2011).

As a video game, apart from its obvious purpose, namely entertainment, Minecraft can also serve other purposes. For example, owing to Minecraft, the creators of the Autcraft server help children with autism to solve difficulties related to establishing social ties. Thanks to the possibility of multiplayer gameplay on Minecraft servers, players have an opportunity to share their experiences and offer help to one another (Ringland et al., 2016). Minecraft is also often used in children's education. This is possible via its specialised version, i.e. Minecraft Education Edition (Crespo, 2021). Minecraft was used to teach mathematics by enabling students to build architectural structures and then perform calculations related to surface areas, volumes, and circumferences of an element. In addition, Minecraft was used in social sciences by creating virtual space in which students could observe historical buildings and simulated events, which allowed them to learn from them (Baek et al., 2020). There are also examples of the use of Minecraft in teaching biology, physics, chemistry, geography, etc. (Short, 2012). Minecraft also enables creatively building virtual structures not only individually, but also in a group. Thanks to these advantages, the game is used in participatory processes in spatial planning.

2.2. Block-by-Block Initiative

Block by Block is a program that uses Minecraft for dialogue with citizens. The main objective of the initiative is to develop common solutions to spatial problems, as well as to develop people's interest, in particular children and young people, in local issues. Thanks to an unorthodox methodology, the program is able to involve people who usually do not have an opportunity to express their opinion in public projects, and also allows changing neglected spaces into places that will improve the quality of life for everyone (Block by Block, n.d.).

The Block-by-Block program was based on the 2011 project «My Blocks project» (in Swedish: Mina kvarter) run by Svenska Byggtjänst in cooperation with Mojang. The task was to transform and modernise the area of «The Million Homes Programme» (Enghag, Sarakinis, 2014). In Sweden, after World War II, there was a lack of a sufficient number of flats. In order to solve this problem, the government decided to build one million houses in a short period (Hall, Vidén, 2005), which resulted in weaker building materials as well as monotonous and poor aesthetics. Despite providing a sufficient number of flats, this approach caused many urban and social problems. The million homes areas were criticised for their appearance and lack of adequate public spaces. In addition, residents of this type of housing estates were identified with the lower social class, which made them feel socially excluded (Mack, 2021). The initiative aimed to improve space in the area of «Million Homes», while involving residents through an innovative method of social dialogue. In the processes of participation, the Minecraft game was used, which was designed to present proposals for changes in the analysed areas in a virtual model (Enghag, Sarakinis, 2014). As part of the project, three areas were selected, i.e. Drottninghög, Fisksätra and Hovsjö, which lacked space for rest and play the most, and younger people were supposed to benefit from the changes. Minecraft was to serve as a transmitter of ideas and opinions between the young generation and the people responsible for designing the new space (Enghag, Sarakinis, 2014).

In each of the areas, slightly different approaches were applied, which were adapted to specific problems. Five meetings were held in Drottninghög in eight months. The participants were young people aged 14–16. In Hovsjö, eight meetings were organised over a period of five months with children aged 11–13. In Fisksätra, the workshops lasted only three days, with participation of young people aged 17–21 (Enghag, Sarakinis, 2014).

The success in Sweden translated into further work on a much wider scale, thanks to establishing the Block-by-Block initiative (Olesen, Stenudd Ermeklint, 2015). UN-Habitat is the main implementer of the program (History, mandate..., n.d.), and Microsoft, which acquired Mojang in 2014, is the sponsor providing the game and providing technical support; this is how the Block-by-Block Initiative was created. The main task of the initiative is to involve the community in the processes of improving local space and revitalising degraded areas using Minecraft. This program aims to promote ideas about the value of public space, especially in the context of urban spatial planning. As part of this initiative, city authorities and residents jointly undertake activities that aim to increase the efficiency of spatial development processes (Olesen, Stenudd Ermeklint, 2015). Minecraft is an important element of the initiative – acting as a tool for social participation. Thus, the game is a means of communication between the bodies planning and implementing changes in spatial development and the local community. This is due to the use of Minecraft as a design tool in which people can visualise their opinions and needs (Bashandy, 2020). The result of the entire program is to show the positive effects of intentional, rational and consistent planning, both for the city and its inhabitants (Olesen, Stenudd Ermeklint, 2015).

Based on the collected experience and data from the pilot program implemented in Sweden, an appropriate methodology has been developed. This procedure consists of three main phases. The

first phase is preparatory. As part of it, all activities prior to the workshop are carried out, especially completing formalities, building a virtual model in Minecraft, gathering a representative group of participants, preparing technical aspects. The second phase concerns workshops held during 4 meetings. At the first meeting, the group of participants learn about the subject of the program and gain basic knowledge about spatial development. The second and third meetings focus on practical activities in the virtual environment. Participants build their proposals for changes in the previously prepared model. The fourth meeting aims to present the final results of the work. The third phase of the project involves final formalities that must be completed after the workshop (Westerberg, Rana, 2016).

3. Case simulation – a former sugar factory in Pruszcz Gdański

3.1. Development and spatial conditions

The premises of a former sugar factory in Pruszcz Gdański is an area requiring changes in its spatial development. The facility operated in the years 1881–2004 (Opuszczona Cukrownia w Pruszczu, 2021). The premises of the former plant are intended for centre-forming service buildings whose main purpose is to give it a city centre character. The housing function may also be taken into account, but with the exception of ground floors. In addition, the facility is registered as a monument; therefore, it is necessary to take into account the principles of protection of cultural heritage in its development. The new development may be introduced only provided that its appearance be adapted to the existing buildings (Miejscowy Plan..., 2006). The number of floors in buildings is limited to three. The development lines have also been defined, specifying the exact location of buildings and requiring a mandatory external green zone (Miejscowy Plan..., 2006). In this way, despite the permit for the construction of blocks of houses, the area is protected against neglect thanks to precise provisions contained in the local spatial development plan.

It should be noted that the currently binding local spatial development plan is not in its final version, as changes are planned. They result from the investor's preference for the development of the area for multi-family housing. However, this change was met with residents' dissatisfaction, which caused a delay in the creation of a new spatial development plan. Due to the ongoing analysis of the area in 2022–2023, all works are being conducted on the basis of the current spatial plan adopted in 2006 (Miejscowy Plan ..., 2006).

3.2. Virtual model

The initial stage included the preparation of a virtual terrain model. This model was prepared on the basis of the local spatial development plan and field research.

Architectural projects in Minecraft differ from those in reality, as they require taking into account the specific constraints imposed by the platform. One of the biggest challenges is the fact that Minecraft offers only limited precision in building, which significantly affects the possibility to build an accurate reconstruction of the terrain. Therefore, in the case of a virtual environment, design simplifications are necessary. This means that it is impossible to build a perfect representation of the terrain taking into account every detail, and instead one needs to focus on the most important and characteristic elements.

The limitations of the virtual model in Minecraft are due to the fact that the game environment is built of blocks representing blocks of one cubic meter. In Minecraft, there are also other types of blocks, such as semi-blocks, tiles or stairs that are smaller than standard blocks, but still occupy similar space. In addition, placing one block prevents placing another one in the same cubic meter, which also affects the possibility of building accurate reconstructions.

Although the model was made with great care for structural dimensions and compliance with the local spatial development plan, it should still be noted that this reconstruction is not a perfect reflection of reality. Nevertheless, the project contains enough aesthetic and planning values to function as a virtual model in which one can experiment with different spatial development concepts.

The first stage in the construction of the virtual model were activities aimed at preparing the area. The model was created on a completely flat surface, where the terrain height was identical in all places. The use of flat terrain facilitated the process of constructing objects, because it was not necessary to adapt them to the terrain that could not be mapped in the game. There is a river near the analysed area. The river dimensions were measured on the basis of a map available on the municipal office website (E-mapa, 2023). Based on these measurements, the lengths and angles of turn of the river were calculated in order to obtain the most accurate representation of the terrain in the game environment.

The next stage was to determine the network of roads in the analysed area, including future roads included in the local spatial development plan. The decision was made to build only some of the roads that are located a short distance from the area. The biggest challenge was to build a viaduct

which is located near the sugar factory. The lack of technical information on the height and width of the structure made it impossible to accurately map the object. It was necessary to carry out field research to determine the approximate dimensions of the flyover.

In the next stage, the proposed land development plan was mapped from the local spatial development plan (Fig. 1). Only an outline of the area was designated, because it would take a long time to fill its entire space. In addition, the main purpose of the model was to enable children to construct land development proposals; therefore, leaving the natural area in the form of grass was necessary to imitate the real environment. A horizontal cross-section of buildings in the sugar factory was also created in order to facilitate further construction.

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Based on the collected experience and data from the pilot program implemented in Sweden, an appropriate methodology has been developed. This procedure consists of three main phases. The first phase is preparatory. As part of it, all activities prior to the workshop are carried out, especially completing formalities, building a virtual model in Minecraft, gathering a representative group of participants, preparing technical aspects. The second phase concerns workshops held during 4 meetings. At the first meeting, the group of participants learn about the subject of the program and gain basic knowledge about spatial development. The second and third meetings focus on practical activities in the virtual environment. Participants build their proposals for changes in the previously prepared model. The fourth meeting aims to present the final results of the work. The third phase of the project involves final formalities that must be completed after the workshop (Westerberg, Rana, 2016).

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It should be noted that the currently binding local spatial development plan is not in its final version, as changes are planned. They result from the investor's preference for the development of the area for multi-family housing. However, this change was met with residents' dissatisfaction, which caused a delay in the creation of a new spatial development plan. Due to the ongoing analysis of the area in 2022–2023, all works are being conducted on the basis of the current spatial plan adopted in 2006 (Miejscowy Plan ..., 2006).

3.2. Virtual model

The initial stage included the preparation of a virtual terrain model. This model was prepared on the basis of the local spatial development plan and field research.

Architectural projects in Minecraft differ from those in reality, as they require taking into account the specific constraints imposed by the platform. One of the biggest challenges is the fact that Minecraft offers only limited precision in building, which significantly affects the possibility to build an accurate reconstruction of the terrain. Therefore, in the case of a virtual environment, design simplifications are necessary. This means that it is impossible to build a perfect representation of the terrain taking into account every detail, and instead one needs to focus on the most important and characteristic elements.

The limitations of the virtual model in Minecraft are due to the fact that the game environment is built of blocks representing blocks of one cubic meter. In Minecraft, there are also other types of blocks, such as semi-blocks, tiles or stairs that are smaller than standard blocks, but still occupy similar space. In addition, placing one block prevents placing another one in the same cubic meter, which also affects the possibility of building accurate reconstructions.

Although the model was made with great care for structural dimensions and compliance with the local spatial development plan, it should still be noted that this reconstruction is not a perfect reflection of reality. Nevertheless, the project contains enough aesthetic and planning values to function as a virtual model in which one can experiment with different spatial development concepts.

The first stage in the construction of the virtual model were activities aimed at preparing the area. The model was created on a completely flat surface, where the terrain height was identical in all places. The use of flat terrain facilitated the process of constructing objects, because it was not necessary to adapt them to the terrain that could not be mapped in the game. There is a river near the analysed area. The river dimensions were measured on the basis of a map available on the municipal office website (E-mapa, 2023). Based on these measurements, the lengths and angles of turn of the river were calculated in order to obtain the most accurate representation of the terrain in the game environment.

The next stage was to determine the network of roads in the analysed area, including future roads included in the local spatial development plan. The decision was made to build only some of the roads that are located a short distance from the area. The biggest challenge was to build a viaduct which is located near the sugar factory. The lack of technical information on the height and width of the structure made it impossible to accurately map the object. It was necessary to carry out field research to determine the approximate dimensions of the flyover.

In the next stage, the proposed land development plan was mapped from the local spatial development plan (Fig. 1). Only an outline of the area was designated, because it would take a long time to fill its entire space. In addition, the main purpose of the model was to enable children to construct

Fig. 1. Mapping of the local spatial development plan in Minecraft.
Source: Own elaboration based on Minecraft Education Edition.

land development proposals; therefore, leaving the natural area in the form of grass was necessary to imitate the real environment. A horizontal cross-section of buildings in the sugar factory was also created in order to facilitate further construction.

At the next stage, after determining the boundaries of the areas and delineating the line of existing buildings – the construction of buildings on the premises of the sugar factory commenced (Fig. 2). The first objects that were built were smaller residential buildings. Next, a commercial and service building was created that required more attention to detail. Its design includes many elements such as windows, balconies, barriers and pillars that were difficult to recreate due to block dimensions in Minecraft. Due to the lack of publicly available technical information, the dimensions and placement of the elements had to be estimated based on Google Maps photos, photos from the Internet and personally taken photos.

The most demanding task was to reconstruct the buildings of the former sugar factory complex, due to the large scale of the facility. The lack of publicly available technical data and the private nature of the area made it difficult to freely access the area and collect the necessary information. The estimation of dimensions and proportions was based on photos from the Internet or taken personally and individual measurements. Personal photos of buildings and the surroundings of the sugar factory as well as individual measurements were taken during open days promoting the creation of the new «Cukroteka» space (Cukroteka, n.d.).

The last stage of the project was the precise setting of elements of the environment and greenery. Due to the need for accurate mapping, the greenery was created manually in order to obtain the highest possible accuracy. In turn, trees were generated automatically using programming tools, which allowed creating identical replicas.

Fig. 2. Former sugar factory buildings in Minecraft.
Source: Own elaboration based on Minecraft Education Edition

3.3. Description of the workshop

Simultaneously with the creation of a virtual terrain model, the search for a group interested in participating in the game began. The invitation to participate in the project was addressed to participants of programming classes in which games, such as Minecraft, are used for learning. The advantage of such a solution was the young people's familiarity with the use of computer equipment, as well as their knowledge of Minecraft. All children, due to their participation in classes in Pruszcz Gdański and the proximity of their place of residence, knew the conditions of the town. The interested children and adolescents who obtained their parents' consent were enrolled for the selected meetings.

The second step in the simulation was to prepare the room and equipment. The workshops were conducted in the facility where the children attended programming classes.

The workshop was held in January 2023 in Pruszcz Gdański. Three meetings took place, which differed from each other in the analysed scope of spatial development. The designated scopes of the game included: sports and recreation area, cultivated greenery and centre-forming service development area. The workshops were also attended by their guardians who occasionally shared their opinion on the shaping of the model by children.

At the beginning of each meeting, a short introduction to the subject of the meeting was presented. A presentation was prepared to help children familiarise with the general characteristics of urban issues and spatial planning. Children were introduced to concepts such as sustainable development and spatial order. It was also pointed out that the projects under construction should be feasible.

The first workshop was attended by 8 persons aged 11 to 13. It was devoted to a sports and recreation area, where children were to show the greatest needs related to sports activities. In the local plan, the area involves a building, but due to the characteristics of building design, the children were tasked with developing the outdoor area. The provisions of the local spatial development plan mention mandatory inclusion of sports and recreation facilities in the construction, including fields for various types of team games (Miejscowy Plan ..., 2006). Therefore, the children were informed about the recommendations and expectations regarding the terrain, after which they could start creating the space according to their own ideas and creativity. Work on the construction of the project was done efficiently and with great concentration on the children's part. If necessary, young people had an opportunity to browse the Internet in order to find inspiration for the project. However, a significant share of them tended to rely on their own imagination and skills. During the work, discussions took place between the participants on proposals, and different design concepts were compared. At the end of the workshop, the participants presented their final projects to others. The presentation

time was short for everyone, due to the children's consultation during the creation process. The children sometimes had problems explaining the design assumptions.

The second workshop was attended by 9 children, with a largest age difference, because the youngest participant was 7 years old and the oldest one was 15 years old. The analysed area of the second meeting was cultivated greenery, where the children were to design space for rest. In the local plan, the area is marked as publicly accessible cultivated greenery with a ban on building development. Therefore, the children's task was to create their proposals for the development of a park. The plan assumes a bicycle path through the entire area of cultivated greenery and rows of trees in designated places. In addition, there is a proposal for the location of the planned rainwater pumping station, so this area was excluded from the game. The local plan also defines aesthetic values of elements of small architecture which should be made using high-quality materials, such as wood, granite or stone cladding, while maintaining a uniform style (Miejscowy Plan ..., 2006). During the project presentations, most participants dealt with them without any major problems, presenting their ideas in a competent and clear manner. However, the youngest participants had difficulty explaining their plans, even though they showed great enthusiasm. In such situations, older participants provided help by asking questions and making suggestions when needed.

The third workshop was attended by 6 persons aged 10 to 12. The area of centre-forming service buildings was analysed, in which the children were asked to develop space for the square. This area includes a sugar factory, where there are historic buildings that should be adapted without violating their historical value (Miejscowy Plan ..., 2006). Adapting the architecture and functionality of buildings is a task that requires specialised knowledge and skills that children usually do not have. Therefore, the aim of the game was to transform the space around buildings into an attractive urban space, enriched with elements of greenery. Work on the analysed area proved to be the most demanding for children compared to the two previous areas. Although most of them understood the subject of the task, they had difficulties in designing the space of the square. The participants emphasised the importance of greenery in the area to avoid completely covering the space with concrete. During the development of the concept, they repeatedly expressed their desire to transform the area into a biologically active space. Other participants focused on additional features of the square that they wanted to highlight. Presentations from the third workshop were not very diverse. However, this time more attention was given to unfinished projects, and the children presented their ideas on what they would like to add if they had extra time to work.

One of the final stages of the Block-by-Block initiative is the development of the final project which would be inspired by the workshop participants' proposals. In the simulation, an attempt at this process was made (as shown in the next section). After the workshop, all available materials from the projects were collected in order to consolidate their content. In addition, the participants' opinions and proposals were collected for use in further possible simulation processes. All assets were carefully saved and catalogued for easy access in the future. Thanks to this, it will be possible to continue simulation processes and use the accumulated knowledge in further activities.

3.4. Result and evaluation of the simulation

The results of the first workshop were the construction of fields for team games and sports facilities in the analysed area. Fig. 3. presents four sample variants built by workshop participants. Children mainly focused on building a sports field with an emphasis on the diversity of its functionality. The participants wanted the field to be used for several types of sports, depending on players' preferences. In addition, some children focused on safety aspects, such as a net fence around the sports field. This is an important aspect due to the location of the area close to the river. Participants also paid attention to appropriate lighting of the field when used late. This shows ingenuity and resourcefulness of the children who want to create a safe and joyful space for recreation and sport. However, the sports field was not the only object created by children, as various types of sports facilities were also created. Children created devices similar to sports infrastructure in open-air gyms, bearing in mind additional sports functions outside team sports.

The final work results of the second workshop participants were mostly satisfactory. In Fig. 4. four exemplary concepts created by children are presented. Most of the children focused on nicely arranged greenery. Each participant added paths and benches to their projects. Many persons also paid attention to lighting to enable evening and night walks, which is why almost every project has lamps. Another similarity is a place for bonfires or barbecues built by many people. Through discussions among themselves, the children decided that such places of rest were needed. In addition, the children argued the appearance of these unexpected in the plan structures with a possibility of using the idea in other areas.

Another important aspect in the projects was also the park entrance, which the children designed in a similar way, i.e. as a prominent element. It should also be noted that too much creative freedom, especially in the youngest participants, can lead to unexpected results. An example of this is the construction of a small zoo and an aquarium for fish. During the third workshop on the area of centre-forming service buildings, the participants presented their spatial development projects in which there were fountains or other water elements (Fig. 5). The projects also often featured trees, grass and other

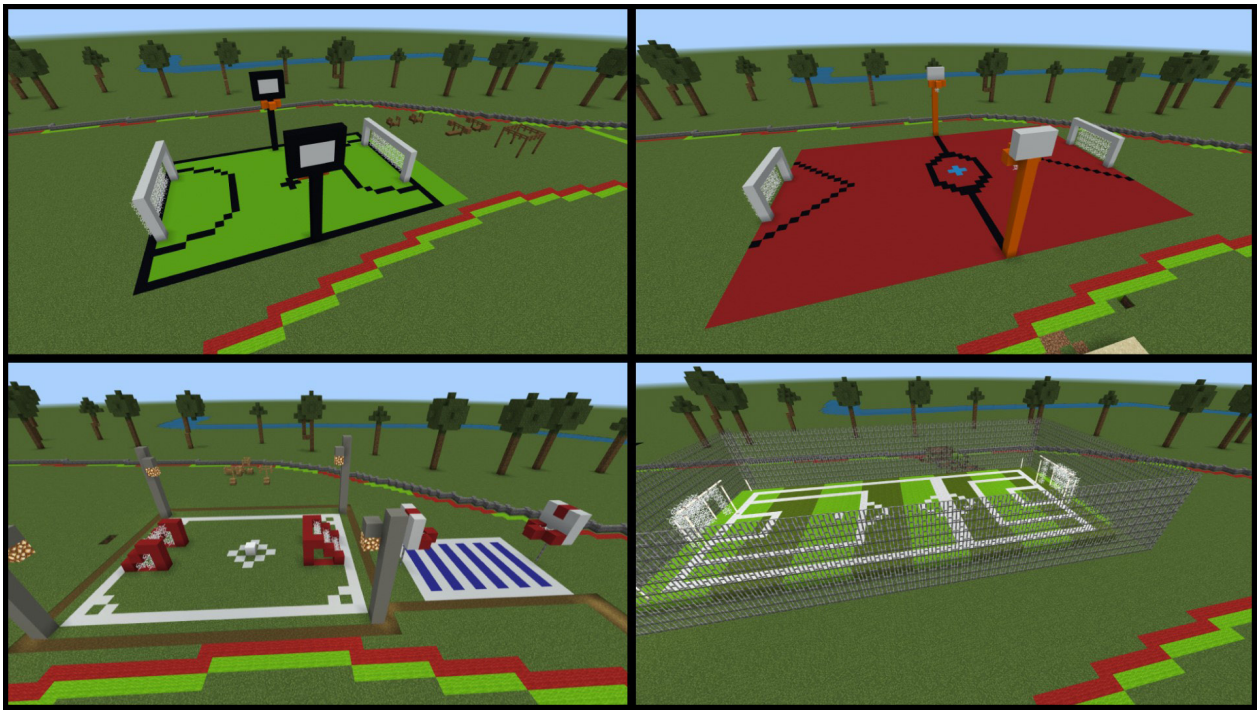

Fig. 3. Outlines of the sports area.

Source: Own elaboration based on materials from the conducted workshops, using the Minecraft Education Edition game.

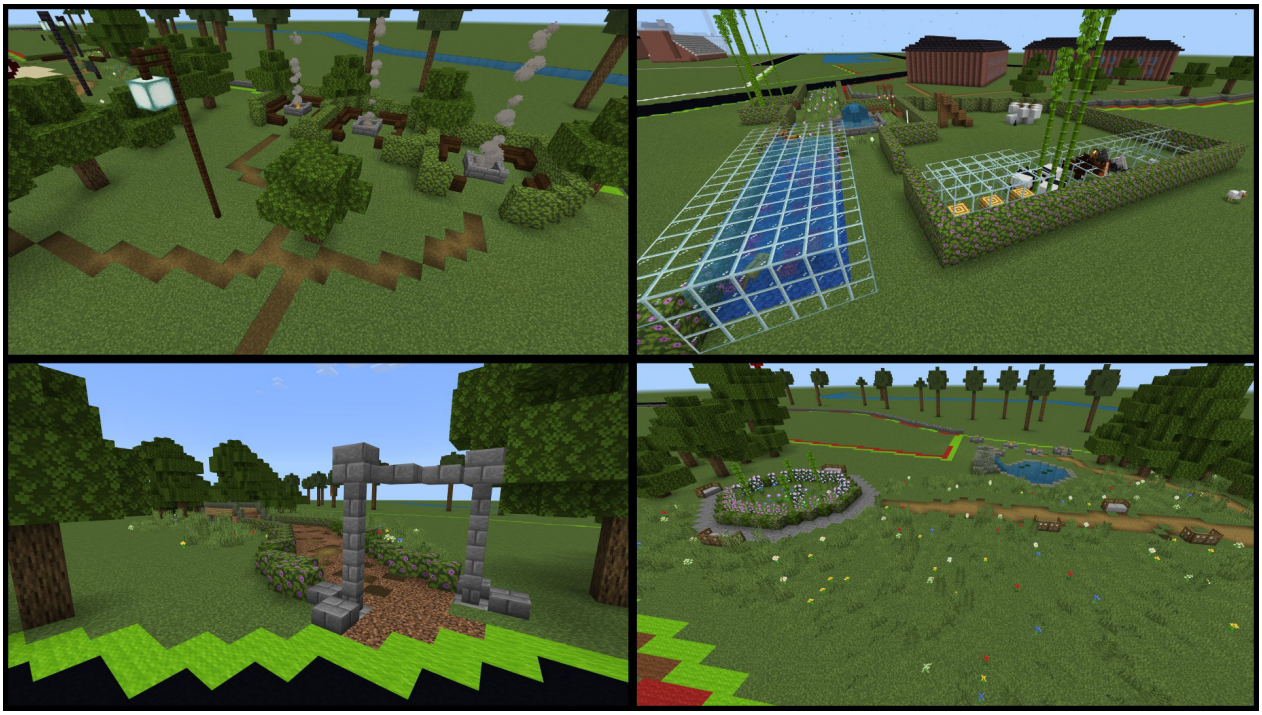

Fig. 4. Outlines of the cultivated greenery.

Source: FOwn elaboration based on materials from the conducted workshops, using the Minecraft Education Edition game.

Fig. 5. Outlines of the centre-forming service development area.

Source: Own elaboration based on materials from the conducted workshops, using the Minecraft Education Edition game

forms of greenery which the children associated with a more pleasant place to rest. Flowers in various forms were also a frequent element of projects. In one of the projects, there was a unique element in the form of a monument depicting a figure holding a tray of candy. This monument was to symbolise the historical part of the area and act as a recognizable landmark in the space of a former sugar factory. Thus, the projects created by children very much differ from what we are dealing with in many Polish cities, i.e. the so-called "concretosis" of their central squares.

One of the participants created a project that differed from others in which he proposed the development of the area with smaller buildings with various functions, such as trash cans, shops or smaller warehouses. The participant justified his decision with the service function of the area, arguing that this place is suitable for the construction of buildings with such functions.

The creation of the final projects required an in-depth analysis of the participants' proposals and opinions and selection of the best ideas in order to create a coherent vision. An additional limitation was the need to adhere to the provisions of the local spatial development plan, which prevented certain solutions.

In the service and sports area, the decision was made to build a multifunctional pitch (Fig. 6). Additionally, in order to ensure safety, a net fence was mounted around it. This decision results from the fact that the area where the pitch is located borders on a river. There is also other sports infrastructure available in the area to allow exercising in the open air. Furthermore, the entire area has artificial lighting, which allows using it even in the evening.

The area of cultivated greenery was designed modestly due to the nature of the facility and the limitations of the local land development plan. The area was developed by placing vegetation and trees in the south-western part of the area (Fig. 6). This is due to the ban on buildings along the north-eastern border of the area to allow access to the river. Due to the workshop participants' suggestions regarding the aesthetic values of nature – a small flower bed was also added. A bicycle path was designed in the central part of the area. Benches were placed along it. The area is well lit, which allows using it even after dark. It was also equipped with open fires to create a picnic atmosphere.

A square was built in the service area near the sugar factory buildings. Its development takes into account the participants' commitment to the preservation of natural vegetation (Fig. 6). For this purpose, special biologically active places were created, and numerous trees were planted, surrounded by benches to allow relaxing in the shade. On the square, there is also a statue referring to the history of the sugar factory, surrounded by water. The bicycle path, which is an indispensable element of the local spatial development plan, cuts the area in half.

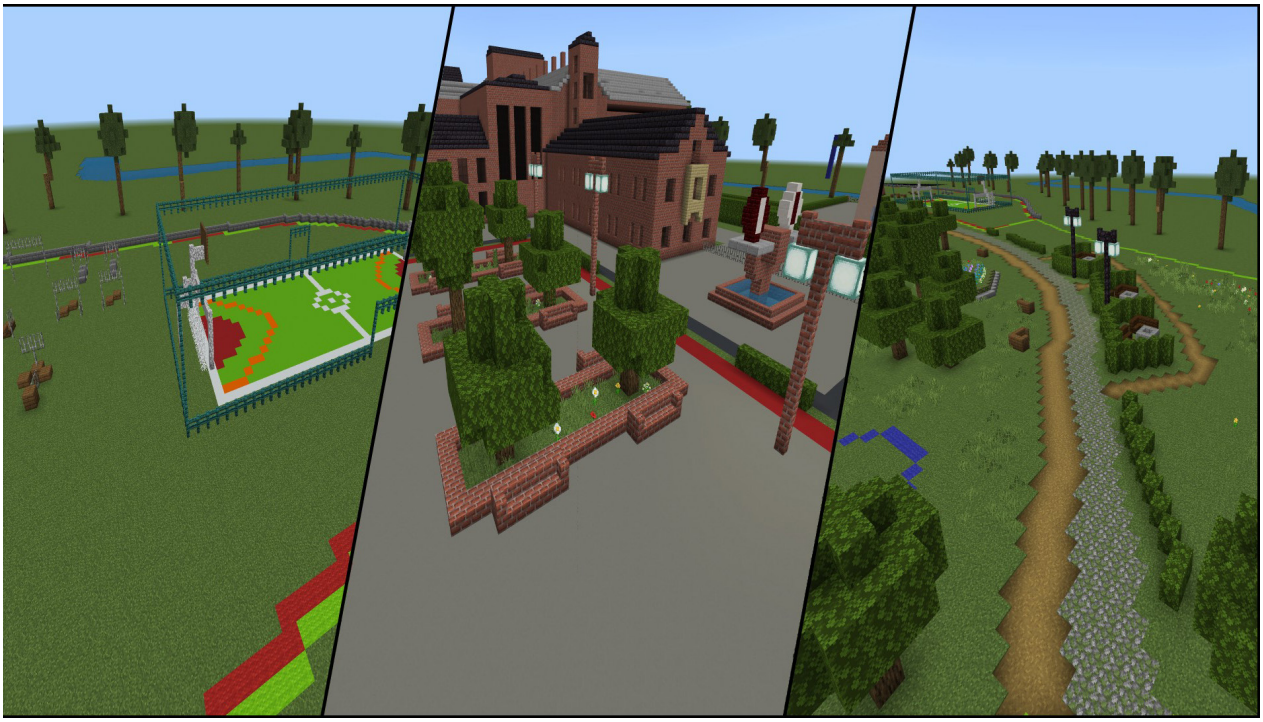

Fig. 6. The final model.

Source: Own elaboration based on materials from the conducted workshops, using the Minecraft Education Edition game

4. Concluding remarks

The new method of social participation, namely the use of Minecraft in dialogue with residents, allows for many possibilities. First, one needs to mention the function of building three-dimensional models in a virtual game environment, which can be modelled, experimented on and refined with various ideas. This form of visualization allows expressing one's opinion in a simple and intuitive way, while retaining a possibility to modify the concept. In addition, the tool is simple to use, enabling the participation of people who have no experience in using advanced design software, because Minecraft allows for free construction of architectural structures in an almost unlimited way. Using blocks, it is possible to create original structures both individually and in a group. The use of such a model also allows for a virtual walk in the game environment, where participants have an opportunity to discover different perspectives and interact with elements of the environment. This allows for a better understanding of the source of the problem and the relationship between spatial elements, which can lead to unusual solutions.

The Block-by-Block Initiative, which uses Minecraft in a dialogue between the authorities and residents, is a method with a solid basis for functioning. The use of video games to engage young people is completely justified and has many benefits, especially because children and adolescents show a unique passion for processes related to video games (Griffiths, 2002). In addition, through workshops, young people are educated on the correct planning of space, and trust among citizens is built from an early age. Therefore, the method using Minecraft can enable greater public involvement, as well as a possibility of free sharing of opinion by persons usually omitted in spatial discussions.

The conducted simulation showed possibilities, advantages and disadvantages of using Minecraft in spatial planning processes. Young people and children showed considerable skills in constructing architectural objects and in spatial development. In addition, the workshop participants were open to learning about and getting acquainted with the principles of correct spatial planning. This shows that young people, in appropriate conditions, are interested in acquiring knowledge in the field of spatial management. Thanks to young people's involvement, it was possible to create a concept of land development of the former sugar factory. Thus, the advantage of Minecraft is to involve young people in the processes of spatial change, as well as to act as a tool used to educate future users of a given space, especially because people using given space can themselves give unique features due to exciting events (Jałowiecki, 2011).

The construction of a virtual environment may seem to be a limitation as regards the use of Minecraft in spatial planning processes. Before organising the workshop, it is necessary to create a

model presenting the current development of the analysed area. Preparation of materials related to the construction of the model (photos, maps, technical information on buildings or field observations) requires extensive work. On the other hand, building requires familiarity with the game functionality, as well as a large amount of time (directly proportional to the size and detail of the area covered by the game).

Therefore, one can be tempted to say that the Block-by-Block initiative should be used more often in spatial planning in Polish realities and that this is an equal tool in social participation. Thanks to this, the developing cooperation between the authorities and the inhabitants of a given city affects the number of people willing to participate in the process of change.

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