



Participatory design games for citizenship education. A public space approach with children

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Abstract

Citizenship education plays a key role in urban societies, as it supports the construction of inclusive, sustainable and healthy communities, promoting values of responsibility, activism, inclusivity, diversity, collaboration.

Civic and Citizenship courses in schools' curricula worldwide gives positive results, but critical barriers can be noted, including: the difficulty for children to understand complex theoretical and abstract notions. Some scholars suggest that education is more effective when democratic processes are experienced by children through decision-making, including through the use of games. Participatory design strategies for the public space, together with placemaking actions, have been promoted since the 1970s to engage adults in decision making processes, with the objective of collecting proposals on urban transformation, strengthening communities, educating to citizenship, with values of inclusivity, diversity, sustainability, activating the *citizen agency* by encouraging activism. Participatory design strategies can benefit from the use of *gamification* strategies and *serious game* approaches to achieve audience development, engagement and conflict resolution.

This research appraises the possibility to use *participatory design games*, focused on the public space, as *tools for citizenship education of children* (aged 5-12). Three case studies developed in Spain and Italy are presented, based on the use of digital and analogue interfaces. Case studies are assessed and compared on their capacity to stimulate interest in children through time, foster interaction and active collaboration between peers, educate to conflict resolution, Educate to inclusivity and diversity, promote behavioural change towards sustainability, collect Data on desires in relation to the public space. Results suggest that participatory design games focused are successful as educational tools, regardless of the real implementation of the design solutions.

Keywords: *urban communities; children; citizenship education; public space; design; education; games; participation.*

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1. Introduction

The strength and cohesion of urban communities is challenged by phenomena of urban growth and gentrification, combined by increasing individualism of postmodern societies (Bauman 2002). Healthy communities are crucial to build sustainable and inclusive cities that can promote individual and collective wellbeing and are resilient in front of ecological and social challenges.

Within this context, citizenship education is recognized as a cardinal element to strengthen communities, as it promotes values of activism and responsibility, encourages interaction and conflict resolution, educates to inclusivity and diversity, and guides change towards sustainable behaviours (Nikolitsa-Winter et al. 2019). Formal education to citizenship has been introduced in schools' curricula in Europe since two decades, accompanied by transversal regular assessments of its impact in different countries (Palmerio et al. 2021). Despite the differences due to local contexts, the assessment shows a constant improvement of civic knowledge in the majority of the countries involved. However, these approaches encounter several barriers and challenges, among which the difficulty for children to understand complex theoretical and abstract notions related to democracy, mechanism of conflict resolution, impact of individual decisions on the community and individual responsibility (Malak-Minkiewicz & Torney-Purta 2021). To address this issue, scholars suggest that decision-making processes can be implemented to make the educational process more effective, as it allows democratic mechanisms to be experienced by children (Greenberg 1992).

Another challenge is represented by the lack of consolidated teacher training, and the lack of resources in urban contexts characterised by low socio-economic levels (Mufalo et al. 2022).

Huppert et al. (2018) proposed to overcome these challenges through a replicable game, easy to be implemented by teachers, focused on distributive justice, having candies as tokens. The game was played with more than 2500 children aged 4-11 in 13 countries, with a very positive assessment in terms of learning achievements of children of all ages.

When dealing with a life-long learning approach to citizenship education, it has been proved that it can benefit from decision-making activities like participatory design processes. These have the primary objective of collecting information on the citizens' desires and proposals for the physical transformation of cities through collaborative practices and have been implemented in urban and public space projects since the 1970s (Sanoff 2000). However, they also have the capacity to strengthen communities (Kent 2000), educate to citizenship, with values of inclusivity, diversity, sustainability (Friedmann 1973), activate the citizen agency by encouraging activism (Forester et al. 1979).

Participatory design strategies can benefit from the use of gamification strategies and serious game approaches to facilitate the organization of participatory design activities, as they can facilitate the comprehension of complex theoretical topics, foster audience development, ensure a good level of engagement through time, promote dialogue and conflict resolution, as well as positive behaviour (Rambusch & Susi 2010; Tan 2020: p.270).

2. Aim and methodology

This research explores the hypothesis that *participatory design games*, focused on the public space, can be used as *tools for citizenship education* of children aged 5-12. It presents three case studies developed in Spain and Italy by multidisciplinary teams

involving sociologists, architects, educators, and game designers. Each case study describe the use of digital or analogue games and asses them based on parameters related to their capacity to stimulate interest in children through time (i); to foster interaction and active collaboration between peers (ii); to educate to conflict resolution(iii); to educate to inclusivity and diversity (iv); to promote behavioural change towards sustainability (v) ; and to collect Data on desires in relation to the public space (vi).

The assessment counts on a mixed-method methodology. Qualitative data is collected with observation of participants and non-structured interviews, while quantitative data relies on the analysis of design proposals developed by players, based on the number of game elements.

3. Case study A

The first case study describes the use of a decision-making game as a tool for Citizenship education, focused on the participatory design of a public space. The test took place in the city of Barcelona, with a group of 20 children aged 9-12.

The digital game used in the session, called “Superbarrio”, was developed in 2017 by a team led by Areti Markopoulou to engage adults and children in decision making and co-design processes with regards to a newly pedestrianised public space of Barcelona. The game mechanics of Superbarrio are designed to favour comprehension of public space as a shared space for societal values, promoting concepts of inclusiveness and responsibility.

The game enables each player to visualise the public space of the neighbourhood in a 3D environment and deploy different 3D elements, each one representing in a realistic manner a function or design solution, belonging to a typology among *ecology*, *mobility*, *energy*, and *social interaction*. Elements included gardens, trees, benches, markets, playgrounds, gym systems, bike sharing stations among others. Throughout the game sessions, the game fosters activism of citizens in the decision-making process, asking them to develop a design solution that responds to 4 indicators related to mobility, economic system, production of energy and resources, social dynamics (*accessibility*, *economy*, *productivity*, *ecology and sociality*). Awards are assigned to players that deploy a large number of modules by keeping a balance between these indicators.

The game stores each player’s design proposal in a database, and a digital dashboard shows the globality of players' proposals on a plan.

The first test of “Superbarrio” with adults had proved a high capacity of engagement, awareness raising and education to values of inclusivity, sustainability, sociability (Markopoulou et al. 2017). On this basis, it was decided to develop the experiment described in this research, testing the game with pupils enrolled in a public school in the neighborhood, in order to evaluate the capacity of the game as a tool for citizenship education with children. The experiment started with an informal interaction with participants, sharing information on the functionalities of the game interface, and interviewing them about the on-going pedestrianization process. It came out that a large number was not in favour of the process (7/20), some of them explained that their position derived from their parents’ opinion (15/20) and that reasons behind changes of public space asset were not clear to them. The game activity counted on a facilitator, allowed only to explain the rules of the game. Game sessions took place with 3 turns over half an hour. Each participant played for over 5 minutes on average along a 35-minutes session, and two of them played for only two minutes.

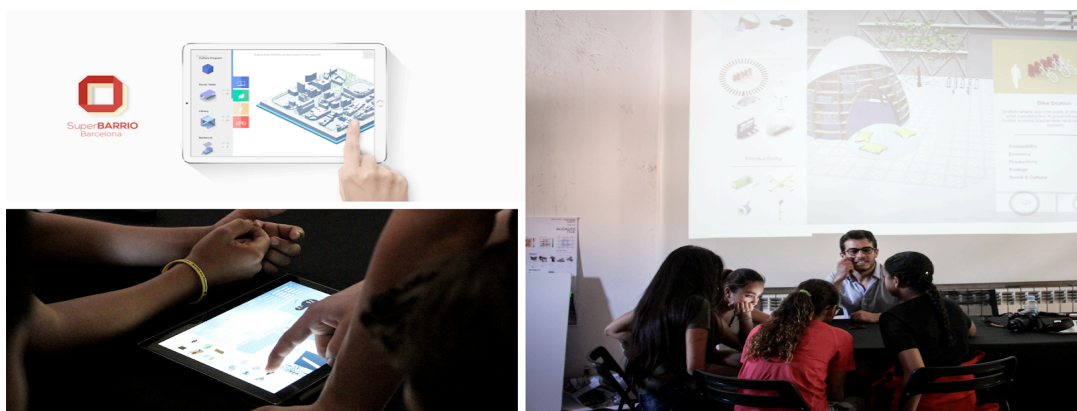
We observed that the digital interface resulted to be very attractive and raised the interest of all the participants, and that players interacted with other peers waiting for their

turn, discussing their decisions. During and immediately after the game sessions, children evaluated the experience in non-structured interviews. Majority of participants expressed their interest and enjoyment about the interface, and appreciated the potential to visualise the future configuration of the public space in a 3D scenario, to understand the impact of their decision on the community, and to compare diverse proposals made by other peers. A participant said that the game experience had let him change opinion about pedestrianisation, as he was able to better understand the impact in terms of sustainability and sociability. Two participants gave a neutral assessment.

In terms of quantitative data, information stored in the database showed that each player had deployed 20 tokens on average, with the majority of the modules from the “Ecology” category, and a big number of playgrounds. Furthermore, data showed that design solutions evolved during the game, as the players erased and replaced modules to achieve a more balanced and inclusive neighborhood.

Qualitative and quantitative data show that the experiment was successful with regards to all the parameters selected for the assessment (tab.1), with the exception of the low capacity to educate to conflict resolution. In fact, the decision making process enabled by the participatory game was able to raise interest in the game for a sufficient time, and fostered interaction and collaboration between players despite being a single-player game. Consequently a good amount of data was collected for the majority of players. Game mechanics that award balance between the four indicators, combined with the plurality of design solutions that can be developed and visualised with the interface, was able to secure a clear understanding of values of community inclusivity and diversity. Lastly, the action of changing the design proposal - in order to achieve a balance between indicators - proves that participants could experience a behavioural change process within the game environment. However, we can observe that the single-player format was not able to promote a collective reflection on this process, and therefore consolidate it through time.

In conclusion, the first experiment of the game showed its good impact on some of the performance indicators related to citizenship education, but also some limitations. These were at the basis of future iterations of the strategies, as described in case studies B and C.



Img 1 . Case Study A

4. Case Study B

Second case study describes the use of two participatory design games, a digital and an analogue version of Superbarrio interface, in the town of Favara (Italy) with 20 children aged 6-12.

It represents a second iteration of the pedagogical methodology tested in case study A, with specific variations to better assess performance, and to test possible improvements. Digital and analogue versions were tested in two following sessions within the same course.

The methodology with the Digital version of Superbarrio was the same as case study A, except for a slightly longer available time to play (15 instead of 10 minutes), the availability of one tablet for each participant, and the introduction of a final session in which each player presented its proposal to their peers. The digital game had been adapted to the local context of Favara simply inserting a different 3D environment reproducing the central square of the town.

The analogue game was played after a short break. This second interface was a *game board* that showed the same public space in a 2D representation, with paper cards representing different functions to be deployed to develop a design proposal. As in the digital game, each card element showed the name of the element, an image, its category, and the score related to the four indicators of *accessibility, economy, productivity, ecology and sociality*. Children played in teams of four players each, for 30 minutes, supported by a facilitator, and each team was asked to present the design solution to all the group at the end of the session.

The behaviour of children during the first session was similar to that observed in the case study A, with limited but diffused interaction between players, and long duration of the sessions. Presentation of results proved to stimulate interaction between peers, to raise confrontation between different opinions, and to help children to reflect and defend their individual decision-making process.

The analogue interface generated a high interest among students, as in the first session. In this case we observed a very high level of interaction between children in the same group, as game mechanics drove them to make a collective decision through debate, interaction and conflict resolution. Facilitators had to give support to younger participants, who had some difficulty understanding the 2D plan of the public space. When presenting the projects, we observed that participants had decided to give a name to the project, proving a feeling of ownership, and were able to explain how their project was the output of a confrontation, explaining the reasons behind each decision made.

Through non structured interviews children were asked to give their opinion about the whole educational experience. All of them rated it very positively, expressed desire to play again, and evaluated it as a formative experience.

In terms of quantitative data, results for the digital version were similar to the case study A, with an average of 20 elements deployed by each child, and the same behaviour was recorded, with players changing proposals to achieve a more balanced result and an award. In the analogue game, each team played an average of 30 cards. Facilitators observed that the attitude to reflect on, and change, the design proposal could be observed throughout the whole game session, was promoted by dialogue between players.



Img 2 . Case Study B

This second experiment confirms potential and limitations of the digital interface. With regards to the analogue version, it is possible to note that the positive parameters of the digital version are mainly confirmed, and that some limitations are overcome. In fact, the decision-making experience through the multiplayer game board was very effective in raising interest through time and fostered a higher level of collaboration. This also included a process of confrontation that educates participants to conflict resolution, by putting it in practice. The promotion of behavioural change results stronger than in the digital version, as it was related to a collective and explicit process based on confrontation within teams (tab.1).

It is possible to conclude that a multiplayer game interface is more effective as a tool to educate children to Citizenship, compared with a single player one. However, the single player digital version presents a higher level of replicability, as it can be easily downloaded and installed on any tablet.

5. Case study C

Third case study is based on the use of a series of play sessions within one educational workshop with children aged 10, namely: a game activity on the concept of space, a game activity on the concept of public space, and a game board to co-design in teams an abstract public space.

This workshop took place within a broader ongoing process, whose aim is to involve citizens of the town of Bagheria, Italy, in the participatory design of a 400-meter-long street. The street is going to be transformed with an urban regeneration process financed by EU funds, aimed at increasing the pedestrian area, planting a linear park and offering new services and urban furniture. Children of a school located in the street, were engaged through a series of three workshops: Public space as a space for communities (i), Co-design workshop of the street (ii) and Co-management workshop (iii). The first workshop is assessed in this paper as case study C.

The pedagogical methodology of the “Public space as a space for communities” workshop focuses on stimulating a deeper understanding of how and why public space is a key driver of community coexistence and development. By doing so, it promotes concepts

of citizenship, conflict resolution, inclusivity, sociality, and responsibility towards community. The educational strategy takes advantage of the good level of awareness of students on the concepts of “emotions”, which is adequately promoted in Italian school curricula.

The first two game activities ask children to reflect, in a game environment, about the space of the class and the space of the street, understanding how both are places that satisfy individual and collective needs, and how each of them proves emotions. Throughout the activity, children are asked to reflect on personal emotions and desires, and their peers’ ones.

The first game activity proposes a reflection on the space of the class. First, children are asked to observe the room, describe *actions* that take place in it, and how space serves to perform some *functions*, for individual or collective needs. Secondly, a collective reflection on how each of them has experienced different *emotions* (happiness, curiosity, anger, fear, shyness, confusion, surprise, boredom, feeling part of a group) within that space, is developed. Children in a circle choose an emotion and describe how and when they felt it in the class, and how it was determined or influenced by the space (e.g. a poster driving curiosity, a window on the garden driving happiness, etc.). A facilitator, or the teacher, asked each time if other peers had similar feelings, in order to reflect on the collective vs. individual dimension in society.

In the second game activity, children were asked to understand how the public space can be a place that satisfies individual and collective desires, but also a case of conflicts driven by diverging opinions. Participants were asked to observe a series of images of public space functions, furniture and activities (gardens, drinking fountains, birdhouses, swings, petanque lanes, benches, slides, picnic tables; Reunion between friends, concert, seniors playing cards, Caring for plants, play), and to express their positive or negative opinion on them by creating groups on two sides of the room. This phase aimed at letting each participant experience with body and proxemics the divergence of ideas in a community, understanding how this can generate conflicts. The facilitator asked each group to motivate their opinion.

In the third and last activity children were divided into 4 groups and played with an analogic co-design game. The game board represented the plan of an abstract public space, with cars, sidewalks, and few trees. Similarly to the analogic version of Superbarrio, used in case study B, each group could use a series of cards representing the functions shown in phase two, and were asked to develop a proposal that satisfied their desires and could let them feel positive emotions. Each card had a cost (from 2 to 10 tokens) and generated an impact on three indicators (ecology, inclusivity, and sociality). The scope of the game was to reach three different awards, each one corresponding to a score, keeping balance between the three indicators.

The limited budget, a total of 60 tokens for each team, was a game mechanic introduced to generate conflicts and promote its resolution. At the end of the session, participants were asked to present their design solution to peers and teachers, explaining how they had found agreements and resolved possible conflicts, and eventually share their feeling about the whole process.



Img.3. Case Study C

The engagement of the participants was continuous through the whole workshop, which lasted a total of three hours. During the first activity we observed that, after a first phase in which they were mainly interested in sharing their personal experiences about emotions, participants started to be more attentive to how their peers had felt similarly in the past, and eventually manifested a clear understanding of concepts of collective vs. individual dimension in society.

During the second activity, when children divided into groups (in favor/not in favor), they were generally able to motivate their opinion in a respectful and peaceful manner. However, some tense conflicts emerged that, as expected, could not find a resolution. Conflicts were instead very fluidly resolved in the third phase, playing the game board: in fact the mechanics turned out to be successful in letting the children experience feelings of responsibility towards a collectivity, as decision makers in their team, and therefore started to develop compromises and agreements. The solutions developed responded to the three indicators of ecology, sociality, and inclusivity, allowing children to interact and reflect upon these concepts when dealing with a community. As in case study A and B, this was related to the awards based on indicators, which generated changes in the design proposal.

In conclusion, it is possible to affirm that educational workshops assessed in case study C performed positively according to all the six categories analyzed. It is easily replicable as a tool for Citizenship education, as it does not operate on a real public space, but on an abstract one. In this regard, a possible limitation can be found in the need of a facilitator that has some level of expertise in relation to public space solutions, but this can be overcome with a simple set of instructions.

6. Conclusions

This research explores the hypothesis that *participatory design games*, focused on the public space, can be used as tools for citizenship education of children aged 5-12. Through three case studies it shows how a participatory design game, through experiencing of decision making, can be advantageous to overcome barriers identified by scholars and address six main objectives of citizenship education: to engage children for a long time to stimulate interest in children through time (i); to foster interaction and active collaboration between peers (ii); to educate to conflict resolution (iii); to educate to

inclusivity and diversity (iv) ; to promote behavioural change towards sustainability (v) ; and to collect Data on desires in relation to the public space (vi).

The assessment of case studies suggests that for educational purposes it can be convenient to use analogue game systems, and that a game environment with an abstract public space can make the process easily replicable. Research also shows that education to conflict resolution is the most challenging objective, which should be addressed in an explicit manner to generate awareness in children and stimulate responsibility. In conclusion, this study suggests further experiments to consolidate knowledge on *participatory games for citizenship education* and evaluate the possibility to integrate them in existing curricula.

Performance parameters	Case study A	Case Study B	Case Study C
Raising Interest	High capacity	High capacity	High capacity
Interaction And Collaboration	Medium capacity	Medium capacity	Small capacity
Education To Conflict Resolution	Low capacity	High capacity	Medium capacity
Education To Inclusivity And Diversity	High capacity	High capacity	High capacity
Promotion Of Behavioural Change	Medium capacity	High capacity	Limited capacity
Data Collection On Desires	High capacity,	Medium capacity,	Limited capacity,

Tab 1. Comparative assessment of Case studies

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Case study B - Superbarrio Favara project: Marco Ingrassia.

Case study C - Metalibertà: Marco Ingrassia (Participation and education strategies) Architectural Project leaders and director: Francesco Lipari OFL Architettura

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