o conceito de
geogames em ambientes
inovadores de aprendizagem

developing the concept of
geogames for innovative learning
environments

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Abstract:

This article aims to provide an empirical overview on the state of the art on Games Studies related to Architecture and Urban Planning throughout a long research structured on fifteen experimental steps related to fifteen different geogame designs. The empirical approach aimed to add and refine comprehensions on the development of the concept of geogames. This concept is a combination of serious games, technology, cultural heritage, and urban planning to create ideas and digital prototypes to problematize and solve urban issues with civic involvement. Also, the work's focus on this concept was to learn which digital platforms could be engaging through the playfulness for children, which compose the societal target group for the research. This discussion tackles two different but complementary topics, related to 1) geogames as a tool for learning architecture and urban planning, and 2) geogames as a tool for collaborative planning. Hence, the research questions are: which type of game builders could be used to support teachers to improve architecture and urbanism learning? And how technology can be applied to keep citizens engagement into the process of planning at the same time that allows reaching a maximum consensus? The games' design and the digital and non digital prototypes presented in the article were structured in order to show the process of validation of the geogames' concept.

Keywords: Geogames, Cultural values, Community planning, Collaborative planning, Geodesign

1   Research in games applied to architecture and urbanism studies This article is intended to show a sequence of innovative game ideas and designs developed during short courses, workshops and lectures across Europe, within a one year-research[1]. Our goal is to tackle the research question on how a geogames' approach is capable of creating innovative learning environments about architecture and urban space, and also support civic engagement in architecture and urban planning processes, based on cultural values (Tuan, 1990; Bachelard, 2014 [1957]; Norberg-Schulz, 1980). We sought to develop the concept of geogames by elaborating ideas and digital prototypes designs to problematize and solve urban issues with civic involvement.

Geogames are related to the theme "*parti.cipate+col.laborate*" as a contemporary process of collective construction of knowledge in architecture and urban planning, with a theoretical and practical approach directed to transdisciplinary, multicultural actions involving actors and non-academic communities. Geogames connect two strong ideas - to participate and to collaborate -, imbued with a dialogic sense in a mosaic of

forms of participation and collaboration, their contexts, methodologies, products and limits. Geogames are part of the urban-shared interventions topic with digital gaming technologies, towards a Geogame Geographic Information System (GGIS).

This discussion tackles two different but complementary topics, related to 1) a geogame as a basis for learning architecture and urban planning, and 2) a geogame as a common ground basis for collaborative planning. Hence, the research questions are: which type of game builders are currently being used to support teachers to improve architecture and urban planning learning? And how technology can be applied to keep citizens engagement during the process of planning, simultaneously allowing to reach a maximum consensus?

Furthermore, a couple of contacts to inquire about the the state of the art of use of geogames were made with two professors experts in the area, one with Professor Alenka Poplin[2], and other with Professor Christoph Schlieder[3], between the second semester of 2015 and the first semester of 2016. Both authors supported the research and were intrigued by the articulation of geogames and urban planning based on cultural values through the methodological lenses of Geodesign.

Hence, three figures sum up the basis for the development of the concept of geogames articulated to geodesign. The Figure 1 synthesizes the process of learning from the evolution of the concept of serious games to that of serious geogames in the work of Poplin (2011, 2012, 2014, 2018). The Figure 2 explains the first ever correlation between geogames and geodesign, focused on the first phase of the Geodesign framework that this paper aims to develop further (Schlieder and Kremer, 2013). And, finally, the Figure 3 shows the framework of Geodesign by Steinitz (2012).
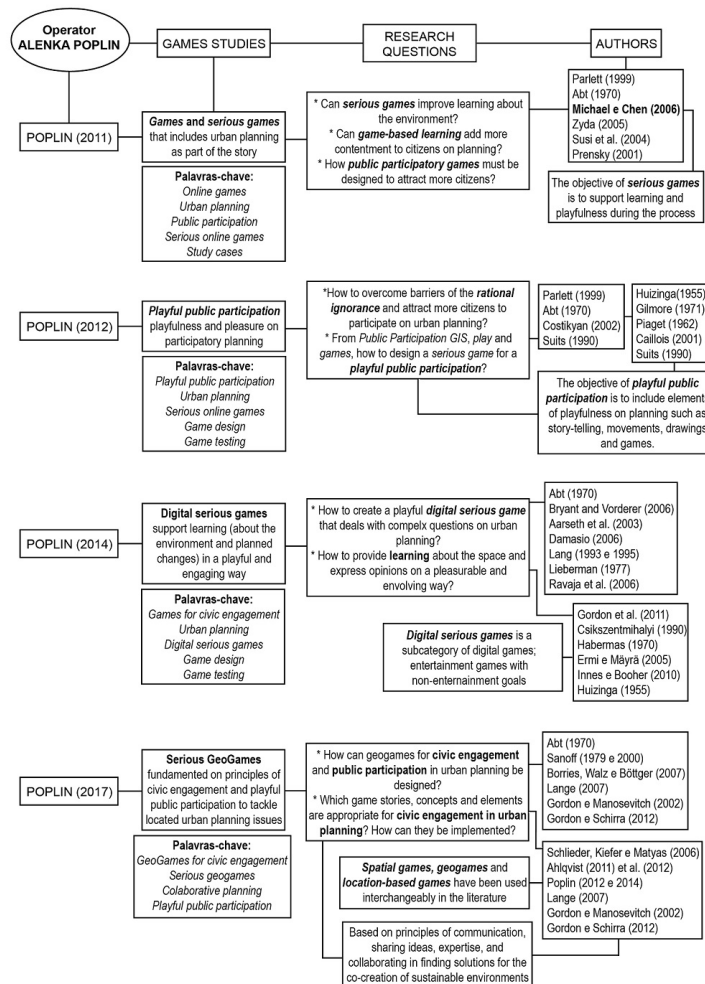
Fig. 1: Evolution of the concept of Geogames in Poplin (2011, 2012, 2014, 2018). Source: The author, 2018.

Geogames		Steinitz et al. 2003	
Exploration games	Learning to use a spatial design How do I move from A to B? What is the best place for activity X?	How should the state of the landscape be described ...?	representation
		How does the landscape operate?	process
Evaluation games	Learning to evaluate a design How do I feel about place A? What would I need there?	Is the current landscape working well?	evaluation
		How might the landscape be altered ...?	change

Fig. 2: Experimental conceptual scheme on Geogames and Geodesign. Source: Schlieder and Kremer, 2013.
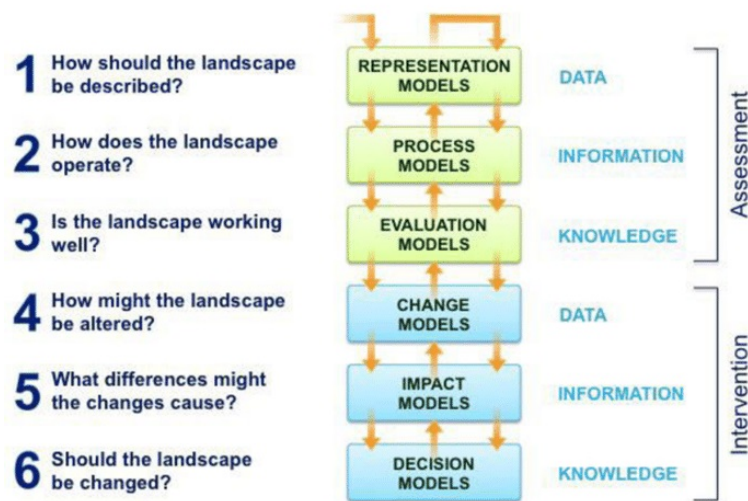
Fig. 3: Geodesign framework. Source: Steinitz, 2012.

2   Study trip on games studies

This section aims to describe the courses, workshops and lectures followed around Europe to get in contact with new digital gaming tools and experiment its potential towards architecture and urban studies (educational games, serious games, geogames).

2.1   "Design of Serious Games"

The first overall activity was the "Design of Serious Games"[4] at the TallinnUniversity, that lasted one week in July 2016. After presenting my "Building Eutopia" game idea pitch regarding the scope and goal of the game, what the player can do, and why the game is special, it was voted as number one game to be developed further towards a prototype on a group of three participants during the course[5] (Figure 4).

Fig. 4: "Building Eutopia" game scenes. Source: The author, 2016. Available at: <https://gph.is/2SbwEOu> [Accessed 25 November 2018].

The workshop encouraged game ideas consonant with the adventure genre, as the game builder platform used was eAdventure[6]. The eAdventure platform does not need any skills of programming. Another game development platforms shown during the course were Scratch, Kodu and Unity. The courses' guiding reference was Adams (2009), a method for designing games, contemplating the sequence: game worlds, creative play,

character design, storytelling, user interface design, gameplay, core mechanics, game balancing, and level design.

The "Building Eutopia" serious game idea focus on an undergraduate student of Architecture as the avatar, who was hired by the mayor of a fictional city inspired in Tallinn to explore it and socialize with the main representative groups of the community, find out about their wishes, needs and conflicts. The goal was to talk to all groups within the city, negotiate with them, facilitate their contact with each other, teach them about urban planning parameters, and improve quality of life, in order to make it a Eutopia city.

According to Geddes (1915, p.75) Eutopia is an ideal city, "[...] a place of effective health and well-being, even of glorious and in its way unprecedented beauty, renewing and rivaling the best achievements of the past". Hence, the parameters worked on the prototype were a) make the city greener, b) create new mobility scenarios, and c) build new architecture in consonance with the pre-existence.

In that sense, Adams (2009, p.3) acknowledges that a definition should contain the essential elements of a game (play, pretending, goal and rules), so a "game is a type of play activity, conducted in the context of a pretended reality, in which the participant(s) try to achieve at least one arbitrary, nontrivial goal by acting in accordance with rules". Moreover, concerning game design for children, Adams (2009), proposes the use of Piaget's theories on cognitive development to address motor and cognitive skills change in childhood: Preschool and kindergarten (ages 3 to 6); Early elementary (ages 5 to 8); Upper elementary (ages 7 to 12, the tweens); and Middle and high school (13 and up, the teens).

2.2   Game.Play.Design: ReThink

The second overall activity was the "Game.Play.Design: ReThink"[7]. The goal was to build a game prototype after five game jams, each one lasted between four to eight hour-day working, to rethink traditional games and rebuild them following the theme of each group of four participants formed to work together from different backgrounds.

The first game jam aimed to warm up the participants[8] to get to know each other's abilities. The goal was to design a game using aleatory words from each participant to create a story using the materials available at the laboratory, such as electronic devices, materials, toys, lego, etc. The first game jam presented was "Bubble Wrap", a multiplayer board game, with electronic inputs that could explode depending on the spot of the board.

The second game jam aimed to rethink Tetris on the theme and mission of the group, which in our case concerned Urban Studies. Therefore, the name of the group became "Urban Nebula", with the following set of values: mindfulness, topophilia, intuition, depth, and creativity; and setting as a mission encouraging a new physical exploration of the city.

The game presented was "Citrys", a match of Tetris and City. According to a matrix of point's combination on urban zoning, the player wins more points by making good combinations, such as, for example, placing housing near green areas, and lose points by making not healthy combinations, such as placing industry near water (Figure 5).

Fig. 5: Citrys' game points combinations matrix. Source: The author, 2016. Available at: <https://gph.is/2SbsshN> [Accessed 25 November 2018].

The third game jam aimed to rethink Pokémon GO. So, the "Fantasy Aros" game relates to cultural heritage, to exploring particular places of the city, such as statues, churches, parks, and public spaces. The goal is to rethink an exploratory game like Pokémon-GO on a fantasy-historically context. Fantasy Aros intended for being more collaborative and interactive, anchored in a family-friendly playful approach. In order to do that the team used Klastrup and Tosca (2004), in which "Mythos" regards cultural consciousness, "Topos" regards a fairytale setting for place-making in Aarhus historic center, and "Ethos" regards ethical and moral issues, such as good trumps the bad (Figure 6).

The fourth game jam aimed to rethink a personal toy. Our group toy was a wooden sword, and then after a brainstorming matching the urban theme, we created the "Katana City" game. The game interface comprehends a sword, a board and a screen. It's a two-player competitive game, in which the goal is to destroy as fast as possible the city displayed by Lego pieces on top of a *magnoblock* board. The goal for the next phase is to rebuild the damage. The magnetic blocks will record the damage in each place and display them on the screen as points. The implicit rule is to destroy and rebuild, and, of course, not injure each other. It is a learning experience to unleash the destructive will that compels players, and bring it to a better emotion of rebuilding. The lesson regards how easy it is to destroy, and how hard it is to rebuild (Figure 7).

Fig. 7: Katana City game pitch. Source: The author, 2016. Available at: <https://gph.is/2Bwh8r5> [Accessed 25 November 2018].

After the fifth game jam, the group had to choose one of the game ideas to develop further and present as a final assignment. The game design should follow Schell's (2008) guidelines for game design, concerning aspects such as game mechanics, player experience, pitching, iterating, and brainstorming. After choosing initially to build it using the 3D top-view RPGMaker game builder[9] (Figure 8), we decided to change for the text-based "Build your own adventure" game builder created in "Itch.io" website (Figure 9). The "Magic Aros"[10] game builds upon the previous "Fantasy Aros" game idea. It is a location-based game for mobile phones based in texts, in which the players have different endings depending on their choices.

The goal of the game is to explore Aarhus' old town, through historic and contemporary architecture and places, such as the main cathedral, the canals, and the new docks building, on a fictional narrative matching facts Aarhus' history and Danish legends. The purpose of the game is to involve and encourage the community into a new experience of topophilia (place-attachment) throughout walking different routes in the inner city, and getting to know Aarhus' history (Figure 9).
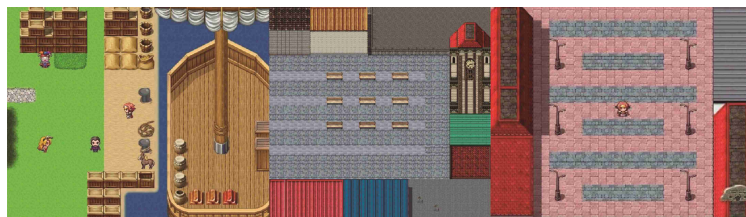
Fig. 8: RPGMaker game scenes for Magic Aros. Source: The author, 2016.

Fig. 9: Magic Aros mobile phone game. Source: The author, 2016.

Schell (2008) was the guideline for the mechanics and game designs of the "Game.Play.Design: ReThink" course. The author highlights the purpose of architectural design in the game environment to control a person's experience. Refers to Christopher Alexander's ideas (Schell, 2008, pp.372-376) to reach fifteen properties of living structures, such as levels of scales, boundaries, deep interlock, ambiguity and non-separateness: "Lay no paths at all. Merely plant grass. Then come back a year later, see where people have worn paths in the grass, and only then begin to pave".

Summarizing, such platforms for game development such as RPGMaker and "Build Your Own Adventure", can easily be learned. The devices to play can be either a desktop computer or a mobile phone application to explore a real-world space, recently made famous by augmented reality Pokémon GO. This kind of mixed-reality game has a huge potential to teach architecture and urbanism, and support participatory planning processes.

2.3   "Collaboratively Articulating "Urban" Participatory Design?!" and "Exploring Theater of the Oppressed for Participatory Design"

During the "Game.Play.Design: ReThink" course a third overall activity took place in Aarhus, Denmark, during the 14º Participatory Design Conference (PDC)[11]. The first one was "Collaboratively Articulating "Urban" Participatory Design?!"[12], in which each participant presented themselves and an essay on the topic of the workshop. After that, there was a brainstorming discussion concerning a common definition of Urban Participatory Design.

The workshop participants were divided in three groups, each one with four participants, following the main theme on participatory design issues. After, the groups had to create a short video to present at the end of the afternoon. The workshop discussions focused on urban and public contexts, participation and democracy, and also technology development, dealing with complex societal challenges such as sustainability, segregation, and neighborhood development.

The second one was "Exploring Theater of the Oppressed for Participatory Design"[13]. The "Theater of the Oppressed" is a theatrical method of exercises, games, and techniques based on dialog between performers and the public, created by the Brazilian dramaturgic Augusto Boal. It can be applied as a participatory method for the community to be empowered to change the design process.

According to Mazzini[14], theatre is a wonderful art to express hidden and unique traits of social and human life, and the "Theater of the Oppressed" is a way to critical thinking. The workshop was conducted on the first half of the afternoon with diverse body techniques. On the second half, the participants were divided in two groups, and each group created and presented a story related to Participatory Design. After that, one group's idea was performed to the public, merging the other group participants.

The topic of the performance was an issue related to dog's poop on a park, so a group of researchers received funding to develop an app that would georeference it. The final performance was presented to the public, which got the opportunity to know about the theater forum method and their active role in it. Hence, some of them got into the play and changed the story according to their own opinions.

2.4 Multidisciplinary Game Research

The fourth overall activity "Multidisciplinary Game Research"[15], focused on programming a game using JavaScript. The course combined theoretical, programming and game design lectures. All groups started with a code from an existing game in which you have to destroy alien ships. Then, the goal was changing the code and creating a brand new game, referenced on Egges (2014).

We programmed the "Giraffe in a car"[16] game, aimed to support kindergarten children to learn how to spell. The game idea developed upon picking up a keyword of each member of the group, and making a narrative out of it, which were city, car, giraffe and stars. We changed an existing JavaScript game code, so the missile character became the giraffe, and the alien ships became the letters in the format of stars falling from the sky. The player is the giraffe that has to collect the letters on a specific order to complete the spelling word correctly. The fantasy behind it is that the Giraffe is also the hero that has to save the city from falling stars, built upon the narrative of the alien in which the code is based on.

In addition, Egges (2014) reinforces the potential of Unity 3D as a game engine that, although it is difficult to learn, it has a lot of free tutorials online that makes the platform a way into designing complex games with astonishing visuals. The potential of JavaScript alone using existing codes to change and adapt into new games made it possible to program a simple game such as "Giraffe in a car".

Furthermore, we contacted the "Play the City" team[17], a company who uses gaming to engage multiple stakeholders in resolving complex urban challenges; and with the Geocraft project[18], an initiative that reconstructed all the Netherlands in Minecraft game environment using one billion cubes with the support of the children and the youth.

2.5 Adaptive Reuse: The Modern Movement Towards the Future

The fifth overall activity concerns the workshop "Adaptive Reuse. The Modern Movement Towards the Future"[19]. The participants were divided in groups of around eight people, led by two tutors each. The goal of the workshop was to propose a new use for an abandoned military complex, near a new development zone in Lisbon, the *Parque das Nações*. My contribution to the group[20] concerned an ethnographic approach with photos and video interviews, in addition to representing in Minecraft one building as a living museum, a ludic space for youth to playful learn around old machineries used to make food.

The idea to use Minecraft is to make the design an inclusive process towards public participation, in order to engage and involve the community to collaboratively play the game and revitalize (build, change or add new structures) the represented living museum building. (Figure 10).

V!RUS 17 | O conceito de geogames em ambientes inovad…
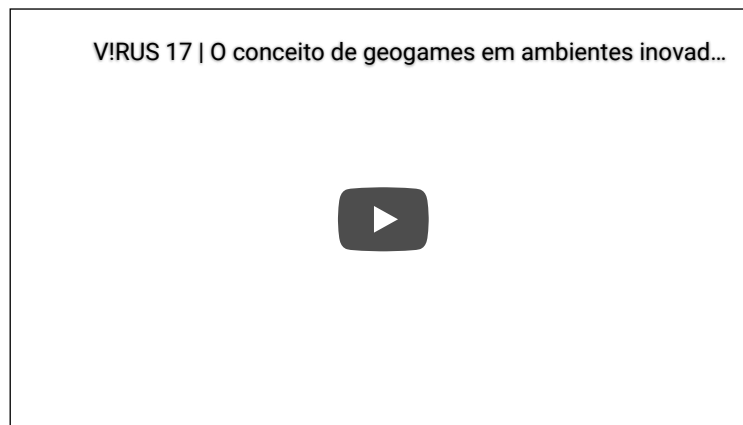
Fig. 10: Living Museum model in Minecraft. Source: The author, 2016. Available at:
<https://www.researchgate.net/publication/317847109_Co-design_no_Minecraft_Docomomo2016_Bruno_de_Andrade>
[Accessed 25 November 2018].

2.6 Conflicting Diversities: Joc Fondo

The sixth overall activity was the summer lab "Conflicting Diversities"[21], at Fondo neighborhood, Santa Coloma de Gramenet municipality, Barcelona's metropolitan region. Three groups were created, in which ours chose a gaming approach towards the resolution of everyday life conflicts at the neighborhood, the most multicultural one in the metropolitan region, including migrants from Latin America, Africa and Asia. Our team, called ReciproCity[22], embraced my suggestion of an Urban Gaming approach to solve conflict issues in public spaces with an original card game called "Joc Fondo".

"Joc Fondo: Torre de Babel" is a card game toolkit (Figure 8), using game as a method for negotiating and co-designing the urban space (Tan, 2014), and inspired on three card games examples "The Urban Collaboration Game" (2014)[23], "Rubbish!" (2015)[24] and "The Sharing City Game" (2016)[25]. The goal of the game was to create a common ground system of community behavior, designed in a way that it could potentially trigger a ripple effect for environmental quality, resilience (intercultural integration) and development.

The concept of the Joc Fondo game was built upon "City Gaming" towards examining cities as self-organizing systems through collaborative and iterative games (Portugali, 1997). And also the concept of "City Games" to tackle real complex urban problems, integrating design and decision making, the topological context and social and political structures, for the purpose of making and maintaining cities (Tan, 2014).

The game aimed to support negotiation within the interested actors in a playful but respectful way, composed by five different card types: card scenes of everyday life conflicts, card characters, coin cards, bonus cards and change cards. The data to build the story within the cards was collected on an ethnographic research during the week of the course, and data provided by the course (Figure 11).
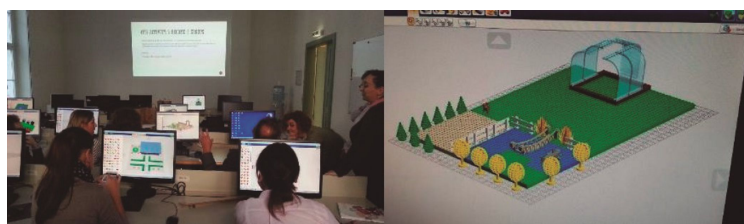
Fig. 11: Joc Fondo game. Source: The author, 2016.

2.7 Geodesign with Lego 3D

The seventh overall activity regards joining the workshop within the Erasmus+ Project "Game Based Learning to alleviate Early School Leaving" (GBL4ESL), at Donau Universität Krems, in Austria, alongside with the University of Malta and the Nystromska School from Sweden. I presented the work in progress "Lego 3D as a tool for planning with pupils", by an invitation of Professor Alexander Pfeiffer[26], that got to know the research on a previous presentation at "Future and Reality of Gaming Conference - FROG 2016".

Moreover, I conducted a workshop entitled "Geodesign with Lego 3D", and added to the TOOLKIT online platform[27], for a group of professors regarding capacitation in Game-Based Learning. The goal was to use the Geodesign participatory planning method in Lego 3D to design future scenarios for the expansion of the campus of the university and reach maximum consensus (Figure 12). A contact was made with Thomas Kunze, the founder of the "Games Institute Austria"[28], who became a collaborator and encouraged our research project to developing a gaming exchange between children in Brazil and Austria.
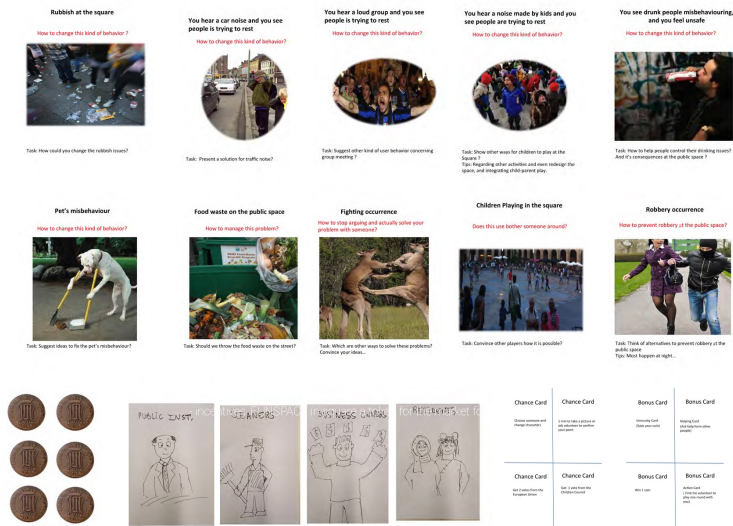
Fig. 12: Geodesign with Lego 3D workshop. Source: The author, 2016.

2.8 Azione Locale Partecipata e Dibattito Pubblico: Geodesign con i bambini

The eighth overall activity was the "Azione Locale Partecipata e Dibattito Pubblico"[29] course, held by the Iuav VeniceUniversity. The goal of the course of six weekend slots, between January and April 2016, regarded the study of participatory planning's state of the art of in Italy, where they recently approved a law on "Public Debate" for civic involvement on major infrastructure projects. The focus concerned this paper regards participation and technology such as online platforms, and participation with children in urban planning.

The highlights regarded the knowledge on "*Interagire online. Valori, potenzialità e limiti della e-participation*", by Giancarlo Sciascia e Luca De Pietro; and the "*Apprendere dal basso. Cosa ci insegnano i bambini sulla partecipazione*?" by Professors Raffaela Mulato and Stephan Riegger, specialists in participatory planning with children in schools in Italy and Germany, owners of the interactive lab "Moving School 21"[30]; and also "*Il ruolo di ascolto attivo e ADR nella leadership facilitativa e confronto creative*" by Professor Marianella Sclavi.

A final assignment previously named "*Geodesign con i bambini*"[31], approached a gamification of Geodesign, changing its framework to enhance the engagement and consciousness of the kids during the Geodesign workshop through playful interactions in Minecraft. Moreover, the ninth activity concerns the participation as staff in the Geodesign Norcia[32] workshop, held in Perugia, Italy, in April, towards the reconstruction of Norcia after a recent earthquake. This activity supported the elaboration of some of the geogaming aspects, together with Dr. Hrishikesh Ballal, the programmer of the online platform Geodesign Hub, such as the use of Minecraft in Geodesign workshops, to our original project called so far "A Framework for Geodesign with Children" in Brazil.

2.91 Geogames' syllabus design and course

The tenth activity concerned the syllabus' course design for an undergraduate course in Architecture and Urbanism entitled "Participatory Planning: Geogames"[33] at UFMG, Brazil. The purpose was to give back and share the knowledge gained from the "*Azione Locale Partecipata e Dibattito Pubblico*" course, and from the internship at the University of Florence, based on the Italian Territoralist School, the state of the art in civic participation in Italy. The syllabus focused on using Geodesign and Geogames through three instruments of participatory planning: exploring, designing and deciding.

The innovation of the course combined the knowledge so far on game studies applied to planning, such as geogames (Poplin, 2012; Schlieder, 2014), in which the students chose and conducted a participatory dynamic. They presented the results on social media about the citizen's design of alternative futures for the Pampulha Modern Ensemble in Lego 3D. For example, the project "Pampulha GO" a student chose the Decisional category and worked with Pokémon GO to analyze the relation between the players and the public space, regarding use and appropriation of space, and its infrastructure, near the lake (Figure 13).

Fig. 13: Co-design process. Source: Laryssa Mariana Moreira Freitas, 2017.

The eleventh activity regarded the paper presented at E-Planning, entitled "Modeling of mining landscape transformation with the use of geogames' logics in Minecraft"[34], using terrain modeling in Minecraft in three different time lapses to show landscape changes in the ore mining cave at São Gonçalo do Rio Abaixo municipality, Minas Gerais, Brazil. The peers suggested our presentation to be sent to the Danish company Geoboxers, who just modeled Denmark in Minecraft as games for change addressing the United Nations' Habitat III New Urban Agenda on Housing and Sustainable Urban Development. This confirmed the interest on the use of games for participatory planning, for instance "Geocraft" and "Play the City" in the Netherlands, "Geoboxers" in Denmark, "Geogames Team" in Germany, The "GeoGame project" and the "Geogames Lab" in the USA, and our own research group in Geogames at the Geoprocessing Laboratory[35] in Brazil.

2.10 #rememberme project

The twelfth overall activity was the "*Projektorientierte Recherche und designgenerierende Methoden*", at ViennaUniversity of Technology. The main axis was learning and applying the original approach "multidisciplinary Design Thinking" (mDT). Tellioglu (2016a, pp.3-4) states "mDT as a summary of several design methods accompanying a design process from the idea creation, through shaping and detailing design parameters, to the exact configuration and description of the properties of a system that has to be finally engineered".

The mDT approach[36] is a rigorous participatory explorative design framework composed by: ethnographic qualitative methods (like participatory observations, in-depth open interviews, data analysis); participatory information technology design such as cultural probes (to understand the cultural context of users); provocative requisites (to achieve provocation, ambiguity, inspiration in context); design games (as a playful way to gain design ideas), narrative posters (to tell the whole story on one sheet); design workshops (to be creative and explore ideas in a team); and technology probes (to get a hint about real life interaction) (Tellioglu, 2016b).

Our group presented one design idea to be developed further during the course. The idea had to be engineered as a device different from a mobile phone, and had to follow the theme "control". We presented two ideas, one related to a technology concerning urban control and another related to remembering daily life tasks. The teaching team directed the group to go towards the remembering idea, which became the "#rememberme"[37] project. The concept aimed to support people to remember not only their everyday life commitments and appointments, but also to enhance the storage and development of creative ideas. The highlight regards the "Design Games" stage (Wagner *et al.*, 2007; Brandt, 2006) of mDT, in which the group worked on creating several games to make the product playful, engaging and intuitive (Figure 14). The process was recorded in video for rigorous documenting.

Fig. 14: Design Games step of the *m*DT approach. Source: The author, 2016.

2.11 Quartier Macht Schule: Die Perspektive Der Kinder

The thirteenth overall activity was "*Fokus: Sozialer Raum und Diversität Kindheit und Raum*"[38], aimed to reflect critically upon the newest theories and concepts on the relation of children and space. We presented the book "*Quartier Macht Schule: Die Perspektive Der Kinder*" (Fritsche *et al.*, 2011), to critical thinking, a case study in Switzerland about children's cognitive mapping as a technique to reveal their perceptions of space mainly by the everyday life routes house-school. A paper[39] was the final assignment on childhood in the city, the development of mental mapping, and the use of technology for the embodiment of physical exploration of space.

2.12 "The Difficulty of Hidden Jewish Heritage", "Audio Guide" & "Geocaching Währing"

The fourteenth overall activity "Solidarity and the Making of Lived Heritage: networks, places and practices", concerned three assignments related to studying Währing neighborhood on everyday life, public spaces and lived heritage. The first one, regarded the creation of an innovative "Informed Walk" at Währing, through a gamification of traditional tour guides on the format of an Audio Guide[40] addressed to Jewish heritage. Although an audio guide was already innovative, the group[41] approached it differently by proposing an

exploration of the neighborhood following a fictional voice, perceptions and feelings of Egon Friedell. This idea referred to the "Magic Aros" game (the second overall activity), which used the concept of *genius loci* to bring back an important citizen of the past to talk about the future.

The second assignment was an essay[42] connecting the theoretical basis of the course with all the groups who worked in Währing, and the third one regarded the "Geocaching Währing game"[43], a treasure hunt game to provoke a playful exploration of the neighborhood using different senses. Hence, all four groups and its Informed Walks themes - hidden, intangible, living and intimate heritage - composes this game, using QR codes hidden in micro caches alongside their informed walks routes. The goal was to encourage the players to go on a journey of exploring and experiencing critical heritage and everyday life through all their senses.

2.13 Kinderarchitekt project

The fifteenth overall activity, concerned collaborations in the Austrian Tyrolean region with the Innsbruck University. It is justified because the research object of study in Brazil is a town named Tirol, settled by austrian migrants in 1859, in a mountainous region of Santa Leopoldina municipality, state of Espírito Santo. From these [44], two schools in Tyrol, and one in Vorarlberg, got interested on establishing a cultural values web between children in Austria and in Brazil. The starting activity was the "Message in a bottle", which contains ludic designs on children's perception and cognition, their towns cultural values and their vision for the city of the future.

The expected products are letters, drawings, photos, lyrics, music, paintings, and other cultural exchange. So far, the Schlitters *Volksschule* (school) in Tyrol presented the school in Brazil with some basic equipment to practice the "Floorball" sport, and now the Brazilian kids will send something back. Moreover, there are other Tyrolean sites with interest in composing the values web, such as Pozuzo in Peru, and Llanquihue in Chile. For this lived heritage that crosses the oceans and produces a microcosm from the macrocosm (Tyrolean heritage), the research of cultural values in common and in dissonance, fostered the creation of a new concept to address this issues, such as rural-urban interface and migrations, the "Elastic Heritage" (Andrade, 2017) (Figure 15).

Fig. 15: School in Tyrol, partner of the *Kinderarchitekt* project. Source: The author, 2017.

3 Final considerations

The matching Game Studies with Architecture and Urban Planning to elaborate the concept of Geogames was well received by almost all activities performed, and the incomes of this experience really qualified the research for diverse possible outcomes, especially related to innovative teaching and researching in Brazil. Other expected outcomes concerns the creation of a cultural values web between children who share this elastic heritage on Tyrolean culture, in Europe and in Latin America, to co-design of the city of the future using geogames such as Minecraft, and connect them with platform such as Second Life.

The key learning lessons regarding the study trip on games applied to architecture and urban studies, often called geogames (Poplin *et al.*, 2018), not only confirmed its potential to be used as a basis for learning about architecture and urban planning, and as a common ground basis for collaborative planning, but also as the core to shape the future of the city amongst citizen conscious about their cultural values. Game engines such as eAdventure and RPGMaker are powerful educational tools to teach children and youth about architecture and urban planning. As in the example of the TOOLKIT - a repository of games for learning -, there are many possibilities to use serious games in classrooms and also outside classrooms using applications for mobiles, or even online multiplayer platforms to widen the exchange.

Theoretically and conceptually, we define geogames as digital and non-digital games, individual or collaborative, anchored in a spatial context, created with georeferenced data and maps, favoring learning and design with ludic aspects. Another important characteristic concerns adding the dimension of cultural values as a factor of place-attachment, history and memory. This dimension supports learning lessons from the past and favoring a learning experience about the territory for all-ages throughout engaging their own representations and designs in the game ambient. In addition, geogames should favor, in a serious but playful way, decision-making and problem solving towards reaching the maximum consensus amongst stakeholders in urban planning.

The lessons learned from the study trip are summarized as follows. From the first activity, we learned some important theoretical references in serious games design such as in Adams (2009), and how to apply them into the actual design of the game using the eAdventure game engine, that does not require programming skills. From the second activity we learned about game jams - brainstorming sessions for rapidly conceptualizing and prototyping a game -, the potential to rethink traditional and famous games into specific purposes (in this case the urban theme), and how working on a multidisciplinary group with different backgrounds can be challenging, but fruitful for the game design process. Some of the prototyped proposed games have great potential to be developed further for learning, engaging and connecting citizen on conserving and valorizing cultural values in urban planning processes.

From the third activity, we learned how the physical experience is important on the process of participatory design, for instance using drama performances as a ludic and fun way to involve citizens into problem-solving processes in urban planning. This concept of "Theater of the Oppressed" could actually become a geogame. From the fourth activity, we got that programming a small and online game with JavaScript is not impossible to learn, and that there are references such as Egges (2014) that can be helpful. From the fifth activity, we learned how Minecraft could be used as a tool to co-design a building by a community, and the relevance of place attachment and heritage values in the process.

From the sixth, we were able to create and apply some card game concepts into a real-world issue, in that case, to solve human behavior issues within a multicultural community in the metropolitan region of Barcelona. From the seventh activity we applied geogaming concepts into Lego 3D as a tool for professors to teach their students a playful way to reach a maximum consensus on urban design using Lego bricks. From the eighth we learned new participatory digital and non-digital methods (*Esplorare, Ideare, Deliberare*) and instruments (Exploratory: teatro forum, world cafe; Ideation: open space technology, design studio; Deliberation: electronic town meeting, citizens jury) to conduct participatory workshops with youth, adults, and elders. The ninth, concerns the collaboration at the two-day Geodesign workshop to co-designing alternative resilient futures for Norcia, recently affected by an earthquake.

From the tenth we exercised how to build and structure a syllabus course around the theoretical and empirical basis learned so far in the study trip, to teach the same course online by skype in 2017/1 and in person in 2017/2, also as a way to compare and evaluate mine and the students' performance on the course. From the eleventh, we worked on modeling a Brazilian mining landscape transformation in Minecraft, in which the geogames course's students co-designed new architecture for a requalification of the previous mining area. From the twelfth, we learned and applied the mDT approach to building an electronic device to support everyday life remembering, enhance mindfulness and concentration.

From the thirteenth, we learned important references about the relation of child and the city, mainly understanding the concentric circles in which each child expands as they grow up. In addition, the challenge that emerged was how could technology enhance a faster and wider expansion of the mental mapping of the child. From the fourteenth, we learned the potential of using different aspects of the perception into a touristic walking that valorizes heritage values, even and mainly the dark ones in order to re-signify them. And from the fifteenth project we started to apply some of the concepts learned in the study trip to build a cultural values' web between children from different continents, aiming for it to go digital with online Minecraft on the co-creation of the Tyrolean city of the future.

The contribution of this paper relates to the development of the geogames' concept using a variety of game engines and game builders, to provoke a positive impact on the use of games to architecture and urban studies. Furthermore, the next steps of the geogaming approach is reframing the Geodesign methodology process to be suitable for children and focused on cultural values. Actually, it's about a gamification of the process, whether it includes games or ludic activities, digital and non digital. The final goal is that geogames become useful as a method and tool for co-designing future territories with children, as a ripple effect towards engaging the whole community.

After this, the geogaming approach might lead into mixed reality - where augmented and virtual worlds will collide -, rethinking mobile games such as Pokémon GO, in a way to encourage outdoor life, teach about the natural and cultural landscape, enhance everyday life and appropriation of public spaces with collective intangible values.

Acknowledgments

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1 The activities were held in different formats and countries, such as Estonia, Denmark, Netherlands, Portugal, Spain, Italy and in Austria, benefiting from a scholarship from the SMART² Project: SmartCities & SmartGrids for Sustainable Development - Erasmus Mundus Programme, for the Vienna University of Technology, at the Multidisciplinary Research Group, Institute for Design & Assessment of Technology, Faculty of Informatics. It is hence factual that the PhD mobility study program was the key to generate a multi-cultural perspective on geogames.

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8 The other three participants of the Urban Nebula group were Nadine Petersen, Troels Peter Jensen, and Julie K. Walker. Each member brought an expertise to the team, Pedersen brought qualities of organizing and structuring the work, Jensen brought digital tools to design the games, and Walker brought her writing skills for the storytelling. I as an architect and urbanist brought us all together within the urban theme and concepts for the game ideas, and designing all the 3D sketches and layouts in illustration software. The artist Wulfric Walker made the hand drawings for the group.

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