Tirolcraft: The Quest of Children to Playing the Role of Planners at a Heritage Protected Town

Bruno Amaral de Andrade(✉), Ítalo Sousa de Sena, and Ana Clara Mourão Moura

Geoprocessing Laboratory, School of Architecture, Federal University of Minas Gerais, Belo Horizonte, Brazil
{deandradebruno, italosena, anaclara}@ufmg.br

Abstract. The main goal of the article is to explore the potential of Minecraft as a platform to engage children into participatory planning. The game enables the players to easily design using blocks to build structures like houses, playgrounds, lakes, vegetation, agriculture, etc. The area of study is a town called Tirol, a heritage protected settlement built by austrian immigrants in the municipality of Santa Leopoldina, State of Espírito Santo, Brazil. This article advances on the state of the art by articulating the potential of Minecraft as a game-based learning into urban participatory planning with children as protagonists actors of rethinking the city. Also, the game enables children to design appropriating themselves on the concept of "child-friendly city" and discussing their design ideas with each other collaboratively. The results indicate that children can learn and work on a playful way to collaborate on urban planning processes, and widens open new researches possibilities.

1 Geogaming: Serious Games & Urban Planning

The development and application of Serious Games in Urban Planning are on its first steps, but have been through an exponential growth as means to help citizen enhance competences like playing the role of designers of their city. The central reference on the hybrid theme "Serious Games & Urban Planning" is Alenka Poplin[1], whose researches and publications helped and guided us develop our own research structure, like the new concept of *Geogames* (Vemuri et al. 2014).

Hence, this article aims to explore the potential of Minecraft as a serious gaming platform to acquire knowledge to engage civic participation on redesigning the place, especially giving the children a leading role. The participatory design was conducted through an intuitive psychogeographic input of non-expert users, and as a digital instrument we used an existing game to get straight to the planning phase.

[1] Assistant Professor, Department of Community and Regional Planning, College of Design, Iowa State University. Research interests: GeoGames for urban planning & Serious games for civic engagement, User experience with interactive maps & GeoVisualization.

M. Ioannides et al. (Eds.): EuroMed 2016, Part I, LNCS 10058, pp. 825–835, 2016.
DOI: 10.1007/978-3-319-48496-9_66

With the support of free and open source software *World Painter*[2] and *MicroDEM*[3] using real world data of the study area to analyze and visualize a territory model to export to Minecraft. Then, in Minecraft there was an opportunity to provide learning processes and rapid meaningful feedback. This experience was an opportunity to come up with important analyzes in co-creating personalized and pervasive games for planning.

Therefore, elects an empirical approach as a concrete-object, the town of Tirol, in Santa Leopoldina, State of Espírito Santo. First, we built a digital elevation model of the territory and then make it thematic with anthropic and landscape elements. With the modeling of a real case study on a virtual platform, seeks an empathic relationship of the children with their territory so that they feel engaged to perform specific interventions, where their range of scale reaches, for example, the home to school route, and other routes and places they visit constantly (Poli 2006).

Furthermore, this article also seeks on a broader perspective come up with relevant questions that will be pursued during the sequence of the research in geogames, such as: How could geogames better work on benefiting citizen on knowledge and awareness about the territory? Serious games as a game-based learning can really be a more attractive instrument to participatory design? What are the stories of games that best fit children's participation in urban planning? What kind of a pilot geogame be like to reach and attract more engagement and participation of social actors?

2 Serious Games and Geogames

Vemuri et al. (2014) expatiating on the differences between the concepts of games, serious games and geogames. The last one that interests us the most for this article is conceptualized as serious games focused on learning about the territory and the different ways of representing and visualizing it in a game-based environment. The authors refers by the same tolken of the concept of geogames to Ola Ahlqvist[4] and Christoph Schlieder[5], who conducts researches on geogames, extolling the movements of players involving locomotion and thereby the physical effort characteristic of any sportive activity as a missing element in interactive console games. Interestingly, Schlieder et al. (2005, p. 168) defines what is not a geogame, that is "(…) games that do not satisfy the spatio-temporal coherence constraints in which resources magically jump around the board – are not geogames".

[2] Available on http://www.worldpainter.net/, accessed in 20 May 2016.

[3] Available on http://www.usna.edu/Users/oceano/pguth/website/microdem/microdem.htm, accessed in 20 May 2016.

[4] AHLQVIST, Ola; SCHLIEDER, Christoph. Geogames and Geoplay Game-based Approaches to the Analysis of Geo-Information. "GeoGames – a virtual simulation workbench for teaching and learning through real-world geography". Available on http://geogame.osu.edu/, accessed in 18 May 2016.

[5] Assistant Professor of Computing in Cultural Geosciences, Head of the Geogames Team, Laboratory for Semantic Information Processing, Otto-Friedrich-University Bamberg, Germany.

Basically, the goal of geogames is to be one or a series of decision-making game-based models capable to support participatory processes in urban planning (Tóth and Poplin 2014).

3 Why Use Minecraft as a Game-Based Learning Tool?

Until August of 2016 Mojang, company that developed the game, has sold more than 24 million Minecraft (PC version), what shows the importance of this game in the world scene. This success is primarily related to the possibility of the player interact with digital world on an experience to build or destroy anything. This characteristic also make this game an endless one, leading to an infinity of possibilities. The block logic brings to the player an experience of endogenous connection to learn, when the environment drives the player to explore the territory to gather supplies from the nature and build structures like houses, castles, mines, vegetation, etc. These aspects of the game have an intrinsic potential to a game-based learning, because of the way that the player interact with the environment.

Colin Gallather organized in 2015, with others teachers, a manual that shows how Minecraft could be used in classrooms. They explain that this game develop concepts like creativity, collaboration (in multiplayer online servers), digital citizenship, fun, leadership, differentiation, engagement, independence, also others aspects of the learning process. Sean Dikkers (2015) published a book called Teachercraft, where he explains the possibilities of applying Minecraft in educational approach, exploring the usefulness of the game in the knowledge-based students' formation, but also in the approximation of the teachers with the digital environment. This potential shows that Minecraft also can be used as a tool to develop others topics by the flexibility of the game structure logic.

4 Why Tirol in Brazil to Play a Participatory Game with Children?

The reason of choosing Tirol as the study area is in the fact that the municipality of Santa Leopoldina be a territory of heritage interest, for having an architectural and urban perimeter protected by the State Council of Culture, and farms buildings of sugarcane and coffee cultures from the nineteenth century in the rural areas, such as Tirol. It is done both a justification through analysis of historic cartography mapping, referring to the territorial cycles that shaped the palimpsest of Santa Leopoldina, and the emergence and consolidation of immigrants occupying cores not Lusitanian, in particular Austrians in Tirol (Andrade 2012).

From the standpoint of the cartography analyses (Fig. 1), the black color highlights the area of the Imperial Government's project delimitation called Colony of Santa Leopoldina, and the stars in yellow demarcate and reveal the names of the countries of origin of immigrants, from top to bottom, there is *Luxemburgo*, *Pomerania*, *Tyrol*, *California* e *Hollanda*. In fact, the urban center of Santa Leopoldina is outside the area delimited for the colony, thus raises the hypothesis that the city center is built to give

privilege to the Luso-Brazilian residents for commercial uses, while rural areas were reserved to non-Lusitanian immigrants as specified above. This hypothesis can be confirmed in the contemporaneity according to the architectural legacy and diffuse settlement in the region, related to the former colony (now splitted in various municipalities, one of them still keeps the name of Santa Leopoldina), so that the immigrants cultural heritage is located mainly in rural areas, just like Tirol (Andrade 2015).

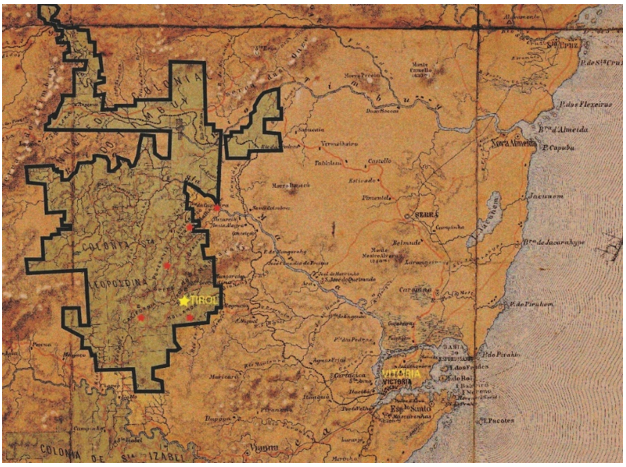

Fig. 1. Tirol's location (in yellow) in the municipality of Santa Leopoldina, State of Espírito Santo, Brazil. (Color figure online) Source: Adapted from Planta da Parte da Província Espírito-Santo, 1978 (Andrade 2015).

Data updated by the IBGE[6] (Instituto Brasileiro de Geografia e Estatística) shows that the municipality of Santa Leopoldina has an estimated population of 12,885 inhabitants, in 2015, a territorial area of 718.097 km^2, and a population density of 17.05 inhabitants/km^2. According to the IBGE 2010 census, 21.5 % of the population lives in the urban center, and 78.5 % live in the rural area (Fig. 2).

This reasoning justifies the interest of this study in the town of Tirol, based on the assumption of its notorious landscape, its singular history, its citizen, and its now-a-days problems like the rupture of cultural values and consequently a population exodus (Andrade 2015). That are, therefore, why we chose to work with the children as social actors who has the potential to be empowered to *Geodesign* (Steinitz 2015) alternative futures to solve the struggles of Tirol.

[6] Source http://cidades.ibge.gov.br/painel/painel.php?codmun=320450, Accessed in 11 July of 2016.

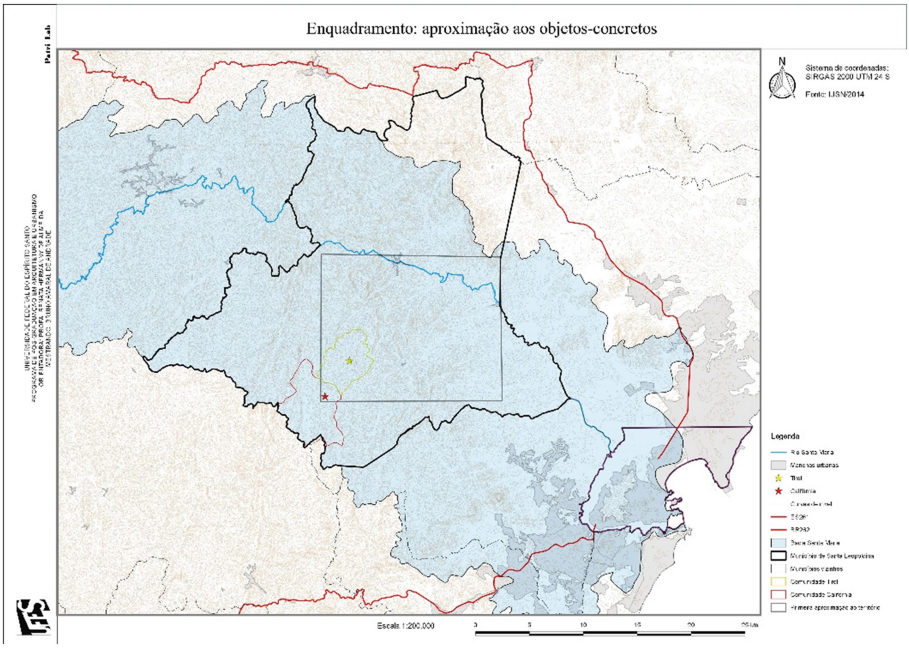

Fig. 2. Tirol's location. Source: Andrade (2015, p. 54)

5 Tirolcraft: Children's Participatory Design

The activity is developed at the Tirol School for children from pre-school until the fifth year of the fundamental school, about 04 to 11 years old. We worked with all the students, which are 30 students divided in two groups: the pre-school and the fundamental school. The methodology steps followed: (1) Presentation of the Minecraft game and its functionalities; (2) The objective of the activity: "Redesigning Tirol"; (3) One by one every student played the game an put one's own spin on it; (4) Final discussion of the projects and what could really be done in Tirol.

The step 1 of the method we designed in the game some structures using blocks, we showed how the game works and the principal functions of using it on a computer, which is different from when you play the game on a video-game console. The step 2 consisted in explaining carefully the main objective of this experiment that is Redesigning Tirol as they would like to see it become. We explained that they could relate some structures as it is presented now, or was settled historically, or they could propose something new. The step 3 allowed every student to play the game and build something ones though it could be built in Tirol to make a better place to live, always trying to show them how important it is to think and design collectively to reach a maximum consensus as it is possible. The step 4 we provoked a discussion about the results of their interventions in the place, what they really thought it could be built and how the community would have liked it. In addition, we asked which one of the

designs made would be their priority, so that they could start mobilizing the community to start a movement to bring the game to reality.

The first group was the pre-school one, composed by 12 students. Surprisingly they have shown a good exploitation of the game, since the attention to the initial presentation and as long as the activity flowed. Which makes us think that we really cannot judge a younger child to reaching the goal of a geogaming activity, although the territorialist school tells us to work more with children between 9 and 12 years old (Poli 2006) (Fig. 3).

Fig. 3. Pre-school children playing Minecraft

In the meantime, of the development of the activity, the pre-school children got distracted, because of the availability only of the researcher's notebook. The five computers that the informatics laboratory has only one works but it does not have the minimum capacity to play Minecraft, and the other four are new but not working. Besides, we had to play offline, because the school does not have internet anymore, and the one they had the professors told us it had a bad speed quality (Fig. 4).

Henceforth, some of the projects that the pre-school children projected were (Fig. 5): (a) buildings with materials coming from the local environment, like wood and stone; (b) playgrounds with equipment for playing activities; (c) lakes; (d) cavern; (d) square in front of the school and the church, with lake, trees, flowers, animals, and a child playground.

Fig. 4. Children getting distracted by the fact of having only one computer to play

Fig. 5. Minecraft design made by pre-school children

The second group was the fundamental-school one, composed by 18 students. They have shown a desirable exploitation of the game, and have made some very interesting suggestions, collaboration to each other ideas and most importantly designs. They did not show any issue on non-concentration like the pre-school ones.

Henceforth, some of the projects that the fundamental school children projected were (Fig. 6): (a) new buildings like a bigger school; (b) vegetation trees, and gardens with flowers; (c) cavern; (d) a new square in front of the school and the church, with lake, trees, flowers, animals and child playground with a places for bicycle, rollerblades, kick scooter, and skate (Fig. 7).

Fig. 6. Fundamental-school children playing Minecraft

6 Final Considerations and Further Research Steps

First of all, it is incredible how children can quickly learn a game, by its inherent motivational aspect of being fun, other than being an innovative method of teaching at school, the fact that their own territory is modeled urging an affective reaction concerning the place as it matches their own mental maps, and the empowerment aspect of decision about future scenarios for their town.

Notwithstanding, some of the ideas of the Tirolcraft experiment remained only on the discourse, like the will to design paved streets and sidewalks, a big square to reunite the community, a shopping mall, and an amusement park. Speaking of that, in Tirol

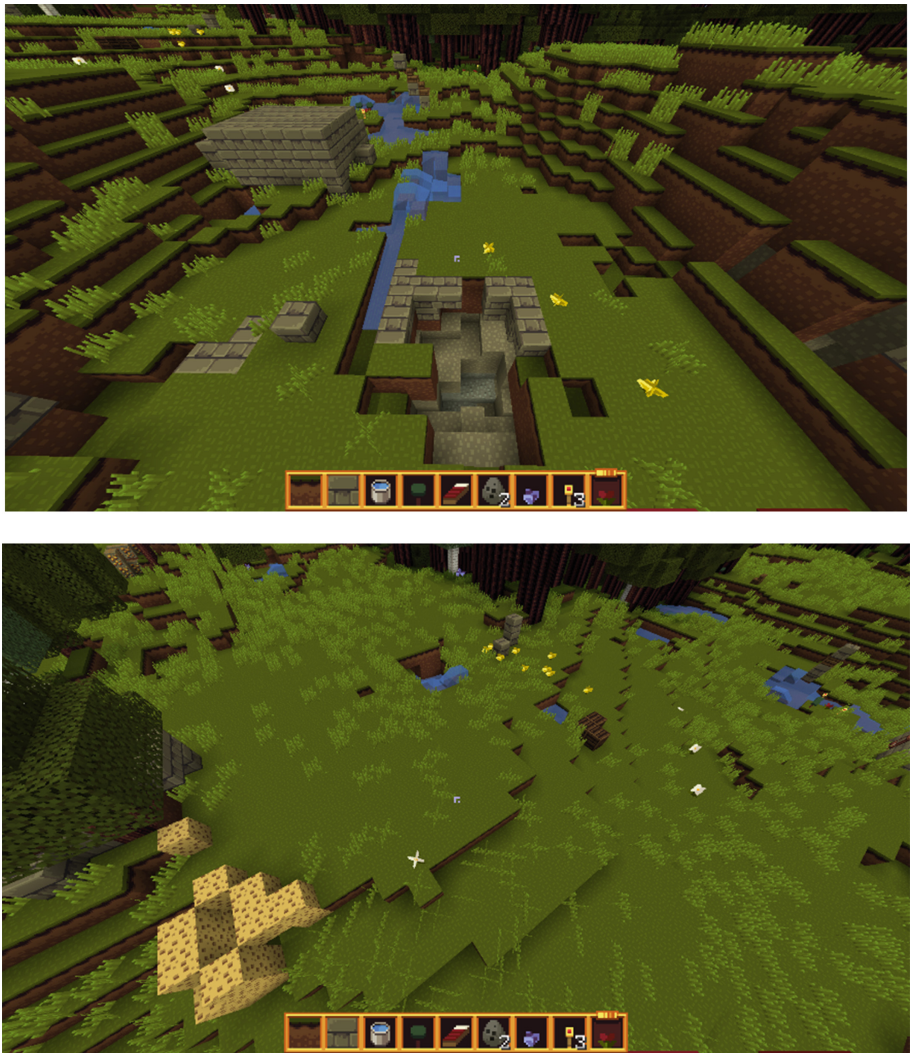

Fig. 7. Minecraft design made by fundamental-school children

there are almost no pavements, most of it are still on dirt roads with no regular maintenance. Which could be explained that as much as they would take the game seriously on a specific purpose, the fun aspect, the innovation activity at the school, and the fact that most of them never played Minecraft were distracting for them.

On a broader perspective, the development and application of this methodology, technology and model aims to favor cultural landscape maintenance, both by identifying heritage values and developing civic consciousness. This first step of the approach is to strengthen the involvement of the children, to listen and hear them, as a way to approximate to the whole community. Then it becomes possible to the next step

on a game-based learning approach to rebuild digitally the cultural landscape and lead the community to identify values for furthering guidelines and best practices related to spaces for protection and planning. Hence, this second step relates to the following works in progress provisionally entitled "3D Virtual Cultural Landscape Navigation of Tirol" and "The Sticker Album of Tirol".

Concerning the questions that moved us to this experiment, geogames appears to better work, both from this experiment with children and from the lessons learned specially from Alenka Poplin, when it has a playful environment with a tight objective focus. Alongside, game-based learning could be a powerful instrument to be used on participatory design regarding its engaging flavor. The stories to be told on a game seems to be on the direction of best representing and visualizing a real world case study, with elements that come from mental maps of the local community.

Overall, it was a successful experiment since the modeling using mostly free and open source GIS software, although some adjustments had to be made like fixing from inside Minecraft the smaller parcel of the center town, the location that they have in domain in their mental maps. The children showed and proved to be relevant social actors to be considered in urban planning processes coming up with ideas, even detailed ones, from a delicate perspective that could enrich a participatory design of a place.

Finally, a geogame pilot that could be developed to reach and attract more engagement and participation is one capable of engaging and motivating the citizen on a real world tridimensional modeling. Adding the most elements as possible from mental maps of its own community, like even sounds of the place, real people dialogues, little quests to best known and recognize the place. The format should be one played on various digital devices, with the social actors online being able to talk to each other and find a consensus to reach at the end of the process alternative futures for their city.

References

de Andrade, B.A.: Uma rota patrimonial para o rio Santa Maria da Vitória, como instrumento de conservação, valorização, requalificação e/ou transformação do patrimônio territorial. Graduation Thesis, Department of Architecture and Urbanism, Federal University of Espírito Santo, Vitória, Brazil (2012)

de Andrade, B.A.: Representando o Patrimônio Territorial com tecnologia da geoinformação. Experimento em Santa Leopoldina, Espírito Santo, Brasil. Master Thesis, Post-Graduation Program in Architecture and Urbanism, Federal University of Espírito Santo, Vitória, Brazil (2015)

Poli, D.: Il bambino educatore: progettare con i bambini per migliorare la qualità urbana, p. 270. Alinea Editrici, Florence (2006)

Poplin, A.: Games and serious games in urban planning: study cases. In: Murgante, B., Gervasi, O., Iglesias, A., Taniar, D., Apduhan, B.O. (eds.) ICCSA 2011. LNCS, vol. 6783, pp. 1–14. Springer, Heidelberg (2011). doi:10.1007/978-3-642-21887-3_1

Poplin, A.: Digital serious game for urban planning: "B3 – Design your Marketplace!". Environ. Planning B Planning Des. **41**(3), 493–511 (2014). Pion Ltd., London

Poplin, A.: Playful public participation in urban planning: a case study for online serious games. Comput. Environ. Urban Syst. **36**(3), 195–206 (2012). Elsevier

Schlieder, C., Kiefer, P., Matyas, S.: Geogames: a conceptual framework and tool for the design of location-based games from classic board games. In: Maybury, M., Stock, O., Wahlster, W. (eds.) INTETAIN 2005. LNCS (LNAI), vol. 3814, pp. 164–173. Springer, Heidelberg (2005). doi:10.1007/11590323_17

Steinitz. Um framework para o Geodesign. Alterando a Geografia através do Design, p. 208. Esri Press, California (2015)

Tóth, E., Poplin, A.: ParticiPécs – a cooperative game fostering learning about the built environment and urban planning. In: 17th AGILE Conference on Geographic Information Science (AGILE), Workshop Geogames and Geoplay, Castellón, Spain (2014)

Vemuri, K., Poplin, A., Monachesi, P.: YouPlaceIt! a serious digital game for achieving consensus in urban planning. In: 17th AGILE Conference on Geographic Information Science (AGILE), Workshop Geogames and Geoplay, Castellón, Spain (2014)