

Planning of public open spaces with digital tools. The example of the WAY CyberParks

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Abstract - The aim of this chapter is to discuss how digital technology can assist public open spaces' planning processes. It is centred on the opportunities that digital technology offers to aid spatial planning, by introducing the monitoring tool WAY CyberParks, developed and tested within the CyberParks Project. This digital tool intends to increase information and knowledge about places in order to create more inclusive public spaces that correspond to the needs of their users. The digital tool, developed to monitor how people use public spaces and as an exchange interface between users and planners, increases the understanding of users' needs and preferences. The challenge is to attract users to engage with the app during their visit to public spaces and define the number of users required to obtain a representative sample. One of the main objectives of this digital tool is to allow strong public participation, therefore users' opinions should be representative. As a result, WAY CyberParks intends to be a tool to be used by planners in the co-creation of public spaces. The analysis of the tests of WAY CyberParks in Lisbon serves to demonstrate the features of this tool and the type of data gathered. This chapter makes an analysis of the strengths and weaknesses of this tool, and the advantages of using digital tools in the processes of planning and co-creating public open spaces.

Keywords - Public open spaces, WAY CyberParks, digital public participation, co-creation of public open spaces, urban planning

INTRODUCTION

This chapter analyses how digital tools can be used to increase public participation in public space planning. It is not a comparison between tools and their usability, but rather a discussion about some results obtained in the scope of the ongoing research work for the doctoral thesis “The importance of digital tools in the co-creation of public open space - the case of WAY CyberParks,” developed by Tiago Duarte. The research aims above all to critically analyse the potential of a specific tool, WAY CyberParks. This tool was developed under the COST Action TU 1306 CyberParks, which fostered knowledge about the relationships between people, ICTs and public spaces, supported by strategies aimed to improve their usability and attractiveness. CyberParks was established as an interdisciplinary research platform that included the collaboration of different working groups to understand the relationship between ICTs and the production and use of public open spaces as well as their relevance to urban development. The Way CyberParks is developed by DeustoTech-Mobility in Bilbao and tries to respond to the needs of researchers and planners to collect the “feelings” and contributions of people in creating better public spaces. Throughout this chapter, a brief description of WAY CyberParks will be given, in order to demonstrate its potential. The results obtained in a workshop carried out in the Mouraria neighbourhood in Lisbon are considered and analysed. Finally, conclusions about the advantages of the use of this digital tool in the process of co-creating public spaces will be presented.

With the opportunities created by digital tools, it is important to understand if they can replace the traditional methods of public participation. Bearing in mind that public spaces play an important role in the interpersonal relations, for friendship and sharing of knowledge and experience (Gehl, 2017), it is useful to rethink urban planning in terms of a more participatory and inclusive perspective through digital tools. From this perspective, the production of public spaces should encourage and enable people to actively participate in the planning process, from the development of a concept to an action plan or to the maintenance of the place. The “New Charter of Athens”, revised in 2003 (Conselho Europeu de Urbanistas, 2003), refers specifically to the use of new information and communication technologies (ICTs), arguing that cities should be physically and virtually connected. Furthermore, the Charter argues that technological developments in communication, information and transportation should benefit citizens and the city as a whole. Currently, our society is organised around technological developments, generalised internet access being an example. The new means of communication have greatly changed the quantity, quality, and speed of information transmission. Associated with a general scarcity of basic information in urban planning, the new digital research forms enable a better understanding of the territory (Frota, 2015).

THE WAY CYBERPARKS DIGITAL TOOL

Nowadays it is quite common to see people using digital communication devices, such as smartphones and tablets, in public spaces. Among other things, these devices enable them to send and receive calls and emails, to take pictures and make movies, for entertainment and leisure (reading or play) and socialize (interactions). Our day-to-day life is endowed with instruments that allow us to access quickly, and in a relatively easy manner, information that would otherwise take more time to obtain. It is through the use of these new tools that a challenge arises for the different experts interested in the production of urban spaces, namely, to increase the knowledge about how to promote these new forms of communication as tools to support decision making in planning, producing and maintaining public spaces (Smaniotto et al., 2015). These new forms of interaction can facilitate the collection of data about public space users, i.e. data to identify people's opinions and needs regarding such spaces, contributing to the adoption of creative solutions and/or forms for maintenance of spaces that meet people's needs. In order to follow this path, it is necessary to equip the digital tools to carry out this task meaningfully. Having better knowledge of the spatial needs/preferences of users can aid the finding of solutions that are capable to increasing the quality and usage of public spaces.

It is also important to compare different research methods (traditional and digital) and evaluate their merits and drawbacks, i.e. paper- or web-based questionnaires or interviews. The possibility of collecting data faster, as well as greater independence of the respondents, with more privacy, without anyone conditioning opinions, are great advantages. Also, smartphones are becoming user-friendlier, so that people can be approached to share ideas and opinions about urban space in entertaining and/or informal ways. In addition, given the current challenges posed to the urban society, i.e. time scarcity for leisure, social exclusion of specific groups (e.g. seniors, immigrants, etc.) to mention only a few, it is essential to create spaces that not only bring more people outdoors - to an open and healthier environment, but also that such contexts be more inclusive and fit users' needs better, for example, countering people's tendency to stay indoors, often connected to a virtual world but not to the real city. Summing up, we must strive to find answers to the question, as put by Thomas (2013) how "can we capitalize on our newly discovered love for wired-life to encourage more people to go outside and use the city?"

The Digital Tool WAY CyberParks allows researchers to inquire into the perceptions of public spaces. It consists of three main elements: a mobile application for smartphones (app), a set of web services, and the cloud. This tool is part of the broader research programme WAY (Where Are You?) of DeustoTech-Mobility (Bilbao) which proposes to develop mobile applications to continuously support people's location and orientation, regardless of the environment. WAY CyberParks

was tested in several countries associated with the CyberParks Project. In Lisbon, this tool was applied in different contexts in the Quinta das Conchas Park, in Príncipe Real Square and in the Mouraria neighbourhood. Studying these places in Lisbon is part of the above-mentioned doctoral thesis. This chapter focuses on the results obtained in Mouraria.

The application, available in IOS e Android versions, offers its users some services: obtaining information about a space, previously loaded and made available by points /places of interest; visualizing their own position and the location of the points of interest by real time map navigation. This latter feature is common to many applications, but in WAY CyberParks it is enhanced by the possibility of including quizzes, whit questions arising in specific locations. The tool also provides a suggestion box, where a user can freely upload an audio, image or video file and/or make text commentary, making it possible to collect geolocated information, opinions and perceptions. On the Android platform, a virtual reality service is available, and it is possible to include three-dimensional virtualised elements, allowing the visualization of equipment proposals to be placed in the public space, as well as gather opinions about them. It should be noted that the application can be used online or offline; the latter involves the need to upload the information collected to the web platform when the application is connected. In the offline mode, some features have limited functionality.

The web platform enables different types of information generated by the app to be analysed, such as the real-time position of users and their routes, also in terms of their duration and distance, the weather conditions, as well as users' suggestions and responses to questionnaires. The transmission of information between these two elements (mobile application and web platform) is performed automatically through the cloud. The potential of the system results from the combination of the mobile application (app) - more directed to the user - and the web platform that hosts the database which allows data to be collected, stored and read, as well as information - more targeted at the investigator/planner – to be uploaded. The web platform, where the collected data is stored, enables different types of analysis - global analysis and/or by type of information, such as by user profiles, by date, time or period of the day, weather conditions, as well as the analysis of suggestions and answers obtained. In the case of users, as they fill out a profile form when they first access the application, the analysis can be done by age group, gender, schooling level, training area, profession, place of employment and residence.

The WAY CyberParks app enables planers to obtain the opinion of different users on specific issues related to a public space. The advantage of an application of this nature is related to (1) real-time data gathering, (2) maintaining an updated database, (3) capturing the different users' activities in the same space, and (4) recording their opinion, via geolocated texts, videos or images. The analysis of the collected information through the mobile application enables planners to obtain better

knowledge about the use of the space, as well as users' opinions and suggestions regarding said space. The quality of the collected data contributes to enhance scientific knowledge and to improve methodologies of participatory planning. At the same time, it helps to enrich planning practices and policy making – now more grounded on people's interests and needs.

WAY CYBERPARKS WORKSHOP - AN EXPERIENCE IN MOURARIA

On June 15, 2017, as part of the European Researchers' Night and in the scope of activities prior to the event, the workshop entitled “WAY CyberParks app – Science in Lisbon”, organized jointly with the CyberParks Portuguese team, took place in the Mouraria neighbourhood. The main objective of the workshop was to test the WAY CyberParks app, using a new location. The results obtained were processed, analysed and presented at the event. The workshop was attended by 20 participants who, in groups, used the app. Prior the workshop, some preparation tasks had to be carried out, i.e. the delimitation of the area to be studied, defining and locating questions that we would like to have answered, as well as adding the places of interest. The placement of this information was based on site visits for its analysis.

The workshop started with a short presentation of WAY CyberParks, and its purpose, as well as of the CyberParks Project. The participants were informed about the area covered by the workshop / app test, which did not correspond to the entire area of Mouraria, due to the limited time available. The participants were told to use the neighbourhood in the same way they would normally do, and to extensively make use of the suggestion box. The purpose of this workshop was to test the WAY CyberParks app and its functionalities and to take advantage of the opportunity to participate in the European Researchers' Night, in order to encourage greater dissemination of the project and of the digital tool. The data collected are as follows: 1) Track of each user's route(s), 2) Information uploaded in the suggestion box, 3) Answers to a questionnaire on the space visited, and 4) Paper questionnaire on the applicability and user-friendliness of WAY CyberParks.

In Lisbon, this kind of workshop had been used previously, also within the framework of the activities related to the European Researchers' Night, in Quinta das Conchas Park. Duarte and Mateus (2017) address the results of the app test in Quinta das Conchas. Backed by the experiences and the results obtained, it was possible to establish again more aspects to be improved in the digital tool. Among them, there were some related to the app features, as some small shortcomings had been detected, like for example the way notifications for the questions popped up, and the type of information placed in the Pls. Another issue was the number of questions in the questionnaire, which was considered too long.

This type of research tool needs continuous upgrades, in order to adapt it to the objectives or requirements. In the case of WAY CyberParks, this has been the subject of improvements based on different field tests, such as in Fòrum de les

Cultures and Carrer d'Enric Granados in Barcelona in 2014 (Duarte, 2014), where some flaws were identified. Only with such tests was it possible to bring the app closer to the conditions necessary for effective use and for meaningful data collection.

The routes of each user

Through the use of the GPS receiver incorporated in a smartphone, WAY CyberParks is able to record the route of users (tracking) in a public space. This function increases understanding of how people use the space, which routes they take, the distance covered and its duration. Fig. 1 shows a screenshot of the web-service of WAY CyberParks showing different users and their routes during the workshop.

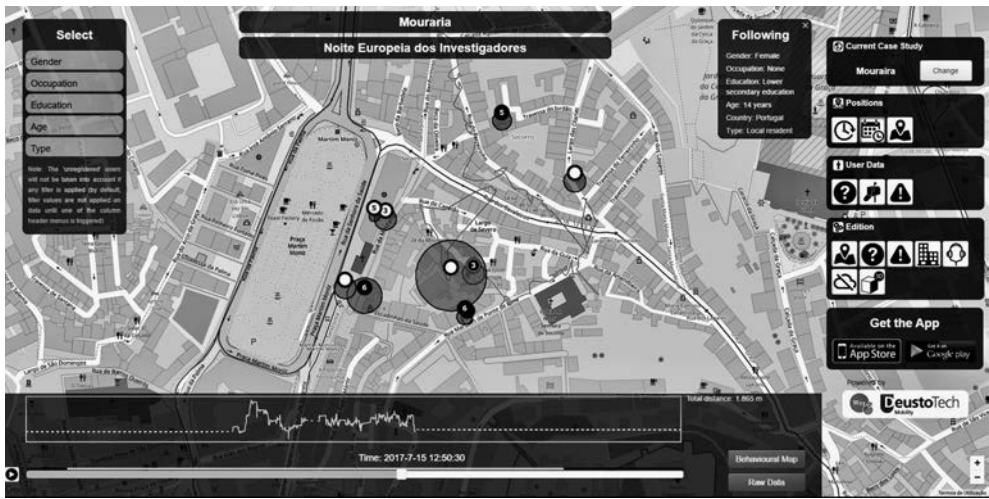


Fig. 1: Screenshot of WAY CyberParks, showing users' tracks and distances covered. Source: <http://services.cyberparksproject.eu>.

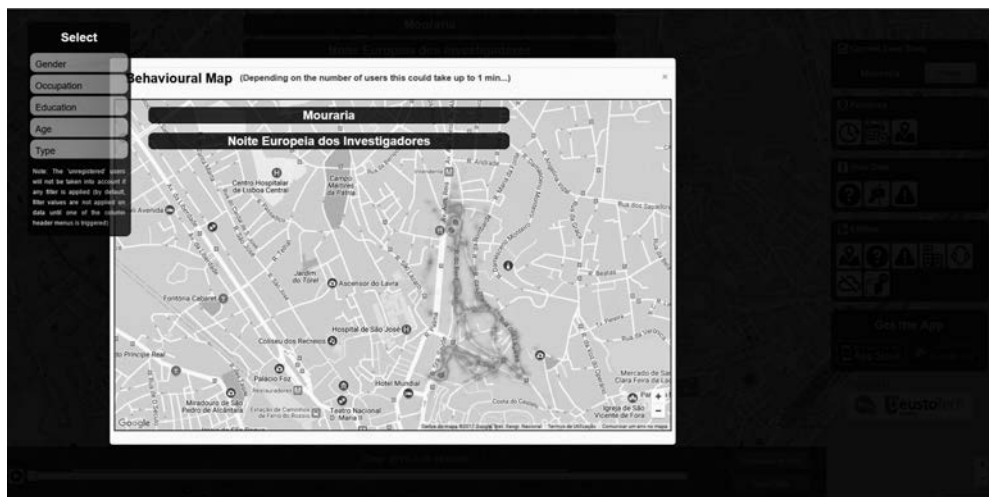


Fig. 2: The behavioural map. Source: <http://services.cyberparks-project.eu>

On the website, it is possible to see all routes, duration and distances of the journeys of the different users. Since they were included in a workshop, the time limit, distances as well as the range of action turned out to be very similar. The behavioural map (Fig. 2) indicates the places with the longest stay.

However, even with these small constraints, an analysis of the obtained results - to verify the potential of the application - could be performed, as planned. Regarding the features, the findings do not reveal divergences with the outlined objectives, but they reinforce the great possibility of analysing different routes without the need for users to take specific care. It is only necessary for the app to be on.

Information placed in the WAY CyberParks suggestion box

At the Workshop, the participants were encouraged to use this functionality in order to provide suggestions as well as indicate the strengths and weaknesses observed. In total, 61 suggestions were sent, a figure that was very relevant to the number of participants, and these allowed us to gauge the app's functionality. The sound feature was used only once, and only three videos were uploaded. Sending suggestions was done mostly through text and image, and the use of text and image in the same suggestion was the most commonly used option. Fig. 3 depicts an example of a suggestion made using text and image.

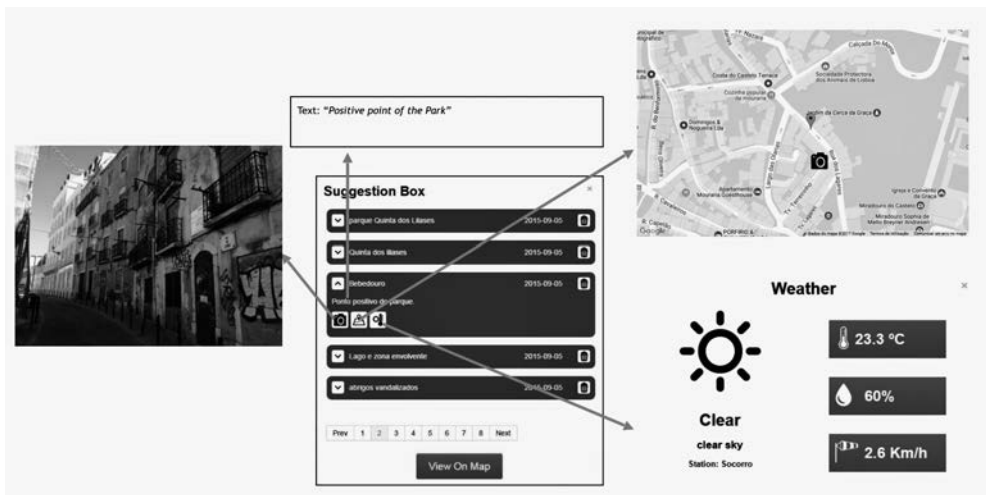


Fig. 3: Suggestion box elements. Source <http://services.cyberparks-project.eu>

WAY CyberParks follows the trend of geolocation entrenched in mobile applications. For all suggestions sent to the web services, it provides georeferenced data as well as the weather conditions at the time of submission. This functionality has enormous potential, since it allows gathering different opinions, providing their exact location and weather conditions without forcing the researcher to be present in the space. The type of suggestions may be as diverse as possible. In the case of this

workshop, the participants were asked to send suggestions related to the app, as well as identify positive and negative aspects in the urban space. Regardless of the goals, the app is so assembled that it enables getting answers. This is undoubtedly an important feature of WAY CyberParks: being dynamic in order to be able to gather different types of information according to the research needs. This kind of information can be also obtained by traditional research methods, i.e. using interviews and paper-based questionnaires, but the app allows, first, a great number of entries, and second, more relevant, it facilitates the analysis of data. It also allows a more effective response to specific data privacy issues, since the data collected is not personalized, while in traditional research method the respondent is inevitably faced by an interviewer.

WAY CyberParks’ questionnaire about the visited space

Another example of a dynamic component of WAY CyberParks is related to the possibility of asking questions about the urban spaces, questions that are automatically displayed when the user is within range of the previously defined. This functionality is an asset in collecting opinions on public spaces and can be a fast and effective way to interact with users. In the Mouraria workshop, the set of locations and the related questions to be put to the participants were defined in a previous site visit. These questions are mostly related to the characteristics of and personal opinion about the urban space. The questions that were asked and that were intended to be answered can be found below.

Question	Location	Answer Options
Did you already know this area?	Intendente Square / Benfornoso Street (beginning of the course)	Yes/No
If your answer is 'yes': do you come here often? If not, why not come here before?	Intendente Square / Benfornoso Street (beginning of the course)	Open answer
Please state why you chose this route?	Olarias Staircase	Already Known/ Curiosity / Transit / Other / I don't know
What is your opinion about this place?	Mural in Benfornoso Street	Rate out of 1 to 5, where 1 is uninteresting and 5 is very interesting
Do you consider the noise level here uncomfortable?	Olarias square	Rate from 1 to 5, where 1 is a bit annoying and 5 very annoying
What do you think of this intervention in urban space?	Corner of the Travessa da Paz (urban furniture - table and benches)	Rate out of 1 to 5, where 1 is uninteresting and 5 is very interesting
How satisfied are you with the sidewalk?	Agostinho de Carvalho Street	Rate 1 to 5, where 1 is unsatisfied and 5 is very satisfied
What is your opinion about Tuk Tuks in Mouraria?	Santo André Street	Rate out of 1 to 5, where 1 is uninteresting and 5 is very interesting
How do you rate the interest of this place?	Square next to the Três Engenhos-Alley	Rate out of 1 to 5, where 1 is uninteresting and 5 is very interesting
Do you think there should be more playground equipment?	Playground on the Capelão Street	Open answer

Question	Location	Answer Options
What do you think about the contrast between the new and the old?	Crossing of Capelão Street and Mouraria Street	Rate out of 1 to 5, where 1 is uninteresting and 5 is very interesting
Which are the 5 highlights of great interest in your route?	Mouraria Street (end of the route)	Open answer
Which are the 5 highlights of little interest in your route?	Mouraria Street (end of the route)	Open answer

Table 1 – List of questions placed in the WAY CyberParks app for the Mouraria Workshop

The content of the questions was very diverse, as well as the possibilities for answering them. For some questions, the opinions could be valued on a graded scale from 1 to 5, others were open, for sending texts or simply typing yes or no. The app enables users to ask questions through existing forms, and the way the answers are to be delivered has to be defined. For these questions it is also possible to define the range of action that meets the planned goals. Only within this radius do the questions pop up to be answered by the user. Fig. 4 shows an example of the results obtained in one of the questions put in Mouraria. It is the question launched at the corner of Travessa da Paz, and it asked participants to give their opinion about pieces of urban furniture recently placed there. The features of Travessa da Paz, with the sidewalk and the street furniture, are shown in Fig. 5. The graphic is generated automatically by the web service. Through it, it is also possible to filter the answers using different parameters such as age, gender, and/or neighbourhood of residence, for example.

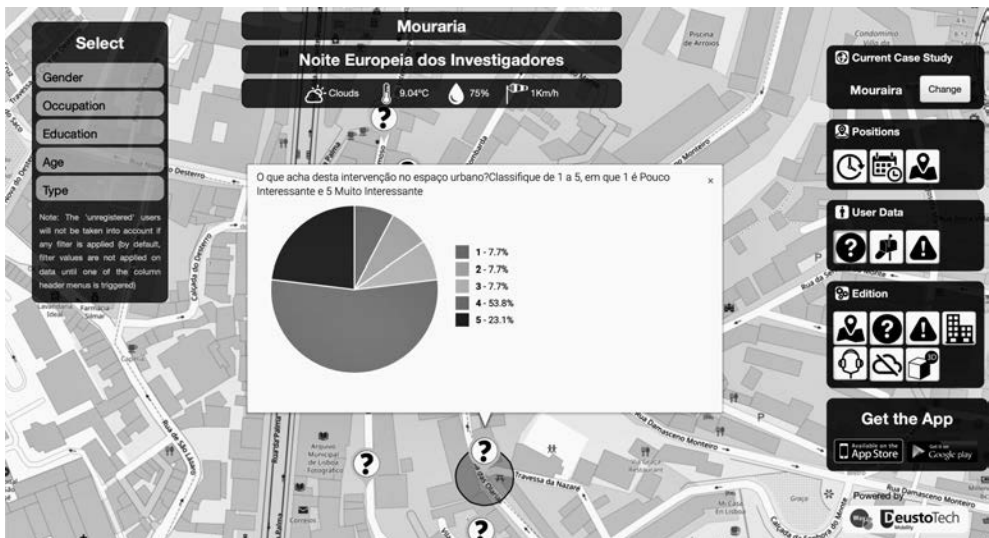


Fig. 4: Answers obtained to the question "What do you think of this intervention in the urban space?" placed at the corner of Travessa da Paz. Source: <http://services.cyberparks-project.eu>



Fig. 5: Corner of Travessa da Paz. Source: Tiago Duarte.

Selecting the question about Travessa da Paz is linked to a recent urban rehabilitation project by the city council in this street: A set of tables and benches were installed on the broad sidewalk to invite people to prolong their stay in the area. The majority of participants considered this intervention “interesting” and “very interesting”, evidencing the positive changes in this place. This question also demonstrated that such a tool can bring enormous advantages over traditional methods, as in paper-based questionnaires it would be difficult to ask such a specific question.

Paper-based questionnaire on the tool WAY CyberParks

Taking advantage of the workshop, a paper-based questionnaire was distributed to the participants in order to get their feedback about the user-friendliness of the app. The questionnaire was handed to the participants at the end of the workshop.

The analysis of the app’s functionalities shows that the participants appreciated the questions, stating that they were simple and objective, and that they enable the assessment of the places they reached along of their way. On the other hand, when asked which further questions should have been asked, since in some cases the questions are very general, there were statements calling for more place-specific questions. It should be noted that this workshop aimed primarily to test the app in a real context, therefore, the main concern was not to go deep into the quality issues of public spaces, but rather to use simpler questions to evaluate the effectiveness of the app’s functionalities. When asked about suggestions for improving the app (question 4), the respondents provided diverse answers, but some included the request to increase the number of points of interest, improve the speed in accessing the smartphone camera, better adapt the icons to the questions, provide easier access to the points of interest and supply the app map with a guidance

feature. It was also mentioned that the process of submitting suggestions could be made easier and the app's own image improved, making it easier to understand the functionalities behind the buttons.

The participants were also asked whether they had found something new in Mouraria through the use of WAY CyberParks. The answers were positive, as through the app it was possible to discover new streets and places. There were also some participants who did not know the neighbourhood, mentioning that the app was a guide for the discovery tour. In general, with these answers one of the workshop objectives was met: to support visitors in getting to know the place better. This is one of the major differences from traditional methods, as with them it would be almost impossible for people to discover something new. With such a digital tool, people enjoy the possibility of discovering the urban space autonomously, and, should this be the goal, there may be cases where it can be done alone.

CONCLUSIONS

The use of digital tools in the analysis and assessment of public open spaces allows for a new kind of approach to placemaking, facilitating information gathering, making the process faster and more effective, and, depending on the case, more accurate when compared to more traditional research methods (paper-based questionnaires, interviews, etc.). However, just as all research tools, irrespective of whether they are more traditional or more innovative, digital tools have also limitations. For example, without internet connection, most features of the WAY CyberParks app are limited in their functionalities. Since WAY CyberParks is an interactive tool, its usage can play a relevant role not only in the creation of new public spaces but also in the maintenance and improvement of existing places.

Through the features of the app it is possible to develop new approaches to public participation in the process of producing public spaces, with greater involvement from citizens, and consequently with a greater probability of success in the planning process. Certainly, there are still some shortcomings in the tools, as detected in the workshop in Mouraria, but these do not diminish its potential in comparison to traditional research methods. Such digital tools enable researcher and professionals to think about digital public participation, where all actors can become more involved in co-creation processes, and consequently take on more responsibilities in defining the public space more suited to the needs of all.

From the discussed case study and in view of the analysis of the potentialities of WAY CyberParks, it can be stated that the workshop allowed a better understanding of the advantages of technology compared to more traditional research tools. Due to the positive effects shown, such as the ability to be easily adapted to different needs and environments, and respond to different issues, making data collection faster and smarter, technology can be an easy and economical research method.

The WAY Cyberparks app allows for the accurate and continuous monitoring of individuals, and the data collected are especially rich and meaningful. The next steps are to expand and increase the use of the app in further case studies. This will provide the basis for assessing the relevance of digital tools in understanding the relationship between public spaces and users. Further opportunities will be identified, in order to explore the tool's potential for contributing to the improvement of public spaces by responding to community needs and taking advantage of participatory methods, such as co-creation.

ACKNOWLEDGEMENTS

This work has been supported by the COST Action TUI306 CyberParks: Fostering knowledge about the relationship between Information and Communication Technologies and Public Spaces, and is part of the ongoing research for the PhD Thesis of Tiago Duarte, “The importance of new technologies in the study of public spaces - The pertinence of using mobile applications. Case study WAY CyberParks app”.

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