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The application of new technologies in promoting a healthy lifestyle: selected examples

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Abstract. Modern society is fascinated by Information and Communication Technologies (ICTs), physical laziness, isolation from nature, and a preference for staying indoors. Despite the general acceptance and understanding of the health benefits of recreation in the open air, a change is being seen in the recreational patterns of urban dwellers, as they spend less time outdoors. In order to counteract such behaviours, we can try to apply ICTs to enhance time spent outdoors. The performed study aimed to find uses of ICT solutions in designing public spaces in order to enhance and promote a healthy lifestyle. The selected examples show possible applications of ICT in promoting active recreation, e.g. mobile applications for sport activities, urban games in line with the idea of the Playable City, and urban furniture and outdoor hotspots enabling access to the Internet. The research findings proved that digitisation is not only a threat to a healthy lifestyle, but that it can also create opportunities to improve the quality of life.

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1. Introduction

The increasing popularity of mobile devices, which is accompanied by constantly decreasing data transfer costs, mean that a significant proportion of society is currently remaining permanently on-line. Typically, people used the Internet indoors, but being constantly on-line requires technology to be transferred outdoors (e.g. to public spaces). Even according to research by Forlano (2008) conducted a decade ago, more than 25% of hotspot users in parks admitted that they had not visited these places before Wi-Fi signal transmitters were installed, and 70% confirmed that they visited green spaces more often if the Internet was available. Moreover, 75% of respondents declared that they chose recreational venues according to the possibility to use free Wi-Fi. However, the digitisation of society carries numerous threats, such as the weakening of social ties, the deterioration of health and the feeling that we are missing out on something (Prensky, 2001). Contemporary trends in landscape architecture and the design of public spaces that meet user expectations can have a significant impact in preventing such undesirable phenomena by implementing design solutions to encourage urban dwellers to transfer their activities to the open air.

1.1. Contemporary society and ICT

Social development depends on many factors, which are conditioned on the one hand by progress resulting from technological development, and on the other hand by the growing needs and expectations of users in regards to its application in everyday life. This broadly fits well with the megatrends of the last several decades, including, as we have mentioned, the move away from an industrial society towards an information society (Naisbitt, 1992; Stacewicz, 1998). The modern approach including the wider use of new technologies describes the changes in this area, pointing to the more intense return of societies towards twenty-four-hour access to goods, services and consumption. The massive use of information and communication technologies (ICTs) in consumption is caused by ever-wider access to information in networks, including the expansion of mobile services (Tinnilä, 2012). The 2015 McKinsey report predicts progress and further development of technologies including the gathering of more and more data, deepening consumerism and furthering urbanisation (Dobbs, Manyika, Woetzel, 2015). Nowadays, the society that is developing is known as the "information society" (IS), for which knowledge and information are the basis of existence (Krzysztofek, Szczepański, 2005), and in which activities are enhanced by the provision of ICTs (Lubacz, Galar, 1999). At the same time, the formation and development of the IS should be seen and considered in terms of at least several aspects, including technology, economics, the social dimension, education and others (Naisbit, 1982; Lubański, 2004).

Within the information society, one can distinguish a generation of "digital natives", i.e. people born in the digital era, for whom new media are the basic environment of existence (in other words, they are addicted to new media). Thanks to innovative gadgets, they have direct access to data and searched content (Prensky, 2001), and they often use multiple multimedia devices at the same time, or one multifunctional device for several activities enabling access to media (Mysior, 2014). This social group not only requires information that is freely accessible and has multithreaded use, but also rapid processing of it (short-term learning, experimenting, multitasking while waiting for immediate results and satisfaction with the action). The Internet is a natural environment for this generation, a system for communicating with others that enables identity building, playing, etc. The Internet can also become an addictive factor, because without constant access to the network, representatives of this group may feel lost or have a sense of fear

that they are missing out on something (the process is called FOMO – *Fear of Missing Out*) (*Przybylski et al., 2013*).

Continuous access to information and on-line services is, however, nowadays the domain of an ever-wider cross-section of society – it is starting to affect entire generations of people affected by internetisation. It causes the blurring of the boundaries between private and professional life, but also between private and public, which might be illustrated by the increased interest and development of social networking sites, which in turn are also changing local authorities' behaviour towards communication with the public via the Internet. Furthermore, elderly users become full-fledged participants in the cyber world as they increasingly use and are fascinated by ICTs. As representatives of the generation of "digital immigrants", they are partially compared to "digital natives" regardless of the degree of their adaptation to new technologies, new lifestyles or conflicts between generations (Prensky 2001).

1.2. Escalating non-healthy behaviours

Contemporary social behaviours related to life and work while using the Internet have permanently specific effects. Nowadays, young people cannot imagine life without constant access to the network. It is obvious to them that they can connect to the Internet at any time. The time spent in front of mobile device screens is managed mainly at the expense of outdoor activities. Creating convenient conditions for using the network in open spaces may thus enable these two activities to be reconciled. The deteriorating condition of Poles is largely due to the increased amount of time spent in a sitting position (Suchocka et al., 2017b).

At the same time, it is observed that the time spent indoors have increased. The indoor spaces are perceived as safe, free of external and unnecessary stimuli, and thus comfortable. Internet users spend an average of 15 hours and 40 minutes online per week. Since 2009, the average declared network-use time has remained at a similar level, and the number of hours spent online is also related to age. People below 34 years old spend almost twice as much time on the Internet (approximately 23 hours) than older users (approximately 6–10 hours on average) (World Internet Project 2013, 2013).

Extending the time spent indoors limits the time spent outdoors, and results in isolation from nature. Universal access to the Internet, and the constant need to use it, therefore have a direct impact on changing preferences related to the use of public spaces by residents, especially those living in cities. Previously popular forms of recreation (such as resting on a bench, walking, sports) are not enough anymore. It is becoming common to spend time in environments where constant access to information is ensured through the use of wireless Internet access. A change in recreational behaviour means to a large extent the minimisation of physical activities ("physical laziness") (Pańczyk, 2012). The "times of fear of nature" have emerged – this term aptly characterises the approach of modern humans to nature (Louv, 2008). The undesirable effect is the deterioration of physical and mental health of increasingly wider community groups.

Searching for model solutions that aim to improve human health and quality of life in cities is a process that has been going on for many decades. The rainbow model of health determinants (Dahlgren, Whitehead, 1991) indicates that health is the result of a series of related causes. An important role is played by social factors (lifestyle and social attitudes) that result from economic, cultural and environmental conditions. At the same time, the level of public health remains in direct relation to environmental sustainability (Graham, White, 2016). In this context, it is desirable to look for methods and solutions for activating society and for encouraging people to go outdoors.

At the same time, creating ICT facilities such as hotspots in public spaces could be a response to changing social needs. It also becomes a way to attract new users to such places, which are often forgotten and programmatically unattractive. Expanding the offer addressed to Internet users makes these places more accessible, more often visited and liked, and their rank and importance in the city's recreational structure increases (Kimic et al., 2016).

Staying outdoors in a natural environment has a beneficial effect on human health. Nature improves mental performance, results in faster problem solving and constructive decision

making, stimulates creativity and ingenuity, and increases motivation to act (Louv, 2008). Thus, for the aforementioned reasons, it is worth considering what design tools can be used to encourage users to spend more time in natural environments.

2. Research materials and methods

In the context of the aforementioned characteristics of contemporary urban residents' changing behaviour and preferences, the paper presents a selection of solutions promoting a healthy lifestyle within the realm of omnipresent ICTs. For this purpose, a content analysis has been made of varied sources, including a review of literature, and public space design projects and implemented solutions.

3. Research results

The innovative application of ICTs in public spaces, especially in green areas, can be used to make people more physically active and to implement various new forms of recreation. A review of publications and Internet sources related to the use of ICTs shows that they are applied in various forms, and those that have a great potential are: intelligent urban furniture with hotspots, the idea of enhancing space through play (or adding a new value to neglected spaces through play), as well as mobile applications aimed at promoting physical activities, including sports.

3.1. Intelligent urban furniture

Open access points (hotspots), enabling a connection to the Internet via a wireless network, are an opportunity to link urban dwellers' need for modern technologies to the use of public spaces. Currently, hotspots are very common in utility buildings, e.g. office buildings, universities and typical commercial facilities, such as shopping malls and restaurants, but even in public transport. They are also being introduced more and more often in outdoor public spaces including green areas (squares, parks, public promenades, boulevards, etc.) (Suchocka et al., 2017a). They can take various forms, from a small, individual element (a single piece of furniture) to more complex systems of various elements grouped so as to create a zone or set of zones. Contemporary multifunctional urban furniture, which is characterised by innovative, often artistic design, gives the opportunity to use ICT to expand its standard functions as a hotspot – by providing access to information through the Internet. They become excellent tools for expanding what public spaces and green areas have to offer, and at the same time they enhance the attractiveness of public spaces and react to the ever-new expectations of a complex urban community (Kimic, 2015b).

The use of ICT in urban furniture enables users to control the spirit or mood of a place, e.g. by changing light, water, sound and images. Specially designed mobile apps combine with urban furniture to create a new layer of perception for users, who gain the opportunity to influence the space. This kind of interaction between object and user is a form of non-verbal communication (Kimic 2015a). Such interaction allows residents to study their city or place and make them re-identify the space (Bochińska, 2007). Technological advances therefore make it possible to use urban furniture as a carrier of information access by opening users up to cyber space in almost any place and all the time.

The digital revolution allows urban furniture to expand its standard functions. The simplest piece of public furniture, and at the same time a widely used one, is a bench, which is a place of rest, but also enables social meetings and interactions. Changing it into a hotspot Internet access point and adding a socket for charging smartphones will not only increase the exploitation of its basic functions, but will also encourage users to use this item more often than before, and lure new users, too. Seating functions – as in the case of the *BlocParc* project (a system of rectangular benches made of wood with metal fittings that can be set in any place, and are used as a hotspot while also serving as a seat, table, obstacle for skaters, and plant pot, among other things) (BlocParc, 2017) – extend to providing direct access to social networks, information about public transport, but also emergency services, and

are thus a significant facility and improvement for users. The hotspot zones arranged as city stations designed as a system of seats and tables adapted to the use of mobile devices become a place not only for meetings and rest in the fresh air, but also for work.

An extensive hotspot station, as in the case of the *Digital Harbour project (100% connected)* – a station realised according to a design by Mathieu Lehanneur (JCDecaux's Intelligent Street Furniture, 2017) – shows the use of comprehensive solutions in the arrangement of places with access to wireless Internet in public spaces and green areas. Such a multi-functional facility not only has an attractive form (here a contemporary roof-top with a roof garden equipped with movable, rotating seats), but also gives the possibility of recharging mobile devices, or provides direct access to selected "urban applications" through a touch screen. Even a simple bus shelter can be easily adapted to new functions – free Wi-Fi will not only allow access to information on public transport or commercial functions (e.g. by enabling online shopping), but will encourage residents to use public transport instead of driving. Such changes in habits can positively affect the physical activities of urban dwellers. In counteracting the sedentary lifestyle, other multifunctional city furniture that increases pedestrian activity can also be used. The *tranSIT* project is one such solution (TRANSIT walking waypoints…, 2015). This is a hybrid pedestrian information system showing the direction, distance and time of access to public transport combined with lighting components, smartphone recharging slots and free access to the Internet, and a system of elevation-mounted single seats for older people enabling them to rest while out for a walk.

It is highly desirable to use ICT to support the mobility of people with physical disabilities. A *Responsive Street Furniture* project is a good example (Responsive Street Furniture… 2017). This uses the correlation of mobile devices (e.g. smartphones, iPads) with existing elements of urban equipment. Receiving help is possible for disabled users thanks to a free application that allows street lamps to be brightened when approached by a visually impaired person, or that activates a sound information system but also extends the time that green lights stay on while crossing a street, or that indicates places to rest. Responsive furniture is a way to encourage physical activity among people at risk of social exclusion, who are reluctant to use public spaces (Kimic, 2017).

3.2. Creation of space identity through play

One contemporary trend in social activation concerns the use of urban spaces for activities encouraging participation in games among all age groups (Raessens, 2006). The use of existing infrastructure allows us to perceive the city as a great game, whose attractiveness depends only on the creativity of the organisers and participants (Bielecki, 2008).

The contemporary approach to increasing the activity of the information society in public spaces and green areas is directly connected with investments serving the creation of smart cities. The trend for using ICTs to physically activate urban dwellers by encouraging them to take part in urban games is becoming widespread (Borden, 2007). One of the currently growing needs in this area is the creation of urban spaces, which must be attractive to everyone, and thus multifunctional and easy to alter. The *Playable City* idea is a form of action serving the innovative perception and use of the potential of modern cities to activate their residents (What is a Playable City?, 2016). It gives the opportunity to conduct social dialogue through the implementation of shared experiences using different forms of play (de Lange, 2015). It is an initiative that brings together various types of activities – with many initiatives taking place in the public spaces of cities, including green areas – artistic projects, happenings, lectures and others. It serves as a medium, which gives a "human face to smart cities" by using new technologies for what can broadly be termed their "socialisation". It transforms the existing infrastructure into places that evoke unexpected social reactions.

With the help of new media, one can use those places to participate in urban games, to create games and to edit their scenarios at any given moment. One example is the *Hello Lamp Post* project – an urban gaming platform implemented in Bristol in 2013, which is an interactive system for discovering the city through conversation with urban furniture (Hello Lamp Post 2013). Dialogue was possible

with over 440 items of infrastructure (streetlights, electric boxes, mailboxes, traffic cones, booths). The interaction consisted in establishing a dialogue between the furniture and people in the vicinity and was conducted using a telephone application that included answers to the urban questions asked by the infrastructure element. This game combined two functions: fun (activity in the urban space associated with the search for more furniture participating in the action) and finding out (noticing the specificity of the "urban code" recorded in urban furniture and learning its "secrets"). Another example from this series is the *Shadowing* project, originally made in the same city, using the light of lanterns and cameras installed in them, supported by a program that allows one to record the moving shadow of a walking person, and then display it before another person moving in the same light (Shadowing, 2014). The aim was to activate and encourage passers-by to play alone and with others, and to draw attention to the fact that the city is a space shared with others. At the same time, this form of play has influenced the revival of spaces (with the help of light and thanks to the presence of people) that had previously been unfriendly and forgotten places.

3.3. Mobile apps enhancing physical activities

One of the less complicated, widely available and fastest growing forms of using ICT to enhance physical activities is mobile apps that can be used on smartphones, palmtops or tablets. Sports applications are one of the most popular, and they are extremely convenient, fast and cheap to use (as most of them are free, or the user decides to pay a fee for an extended version). They enhance many types of physical activities such as running, cycling, swimming, weight training, aerobics and others, and most of them are carried out outdoors, in public spaces, including green areas. Most applications not only allow users to track their own sports activities, which itself mobilises users to increase individual achievements, but they also allow information and sports results to be shared with other users. Thus, such apps facilitate establishing social relationships with a group of people with similar interests. The connection with the appropriate support in terms of diet and, for example, counting calories, allows for a more comprehensive and effective use of this form of activation associated with improving health.

One of the most popular examples of a sport-promoting app is *Endomondo*. This application supports a lot of activities, e.g. running, cycling, canoeing, etc. The app records the route taken by a user while practising a sport and registers time spent on an activity, user's speed, distance covered, or even heartbeats and calories burned. The ability to view other users' results and share one's own results is another form of information exchange and motivation (Endomondo, 2017). Another example is *Runtastic* – an application designed mainly for runners, canoeists and cyclists, which allows users to effectively recreate the exercise route on a map using 3D mode (Nowak, 2012; Runtastic, Running Bieganie i Fitness, 2017), as well as establish its new course. Many applications have a specialised range for monitoring specific activities, such as *Pedometer*, which encourages walking – the idea is to persuade users of the need for 30 minutes of physical activities per day. The app allows the distance walked to be tracked and helps users to achieve goals (Pedometr…, 2017). Another type of solution is an app that functions as a personal trainer, as in the case of the *Daily Yoga* app. It gives you the opportunity to download sets of exercises adapted to different levels of difficulty (including over 400 asanas and video materials), music tracks that make the time spent on exercise easier, and access to a social network that allows users to share their achievements with others (Daily Yoga: Świetnie zaprojektowany …, 2017).

Activation in public spaces and green areas is also associated with the use of information and communication technologies in interactive urban games. They are processed in real time and real places (based on location using GPS – Location Based Service mobile games) with superimposed virtual objects using augmented reality. The most popular game is Pokémon Go, encouraging users to cross streets, city squares and parks in search of mysterious portals in order to catch fictional characters. And although this game evoked controversy related to the security, privacy and even ethical and moral implications of technology in reality (Alomar, Alsaleh, Alarifi, 2018), it gained popularity in a very short time. There are many other interactive games acting on similar premises. One of them

is Ingress, which is used, among others, in tourism as it encourages users to visit new places, while also providing users information about the qualities of cultural heritage (Bajgier-Kowalska, Tracz, Uliszak, 2018). The increased physical activity of such games' users results directly from the requirements imposed by the games (Gabbiadini, Sagioglou, Greitemeyer, 2018) and results in more time being spent outdoors. Such games constitute one of the innovative strategies aimed at motivating people to engage in physical activity and go outside (Kamboj, Krishna 2016; LeBlanc, Chaput, 2016).

4. Conclusions

Information and communication technologies have a positive impact on improving users' health and promoting healthy habits through their variety of forms and the range of ways they are applied in public spaces and green areas.

In general terms, the presence of ICTs is now a desirable way to shape modern, diverse, and thus attractive places for various group of users – in accordance with the role that well-designed, high-quality public spaces should fulfil. The multi-directional potential of ICT applications and their practical use is aimed at increasing the standard of urban spaces, creating their positive reception by users. Information and communication technologies can simultaneously be used as a positively perceived tool for shaping the image of smart cities and for contributing to their promotion on many levels.

The ongoing cultural changes, including those caused by widely available access to the Internet, have a direct relevance in meeting the needs and expectations of contemporary information society users. The use of ICTs creates new opportunities to support and initiate various ways of spending time – not only indoors but also outdoors. This direction of application allows for the implementation of many activities in a variety of ways, allow public spaces, including green areas, to offer a wider range of services and functions. This applies both to outdoor activities that do not require significant physical involvement (passive recreation e.g. sitting on a bench, walking) and to the development of many physical activities (such as games, sports and others). Therefore, the application of ICTs can be used to acquire new users of public spaces, increasing the number of people who, if provided with access to the Internet, spend more time outdoors, as they usually refrain from going out so as to avoid disconnecting from the Internet. Another positive phenomenon is the influence these technologies have on extending the time that users stay outside, and an additional advantage of ensuring constant access to media without the need to resign from performing other activities.

The use of ICT in public spaces and green areas can be used to invite users to leave confined spaces and move certain activities outside – this applies above all to leisure, but also to work. Spending time in public spaces with access to the Internet, can have an impact on the interpersonal and personal development of people. Such targeted application of information and communication technologies will therefore promote a healthy lifestyle for a growing number of city residents in the future.

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