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The role of ICTs in creating the new social public place of the digital era

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Ayat Ayman Abdel-Aziz *, **Hassan Abdel-Salam, Zeyad El-Sayad**

Architecture Department, Faculty of Engineering, Alexandria University, Egypt

Abstract   Nowadays, Information and Communication Technologies (ICTs) have spread extensively in everyday life in an unprecedented way. A great attention is paid to the ICTs while ignoring the social aspect. With the immersive invasion of internet as well as smartphones' applications and digital social networking, people become more socially connected through virtual spaces instead of meeting in physical public spaces.

ICTs are categorized in this paper into four elements which are as follows: Wi-Fi networks, digital interactive media façades, interactive public displays, and smartphones' applications in public spaces. These elements will play major roles in the public space classified into five domains which are as follows: culture and art, education, planning and design, games and entertainment, and information and communication. Based on this classification various examples and proposals of ICTs interventions in public spaces are presented to encourage good old fashioned social interaction by creating the **new social public place of this digital era**.

Accordingly, this study will help to find design principles that can be adopted in the design of future public spaces to meet the needs of the digital era's users with the new concepts of social life respecting the rules of place-making.

1. Introduction

Social media and digital technologies surround everyday life of urban city dwellers. The age of ubiquitous computing is almost here. As the technology is constantly developing in a rapid race, so are the applications and services that become utilized in everyone's daily life. Contacting with friends, organizing meetings, buying things and much more daily activities are happening now online. The new media and information technologies have impact on many aspects of everyday life in work, home or leisure.

In this digital Era, social networking has already become a social norm for many of the new generation teenagers. Updating Facebook status, tweeting and posting photographs on Instagram have become everyday activities. Their life is reflected in social networking where there lies a lot of

* Corresponding author at: Faculty of Engineering, Alexandria University, El-Horreya Ave., El-Hadara, 21544 Alexandria, Egypt. Tel.: +20 1110378328.
E-mail addresses: eng.ayat.ayman@gmail.com (A.A. Abdel-Aziz), hasalam2001@yahoo.com (H. Abdel-Salam), Zelsayad1@hotmail.com (Z. El-Sayad).
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memories by posting images of their happy moments and recording some other emotionally important happenings and events.

Keeping in mind the modern trend of favoring virtual interaction over face-to-face contact, this paper, in opposition to several approaches stating that technologies can only encourage segregation of individuals, aims to present the ways of implementing ICTs tools in public spaces to regain their status as attractive places for people, incite meetings in real life and create lively city centers.

2. Place-making: social design of public spaces

"When a space becomes more than the sum of its parts, it becomes a place" [1]. Place-making is the act of creating great places by making a public space a living place. The objective is that "all Public Spaces should become Places" [2]. It is not a new idea. The concepts behind it originated in the 1960s, when visionaries like Jane Jacobs and William H. Whyte offered groundbreaking ideas about designing cities for people, not for cars. Their work centered on the idea that it was important to create and maintain lively neighborhoods and inviting public spaces [3].

Place-making can be used to improve all of the spaces that comprise the gathering places within a community: its streets, sidewalks, parks, buildings, and other public spaces. The goals of place-making are to invite greater interactions among people and to foster communities that are more socially, physically, and economically viable [1].

2.1. Urban space and social interaction

Jan Gehl has argued that success of the place depends on the nature of the activity undertaken. Public space activities are particularly important in perceptions of public space. They are also particularly sensitive to the physical quality of environments. Gehl has characterized outdoor activities into three categories [4]:

1. *Necessary activities:* which are everyday tasks which an individual carries out to fulfill their needs usually with no other choice. That are influenced only slightly by the physical quality of the environment because they are necessary for life to continue, like walking to work or school, waiting a bus, shopping for food.
2. *Optional activities:* by contrast, only take place when conditions are optimal, and are therefore a direct barometer of the quality of public space. They also affect users' perception of space because if people are choosing to stay in spaces rather than hurrying through, then the space itself seems more "livable". Those activities are like, walking for the sake of it, watching the world go by, sitting at a pavement café.
3. *Social activities:* occur as a result of the first two activities (necessary and optional) so they could be also termed 'resultant' activities. They are dependent on the presence of others in public space. Those activities are like, children playing, casual greetings, conversations, communal activities.

2.2. Creating good places for interaction

Good places for interaction are spaces that make people from different areas and backgrounds want to be there. In order for that to be the case, these spaces need four basic characteristics [2,5]:

1. Good places promote sociability (there has to be a reason for people to go there).
2. Good places offer lots of things to do (there has to be a reason for people to stay once they have arrived).
3. Good places are comfortable and attractive (the space has to feel safe).
4. And good places are accessible (the space has to be welcoming and accessible to everyone).

3. Public spaces at the era of digitalization

The public space before the advent of digital media represented the main source of information and politics and also hosted various debates. Moreover, commercial activities have encouraged the use of public space since markets and retail shops were the places to go shopping. With the raise of telecommunications technologies, the activities in the public realm started to diminish, as information became easily accessible from home, via internet. This also enabled the rise of electronic shopping, while talks and debates partially migrated to web-forums. The internet has identified as a new form of public space "**information agora**" [6,7].

As the use of digital networks becomes an essential part of everyday life, a new digital layer is added on the existing urban landscape, which makes the experience of the urban environment consisted of multiple layers, through direct contact and through the mediation of digital technologies. The redefinition of public space in terms of both physical and digital existence rises as an essential question [8].

The continuous advancements of this information age and the revolution in mobile phones, wireless internet, Bluetooth, GPS and all their associated applications have influenced the way people interact with each other and with their surrounded physical space which raise questions about the impact of these technologies on the usage and act of communication within public space and how can urban planners create a new kind of livable, attractive, safe and sustainable public space with a fluid hi-technology infrastructure.

4. Change of social life in public spaces

Jan Gehl raises a question that "can the function of cityscape can be taken over by electronic media such as TV, internet, and mobile technology?" Social life has changed in different form but the real quality is face to face meeting [9]. These media do not prevent the use of public meeting but it gives flexibility to the lifestyle. They are used as secondary ways to connect more people.

A study was made by Keith Hampton [10] – a prominent voice in the burgeoning academic debate surrounding the impact of technology on social interaction – and his team to examine: how behavior in public space has changed in our

contemporary digital world? And how much human interaction in public space actually existed before the age of portable electronic devices, and how much, if any, has been lost? [10]

They compared the time-lapse photography of both William Holly Whyte and PPS used to analyze human behavior in the public space of Bryant Park in the early 1980s to contemporary observations by filming the same public space from similar angles [10].

They found surprising results, people are actually more likely to spend time in groups and there has been a marked increase in the percentage of women in public space overall, in contrast to popular opinion, that people have become less socially isolated in public space with the greater use of technology. Also, they found that mobile device users included only 3–10% of those occupying public space. Hampton notes that "it seems they are using it when they are alone and waiting for someone to join them, or they are using it in those transitional spaces (areas between destinations) which he do not see as a loss to public space and in fact, may allow people to reconfigure their time so as to better use public space" [10].

It is concluded that, design that takes technology into consideration is paramount for the future of cities. As much as providing trees, water fountains, food, or other amenities to encourage people to spend time in spaces, to provide them with privacy, and to facilitate group interaction, there is a need to start thinking about how the infrastructure of these technologies fits into public spaces.

4.1. Social media and social digital networking

Social Media can be defined as "service which enables to share various news, information, opinion in ways of multimedia" [11]. Content is often media content like photographs or video which by commenting it enables discussion.

Social Digital Networking is a "sub-category of social media (such as Facebook, Google+, MySpace, Twitter, and YouTube) by which people are able to connect with one another and share information globally within a short time" [11]. This advancement leads to various activities and discussion and gives possibility to interact.

4.2. Social media platforms as a tool to create a local sense of place

Public spaces are neglected so they became less attractive to the people and in consequence the social life disappears and the sense of locality is declining as well. The activities and entertainment in physical environment are diminished, because social engagement can easily be achieved through far-distance connections in social media networks. Facebook and other such networks can be considered for types of online communities, in which people connect and cluster in social groups that fit to their interests.

This is why a sense of place is no longer something that comes with simply spending time in a place, like by living in it, because today, people might live in one place but carry out most of their social engagements in other places. They can be physically 'here' while the environment they are building up familiarity with is out 'there' or brought in here through digital screen [12]. As people are increasingly engaging with social groups through new media, they might decreasingly engage with their local social environment. So a local sense of place is not just automatically there unless it is developed through an active engagement with the place.

The local social media network adds a digital dimension to physical urban planning to form a local sense of place constructed from an online sense of connection. It emphasizes the importance of planning for creating a local sense of place that is coherent and adaptive, and that stimulates a strong sense of belonging and empowerment to the local area and its community. The challenge seems to be the practice of connecting this social media with the development of a local place, **by giving new media a role in place-making**.

5. Ways of implementing social media elements in public spaces

To create the New Social Place of the era of digitalization, spaces must follow the concept of "**human information interaction**", which is a concept based on the relation between human, space, and information technologies of the era. These information technologies are categorized in this paper into four elements which are as follows: Wi-Fi networks, Media Façades, Interactive Public Displays, and Smart Mobile Phones' Applications in Public Spaces. These elements will be combined together in the space with different ways of implementation according to the following areas: (1) culture and art, (2) education, (3) planning and design, (4) games and entertainment, and (5) information and communication. This will help to increase the attractiveness of the space, the interaction between citizens each other as well as between citizens and the space around them which will foster the sense of place and the sense of belonging to the space.

5.1. Wi-Fi networks

In the past, the wired nature of desktop computing has limited the potential for internet use to blend into urban public spaces. But with the launch of Muni Wi-Fi, for the first time it will be possible to integrate internet use with the use of public space [13].

By observing public spaces, it was indicated that Wi-Fi infrastructure by itself will not populate urban public spaces, nor will it revitalize them if they are already in decline as a result of poor design or other factors. It was also found that internet connectivity within public spaces contribute to broader participation in the public sphere and higher overall levels of social engagement than what is afforded by similar spaces free of internet connectivity [13].

But, if people use Wi-Fi the same way they use mobile phones, it is likely that Wi-Fi use will exasperate a trend toward "public privatism" which creates a private sphere of interaction within public spaces. To avoid the "public privatism" and encourage greater participation in public spaces with high public interactions and a great sense of place, the Wi-Fi infrastructure must be provided in a way that encourages the activities of people' interactions. This interaction can be between people each other or between people and the physical objects situated in the space. These objects must have the ability to interact with its users, for example by touching or by sensors which will create a sociable environment and will encourage people not only to come and stay but also to return again. The next three social media elements will show the ways

by which the space can be interactively connected with its users [14].

5.2. Digital interactive media façades

Images' displays and advertising boards are usually found everywhere in the physical space, but replacing all of these with electronic displays makes it possible to present dynamic images, to mix images and graphics and to change the content at any time [15].

Interaction with large screens in urban settings is a new way that could increase the social interaction between people themselves and between them and their space around. This new way has quickly becoming a reality with the incorporation of Bluetooth, RFID and GPS built into new devices of smartphones and tablets [16].

The famous **"Haus des Lehrers" (house of the teacher)** building at Berlin has been cited as the prototype of using a building façade as an interaction tool in urban space: **Blinkenlights** to become world's biggest interactive computer display. People were very passionate about it because of their ability to control light shape of the building, to send personal message on it, and to collaborate by playing games via mobile phones [17,18].

Also, **"Aarhus by light"** is a two-month social experiment of an interactive media façade – at the Concert Hall Aarhus in Denmark toward the adjacent public park – which engages local citizens to explore new possibilities of digital media in urban life. The large glass façade on the building was fitted with 180 square meters of semi-transparent LED screen. When walked through the park, visitors passed through three interaction zones marked with bright colored carpets (pink, blue, and yellow). In these zones, camera tracking and sensors translated the visitor's presence and movements into digital silhouettes on the façade. These silhouettes enable visitors to interact with the creature by pushing, lifting and dropping them which encourage a curious and playful investigation of the expression among the users [19].

5.3. Interactive public displays

Public displays are experiencing a transformation from traditional to interactive digital displays enabling new forms of multimedia presentation and new user experiences as many researches' findings demonstrate the importance of taking into account full body and performative interactions as an essential factor of human experience [20].

In terms of interaction a display is in either passive broadcast (digital signage) or in interactive mode. In the passive broadcast mode, the screen shows playlist of video, animation, and photographs. When the cameras detect a face or someone touches the screen, the display changes to an interactive mode. Some services enable the pairing of the mobile phone with the display by using Bluetooth, QR codes, and SMS [21].

It can be concluded that both the media façades and the interactive public displays will actually help at stimulating three of the essential human needs in public spaces as described in the book of *"Public Spaces"* [22]. These needs are as follows: **(1) the passive engagement** with the environment where people observe each other, **(2) the active engagement** with the environment where people interact with each other and with the space around them, and **(3) the discoveries** within the space. And this is happened when the interactive and dynamic content of the public display forces people to discover it, and then the active engagement started when people begin to be engaged with the display. The more people were in the active engagement zone, the more attention the display got which means more passive engagement, thus increasing chances for social triangulation [23] as people were trying to interpret what the application does collaboratively, or they were discussing the information, expressing interest in it, or simply enjoyed the content together.

5.4. Smart mobile phones' applications in public spaces

Mobile Phones changed the way that people interact and communicate with each other in public space. These devices allow new kinds of information to flow into public spaces. With the proliferation of personal **smart mobile phone devices**, the internet is going mobile. Citizens can surf in the web nearly everywhere. The events of the world are reported and documented faster than ever. Social networking sites have been adapted to smart mobile phones which have facilitated the continuity of staying connected in the network for various discussions and thus helped meetings as users always carry their mobile phones with them [6,24]. The internet is getting ubiquitous. Location based services, augmented reality and the ubiquitous connectivity offer new ways for the perception of space and participation in the urban environment [6,25].

Smartphones provide a new platform for location-based-services and will be small Augmented Reality browsers. **Augmented Reality (AR)** represents a new trend in ICTs, which has the ability to modify the perception of reality by digital devices such as specific head-worn devices, eyeglasses, contact lenses, virtual retinal displays or handled displays such as smartphones and tablets. In AR, the physical surroundings are filtered by such a digital device, allowing the user to adjust the way the reality is perceived and to customize public spaces according to his own preferences [26].

"LayAR" (http://layar.com) is one of the first companies, based on their own software, support programmers to develop augmented reality mobile applications. "LayAR" uses a monitor AR system; it is a mobile augmented reality browser used by people who want to use a smartphone for this purpose. It is necessary to have a geo-tag, to reference the position of the 3D model in the real world, for a correct representation of the augmented content [6,26,27].

There are different applications of Augmented Reality (AR) in the city using smartphone devices for example: the application of **Museum of London "Street Museum"** which is a recent iPhone application that provides a view of historical images of the city coordinated with the physical location. The images include everyday situations as well as major events happened there. This new historical information layer across the city provides a unique perspective of old and new London [27].

This overlapping of digital narratives over physical place is an excellent example that shows that these new tools have been succeeded in all areas that contribute to the attractiveness of public space whether cultural, aesthetical, educational, design, entertainment, and informational, as it has the potential to enhance the meaning and understanding of heritage and the

cultural significance of place, to clarify and explain the meaning behind the urban form and to form a better understanding of the place and its history. All of this will contribute to enhance the **"sense of place"** and the attractiveness of public spaces which will increase the social interaction and the people attachment to their community.

6. The five domains for implementing ICTs tools in public spaces

When combining all the four elements of ICTs cited above, the municipal Wi-Fi, Media Façades, Interactive Public Displays, and Smart Mobile Phones' Applications in Public Spaces, new dimensions will be brought to the public spaces in different areas such as : (1) culture and art, (2) education, (3) planning and design, (4) games and entertainment, and (5) information and communication.

In the domain of education and culture, digital screens and the interactive public displays can have a wide range of utilities that help to promote education in public space as they use ICT tools to broadcast knowledge and information about history, culture, etc. They can be used in relation to touristic activities and attractions, in order to transmit information regarding local history and culture. They can show interactive maps indicating the position of various points of interest and their description. In addition, education in public spaces can also be achieved by offering people the opportunity to access knowledge and information through implementing Wi-Fi networks [26].

In the domain of art, these screens and displays can be used to promote various artists and their works such as the project developed by Times Square Alliance toward opening the large advertising digital screens to art. This project aims to buy the permission to showcase art on all digital screens around Times Square in New York which is cited as one of the most famous public spaces in the world [26].

In the domain of games and entertainment, when combining the use of smartphones devices with the digital screens using Bluetooth and with the development of location based games, the physical environment has been turned into a game board, where players use their mobile devices and interact within the large physical environment. These games have the ability to bring new uses and meaning into a public space which allow new interactions between people and places in fun and creative ways [27,28]. Projections on buildings, pavement or specific objects can be used also to generate interactive games in public spaces by changing the area's image, colors, dynamics, etc. as shown above in the case of "Blinkenlights" and "Aarhus by light" [17–19].

In the domain of design and planning, ICTs tools offer a large amount of software products that allow modeling concepts and can show virtual prototypes in a very realistic form. In terms of Design, The Augmented Reality applications as cited before are new ways for experiencing the urban environment as it was once, it might have been, or as it would be in the future. Also, Parametric architecture is one of the new computer aided designs that have influenced the design of public spaces as well as a wide range of new other software products and the development of 3D printing, support this trend. In terms of planning, new technologies have allowed to better analyze the urban context, to better use of the urban public space and, in some cases, to predict its development through

simulations. William H. Whyte's *The social Life of Small Urban Spaces* in the early 1970s, when the technologies involved were quite simple, was one of the first documentaries studying in detail the way public spaces were used using surveillance cameras [23]. With the rise in the technology of software products, Space Syntax was developed that consists of software using for the in-depth analysis of accessibility and movement intensity in urban spaces, used for studying the routes choosing by people within cities [29]. Another software is Flux Space which is a software based on a 3D rendering of the surrounding space. The rendering overlaps the real space is copied through video projections. Sensors help transforming the rendering depending on how people interact with the real space and their every movement transforms the surrounding layout creating either visual or sound effects which raise awareness on the fact that each people's action influences the urban environment. The high amount of information generated by the sensors can also be used to analyze human behavior within the space which proves that Flux Space will have impact on the future development of complex analysis of human behavior and interactive installations [26].

In the domain of information and communication, ICTs tools are used in order to keep users informed of the events and news by either transmitted them on public screens or made them available to users throughout wireless networks at any time and any place. The virtual public space (internet), GPS based technologies and social media platforms such as Facebook, Twitter, and Foursquare offer alternatives and foster online interaction.

7. Conclusions

The overall conclusion of the paper can be summarized in the following chart in Fig. 1.

Starting with the name – the information and communication technologies (ICTs) – the subject's relevance to the public space is clearly understandable. Information and communication are two essential factors of interest and attraction specific to urban environments and at the same time they represent key factors for the progress of the city, as bringing people together and supporting exchange of ideas generate development.

Technology is only 10% of the problem. Ninety percent of it is about how it is used to connect and for a better quality of life. Technology is making it easier for people to connect to the places that they inhabit. The tools that are being created are not ends in and of themselves; much like the place-making process, they are the means for bringing people together to connect, to learn, to innovate, and to feel welcome to do so.

The creation of hotspots providing wireless Internet access encouraged the return to the public, for both work and recreation. In addition, social media has a high potential for encouraging social interaction, in virtual as well as in real life public spaces, thus connecting them. The use of ICTs can significantly enhance public space, by creating access points to information and supporting education. In this sense, augmented reality can complete the toolbox, playing a significant role in engaging users and personalizing the urban experience.

The development of ICTs tools and the mobility of modern devices also bring new demands regarding urban design and the way public spaces are being planned. Namely, public spaces have to provide resources for proper functioning of gadgets (e.g., electricity, plugs). Street furniture should be able
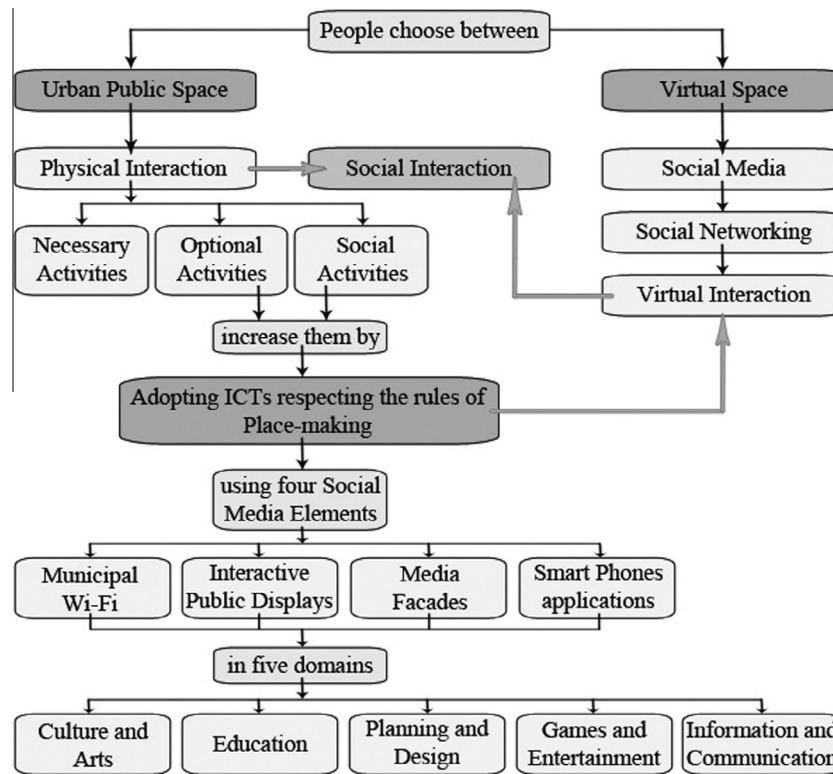
Figure 1   Flowchart summarizes the overall conclusion of the paper (The researcher).

to satisfy the users' needs through its usage, comfort, quantity, accessibility, arrangement and aesthetics. They should be secured to avoid collapse by natural or human forces, and they should be regularly maintained by cleaning and repairing them. They have also to be easily adjustable in order to accommodate different activities, and have to encourage the shift of more and more activities from indoors to outdoors. Apart from the physical infrastructure, in order to successfully integrate ICTs in the urban life, the community has to be trained and prepared to embrace the change.

The challenge for the planners and urban designer is to manage to blend these technologies into the urban fabric so they do not disrupt the form and visual amenity of their setting. The planner must go back to the basics of good design, while assessing the specific technological needs. Place-makers must consider the inclusion of digital technology with its potential to enhance existing features of place and create points of interaction and serendipity.

The successful public spaces should – in general – be: safe, attractive, livable, healthy, and sustainable together with the flexibility to cope with the new needs appearing each era.

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