

## The Effect of Digital Media in Reviving Urban Public Spaces

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### 1 ABSTRACT

Urban public spaces have always been valued by city residents and experts. Pioneers and critics have managed to develop several evaluation parameters that indicate space efficiency and success.

Unfortunately, a new social trend is emerging, pushing the public towards virtual life. People's over reliance on media is unprecedented. Public spaces' importance is decreasing, they are becoming more deserted than ever. Urbanisation has pushed this phenomenon to its extreme. However, what is regarded as a massive defeat and a huge promoter of public space abandonment, can be interpreted differently. Digital media can be utilised in public domain revitalisation.

The study focuses on public space assessment, using nine qualities retrieved from the literature review, followed by a proposal of prospects for reviving the common realm using media tools. This was accredited by the case study of a neighborhood park in Smouha, Alexandria. A questionnaire was used in order to determine the effect of several media interventions' suggestions on qualities of success of the park, and how far they can reestablish the lost spaces. This research aims to reach a clear conclusion about the effect of media use in public involvement and on space qualities to reach specific recommendations for public space improvement.

Keywords: Qualities of Success, Digital Media, Smart Urban Spaces, Assessment, Public Involvement

### 2 INTRODUCTION

"There is more than the eye can see, more than the ear can hear, a setting or a view waiting to be explored." (Lynch, 1960, p. 1).

This is how Kevin Lynch defines the public domain as a place beyond what is tangible, an eternal piece of art, that can persist and have an impact. He continues to describe it as a large stage, where the public is part of the show, they can never be only spectators. Hence, a major aspect of the public space only appears when it is put into relation with its users and their interactions. This interrelation needs to be regulated by some sort of benchmarks, representing what the public could look for in their shared domain, to be applied to public spaces as the main assessing factors that determine the positivity of people-space relation. Relying on some of the pioneers' studies, these benchmarks, representing the qualities of success of public spaces are: visual qualities, inclusiveness, access and linkage, protection, user centred approach applied, activities and functionality, comfort, enjoyment, livability and vitality and finally communal qualities. Further explanation is given in the literature review.

People perceive public spaces in different ways related to cultural backgrounds, gender, preferences, history and social stage. All these factors affect behavioural patterns in many ways that cannot be computed or predicted. Then, those behaviours spread and shape the public space all over again.

This explains the fact beneath the changing image of public spaces due to public behavioural changes occurring from one decade to another. Especially when there is a certain life deviating event or promoter. Recently, and due to the excessive technological achievements, people are depending more and more on digital media, allowing their life to be more virtual than real.

Back in 1998, Rob White was able to anticipate a certain behaviour in his book *Public spaces for young people* (White, 1998). He mentions the appearance of a considerable debate about the fact of the presence of youngsters in public spaces and their involvement in various activities. He also detects anti-social behaviour among young people, that is easily perceived by individuals they deal with such as shop-keepers and older generations. Back then, technology was taking significantly large steps, with the growing number of computers and mobile phones ownership, as well as the internet availability to the public that started in 1991.

At this time, probably the addiction was not yet in question, but the willingness of adolescents to escape from their lives to screens was certainly threatening.

In addition, in his publication Public space for a changing public life Gehl, (2007) wonders about the potentiality of the digital and virtual world to substitute the direct contact between human-beings, and if the deserted public realm can be considered as an acceptable consequence for these challenges.

This addiction to social media has reached the physical, mental and social lives of human beings and it has even affected the urbanised environments in ways that could never be imagined, and never be restored. Some public behaviours are even recently appearing due to the crowd orientation.

Houghton describes some terminologies as being the new trendy behaviours not by choice, but as a consequence of suffering from media addiction (Houghton, 2010).

These behaviours include: Hyper-coordination; copresence and distant focus; mobile phones for perception of security; productive use of transition or travel time; constant connection of work and contact; and public dance or choreography of the mobile phone.

In order to understand the effect of media overreliance better in daily community life and in the living environments, a correlation is made between the long established qualities of the public spaces in which people spend most of their time, and how they are affected by the addictive behaviour of the crowd, or its resultant trait changes as shown in table 1.

		Visual Qualities	Inclusiveness Access and Linkage	Protection	User Center	Activities an Functionali	Comfort	Enjoyment	Livability an Vitality	Communal qualities
<b>Digital Addiction</b>	Hyper-coordination					●				
	Co-presence and Distant Focus	●			●	●			●	●
	Mobilephones for Perception of Security				●				●	
	Productive Use of Transition or Travel time	●			●	●	●	●	●	
	Constant Connection of Work and Contact				●		●	●	●	
	Public Dance or Choreography of the Mobile Phone	●	●		●	●				
	<b>Weight of effect</b>	Moderate	slight	slight	Large	Large	Moderate	Moderate	Large	slight

Table 1: The effect of digital addiction and its accompanying personality traits on the qualities of success of public spaces.

It seems that large configurations and changes in the human perception, priorities, needs and interests have occurred, only to leave the well designed public spaces with an extra challenge in terms of people participation. This is mainly reflected in the user centred features in public spaces, their offered comfort, and livability and vitality. Those are the most affected qualities by this behavioural disorder. However, all other qualities seem to be affected as well. In consequence, public spaces have lost their roles and significance, and regrettably their contribution to society could never be filled with any substitutions. Urban spaces can suffer from the affiliates of this mainstream, leading to major changes in the known social pattern and threatening the long established qualities of the public realm.


This aversion towards the public realm obligates a fast and effective intervention. Using media tools is considered to be the ultimate solution for people’s involvement in public spaces. Since the main challenge relies on people overreliance on technology, the solution can lie in using this specific tool, as an attraction to people towards public spaces, and exploiting it in creating significant engagement in public spaces. This is accredited by an empirical study for a neighbourhood park in Alexandria, Egypt, to determine the degree of impact of media tools application in the public domain and in the amelioration of public space assessment and qualities of success.

### 3 LITERATURE REVIEW

#### 3.1 Public space qualities of success

Since a poorly designed public space is never able to accomplish its roles. a theoretical review has been done in order to achieve a better understanding of public spaces qualities that are key elements to the success of the common domain .

Architects and urban planning pioneers suggested over the years various parameters that can be used to assess public spaces. These assets were skimmed through and sorted to attain a coherent set of qualities that can be defined as qualities of success for public space. Each quality was mentioned by several studies, using various terms that reflect the same value. Table 2 shows the qualities of success of public spaces, and their related sub-qualities, used to measure and assess the space value.



Qualities	Access and Linkage	Protection	Use centered	Functionality	Comfort	Engagement	Vitality	Qualities
Artistic	Degree of Attractiveness	Protection Against Crime and Violence	For People	Functional Space	Possibilities for Seeing	Possibilities for Enjoying Positive Aspects or Climate	Healthiness	Affecting Cultural Heritage
	Degree of Legibility	Protection Against Unpleasant Sense Experiences	Respect Human Scale	Various Activities	Possibilities for Sitting	Aesthetic Qualities	Sustainability	Affecting City Policy
	Distinctiveness	Protection from the Environmental Conditions		Efficiency and Quality Level	Possibilities to See	Positive Sense Experiences	Sociability	
	Proximity and Accessibility Degree			Possibilities for Walking	Possibilities for Hearing and Talking	Scale	Cleanliness	
	Coexistence Ratio			Possibilities for Standing and Staying	Possibilities for Playing and Unwinding	Possibilities for Enjoying Positive Aspects or Climate		
	Protection Against Traffic and Accidents							

Table 2: Classification of open space qualities and their sub-qualities.

The characteristics of open space qualities can be elaborated as follows:

- Visual qualities: Visual qualities can be applied at four consecutive scales. Starting with the aesthetics of public spaces mentioned by Sitte as the artwork (Sitte, 1889), Jacobs expresses the importance of the senses, especially sight (Jacobs, 1961), as well as McCormack, Rock, Toohey and Hignell (McCormack, Rock, Toohey, & Hignell, 2010), Gehl (Gehl & Svarre, 2013), Mehan (Mehan, 2016) and Van Hecke and his colleagues (Van Hecke et al., 2018).

This is followed by the attractiveness of public realm. Authors who mentioning this particular scale of visual qualities are Carmona, de Magalhães and Hammond (Carmona, De Magalhaes, & Hammond, 2008) Gehl (Gehl, 2007), and finally Zagroba (Zagroba, 2016).

Imagebility and legibility are considered as core attributes in visual qualities. They are explored and explained by Lynch as legibility and mental images (Lynch, 1960) and in Project for Public Spaces (PPS., 2009).

Finally the identity scale is introduced by Lynch (Lynch, 1960), as well as Carmona, de Magalhães and Hammond (Carmona et al., 2008) -who uses the term distinctiveness-, as well as Balabanides and Philippou (Balabanides & Philippou, 2015).

This process was repeated to reach a coherent set of qualities and sub-qualities as showed in the previous table. Each quality classification is mentioned briefly, relying on the references that accredit it.

- Inclusiveness, Access and Linkage: This quality is subdivided into two scales, the first one is the proximity, accessibility and linkage degree (Carmona et al., 2008; Lynch, 1960; McCormack et al., 2010; PPS., 2009; Sitte, 1889; Zagroba, 2016).

As for inclusiveness, it is mentioned by several references including: (Balabanides & Philippou, 2015; Carmona et al., 2008; Gehl & Svarre, 2013; Jacobs, 1961; Marcus & Wischemann, 1990).

- Safety: It is a quality that can be described as crucial for the public realm (Carmona et al., 2008; Davis, 1990; Jacobs, 1961; Lynch, 1960; McCormack et al., 2010; Newman, 1972). Gehl (Gehl & Svarre, 2013) actually talks about the safety sub-qualities. Balabanides and Philippou and Van Hecke and his colleagues all insist on the fact that safety and security are at the core of public spaces success (Balabanides & Philippou, 2015; Van Hecke et al., 2018).

- User Centred approach: User centered theories were evolutionary at their time. Creating a space that focuses on human needs and dimensions raised public spaces' value to another level (Alexander, 1977; Gehl & Svarre, 2013; Sitte, 1889). Other researchers focus on another level of user centred approach which is respecting human scale and dimensions in all designs (Balabanides & Philippou, 2015; Gehl, 1987).
- Activities and functionality: Public spaces can be defined as containers that embrace public activities and functions dedicated to the city residents; hence, the functionality and activities held within the public realm, and their efficiency determine the space success. The first scale of this quality is space functionality (Carmona et al., 2008; Corbusier, 1927; Gehl & Svarre, 2013; Mehan, 2016), assisted by the space activities (Balabanides & Philippou, 2015; Gehl & Svarre, 2013; Lynch, 1960; McCormack et al., 2010; PPS., 2009; Van Hecke et al., 2018).

Ultimately it is reaching the efficiency and maintenance scale of functionality (Balabanides & Philippou, 2015; Carmona et al., 2008; Lynch, 1960; McCormack et al., 2010; Van Hecke et al., 2018).

- Comfort: This can be seen as another key element in the public spaces including thermal and environmental comfort (Bosselmann et al., 1984; Carmona et al., 2008; Peng, Feng, & Timmermans, 2019; PPS., 2009). Gehl and Svarre describe several comfort indicators which are used as sub-qualities (Gehl & Svarre, 2013).
- Enjoyment: Its basic categories are reflected in Gehl's studies as the concept of enjoyment (Gehl & Svarre, 2013); it is mentioned additionally in various sources (Mehan, 2016) and others.
- Liveability and Vitality: Together, they form the eighth value. Enjoyment is upgraded into vitality. mentioned as healthy environments and cleanliness which consist of two sub-qualities (Balabanides & Philippou, 2015; Carmona et al., 2008; Gehl, 2007). Sustainability is suggested by Gehl (Gehl, 2007). in addition to liveability and sociability qualities (Balabanides & Philippou, 2015; Gehl & Svarre, 2013; Jacobs, 1961; PPS., 2009).
- Communal qualities: At long last, communal qualities form an important approach to public space evaluation. How the public domain affects the cultural identity of society and preserves its cultural heritage; this is the main focus of Zagroba (Zagroba, 2016), adding the management policy and rules accredited by Linde Van Hecke and her colleagues (Van Hecke et al., 2018).

These qualities work complementary to reach greater success for public spaces. Their cooperation ensures better environments and excellent results.

### 3.2 Benefits of introducing digital media into public spaces

Having a digitalised public urban space has as its main goal the enhancement of space liveability and sociability. This happens by increasing its aesthetics, its accessibility, its level of security, along with its user friendliness, its offered activities and its comfort in order to maintain satisfaction of individuals and in turn increase communal partnership. Digital media and internet use have a great impact on improving the quality of life of individuals. As Ali, Alam, Taylor and Rafiq state this happens by enhancing physical and psychological well-being, promoting self-esteem and facilitating social relationships (Ali, Alam, Taylor, & Rafiq, 2020).

Radwan and Morsi (Radwan & Morsy, 2018) conducted a comparison between a typical public space and a smart public space reaching the following conclusion. Addressing the accessibility aspect of the public realm, a digitalised space is more accessible since it offers digital accessibility, whereby users can access the space virtually, obtaining all sorts of data they need to know and maybe encouraging them to actually visit the place.

Visually speaking, a space using digital media can have the same appealing look than the ordinary space. in addition to beauty, with some added features such as virtual reality and other smart features. Eco-friendliness is a must nowadays, and smart tools make it more applicable and independent of state government. Sociability and inclusiveness are key qualities in public spaces, and must be present whether the space is digitalised or not.

As for management, smart technologies offer a collaborative approach where people can exercise their partnership. Event coordination becomes easier when applying new technologies. User feedback can be

much faster and on the spot, and eventually more frequent than the manual one. And finally, users are allowed to interact with their occupied space to a great extent and in an evolving manner.

This was further documented by the study of digital media tools interventions in public spaces and how they affect each of the nine quality, finally reaching the same conclusion. A digital media tool implementation is always a gain for the public space. Various tools of media can affect the nine qualities of success of public space differently, but at the same time ensure more people involvement, especially people who are suffering from media overreliance. Those will be definitely interested in the renovations of their public domain to suit their interests and emerging needs.

#### 4 METHODOLOGY

The aim of this research is to introduce a new perspective where digital media should be seen not as a harmful tool, but rather as a cooperative feature in the revival of existing urban spaces and public involvement stimulation. This will be achieved by studying the urban public spaces, their overall quality and prospect for revitalisation.

The research is focusing on optimising the public realm by using smart features that are aligned with the enormous current technological development, in addition to taking advantage of the digital media and people addiction and overreliance, turning it into a privilege. And finally, the research is dealing with digital appliances as an attraction to the physical world for all generations, so that they can engage in different social activities revitalising the urban spaces and their significance.

This paper adopts an inductive methodology. It includes a literature review with attention to the public space values and qualities of success, their recess due to overreliance of the public on digital media. This also includes the restoration of the role and importance of public urban space through retrofitting it to a digital era, where tools of digital media are used in public spaces to attract more users, engage them into the public domain and evaluate their experience for future improvement. This is followed by a questionnaire based survey to: (1) determine the users identity and scale of dependence on digital media and their interest into visiting open public spaces; (2) define their perception of the space qualities and success ratio at its initial stage; and finally (3) suggest a set of theoretical interventions -which are suggested but not actually applied in the park due to several limitations- that utilize digital tools in the public space and examine the users' reaction to them. Thus, combining the theoretical findings with the users' perception of the suggested interventions will help in defining a clear assessment process that can be generalised in order to reach a set of recommendations that leads to a better, more adapted urban environment, matches the public needs and their interests, and is capable of attracting and engaging people into social life and a balanced society.

A methodology diagram is shown in figure 1.

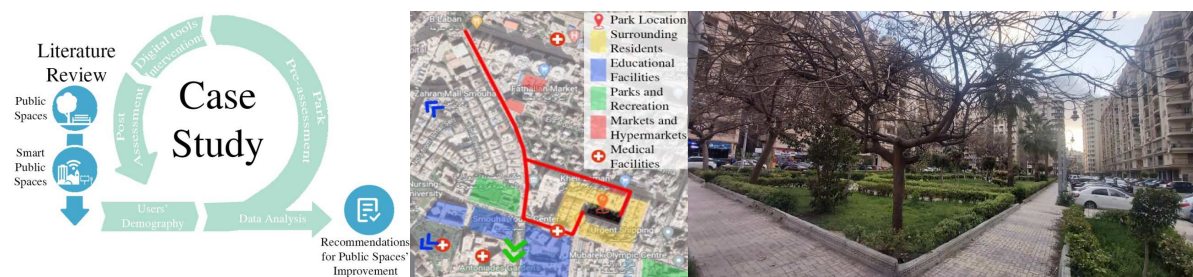


Fig. 1 (left): Methodology Diagram. Fig. 2: (middle) map of the chosen site of the Smouha Neighbourhood Park and its surroundings, Fig. 3: (right) the park space and definers.

#### 5 CASE STUDY

##### 5.1 Settings: neighbourhood park in Smouha, Alexandria

The paper focuses on a neighbourhood park as a case study of the impact of digital media implementation into public spaces. The neighbourhood park in Smouha, Alexandria was chosen. The park is located in the middle of a high income neighbourhood in Smouha at the centre of the city.

The park is at the centre of a non gated compound known as "The Golden Square".

It is surrounded by a number of educational facilities, such as the Faculty of Nursing, Faculty of Economic Studies and Political Science, Mohamed Zahran Experimental School and a couple of smaller schools. Student housing is also nearby, for foreign students. The Mubarak Sports Club and Antoniadis' Garden are also considered as major magnets for the whole setting; not to neglect the existing well known hyper markets.

In addition, several medical facilities exist in the region. Thr Al Salama Hospital also known as Al Andaluseya Hospital, and the medical complex are considered to be only streets away from the designated park. These significant surroundings are indicated in figure 2, while figure 3 shows a perspective of the park.

In the last decade, the site was known to be a great attraction for commercial activities. Lots of restaurants and cafes were built to draw more youth to spend extra time there in social and common activities.

Nonetheless, the overall activity index in the context does not rise to the offered amenities. The outdoor activities, and park liveability seem to be in question day after day.

## 5.2 Data collection and analysis

An online survey dedicated to the park users was undertaken at the end of April 2022, it reached people who are generally engaged in the park or periodically pass by it. The residents in the adjacent apartments, were also encouraged to take part in the questionnaire in order to make their voice heard in terms of how they assess the park's existing situation and, more importantly, how they evaluate the proposed interventions in it.

The questionnaire was undertaken to determine the park's overall existing qualities' status, and to suggest interventions using digital media technologies and to explore the impact of digital media use in the public domain. The survey was divided into four sections. Section 1 was used to categorise the users and participants into groups according to their gender, age range, highest educational degree obtained, city residency, dependency on digital media, frequency of their visit to the park, duration of their stay, preferred timing of the visit and pattern of the visit whether alone or in groups. Section 2 was dedicated to assess the park qualities in its initial status and current situation. Questions about the nine qualities of success of public spaces reached in the literature review were included. Each quality had a set of sub-qualities -a result of the theoretical study as well, dividing each quality into a variety of scales (from two to six sub-qualities). They were submitted to the participants to check whether they find them present in the park. Section 3 introduced four park interventions to the users -adaptive lighting system, mobile application, public art interactive screen and media facades-, who were asked to assess the qualities of the space all-over again taking into consideration the impact of the suggested interventions on the public space setting.

The analysis began with a descriptive analysis of the participants in the questionnaire to be linked afterwards to various perception of quality evolvement. Then an analysis of the sub-qualities offered by the space at its initial state and the evaluation of its qualities before any intervention was made. Afterwards, the suggested implementations and interventions were analysed, followed by the qualities' assessment after the use of digital media.

Finally, a comparison was made between the qualities achieved before and after, qualities were ordered according to the degree the media tools impacted on each of them. Furthermore some filters were added to identify how different user groups perceived the impacted qualities.

## 6 RESULTS AND DISCUSSION

### 6.1 Demography of the sample

The online questionnaire investigated a sample of 66 users of Smouha's Neighborhood Park. Regarding the limitation of data related to the total park's users' count, this sample is considered to be the largest reached users' set. More than half of the participants, 37 users to be exact (56.06%) are between seventeen and thirty years old making up the majority of the participants from the young adults. Male participants are slightly exceeding female participants by 8 users. The ratio is (56.06%) males to (43.94%) females.

Since young adults were the majority of the participants, (66.67%) they state to have a bachelor's degree. Concerning the participants' dependence on digital media, which is a major personality aspect affecting the assessment of the park, all participants state having some sort of dependence on digital media, varying from

large, average and low dependence, the majority having average dependence (60.61%). (95.45%) of the sample are residents in Alexandria.

As for the information dealing with users' relation with the designated public park, the preferred timing for users to visit the park is not clear. Most of the participants (40.91%) mention visiting it equally by daytime and nighttime. As for the visit pattern whether alone or in groups, no specific pattern is identified, given the fact that (53.03%) of users practice both patterns. The frequency of the visit is a major characteristic. Users with the least visiting ratio -less than once a month- are at the top of the list with (33.33%) of participants. While the duration of the stay indicate that most of the park's users (63.64%) are not active users, they are only passing by the park on their way not actually spending time engaging in the park's activities. The previous numbers indicate a distinctive mass behaviour that encourages people, especially the residents nearby public spaces. to neglect the common domain and subside from it for their daily routines and life pattern. Whether this is due to a deficiency in the quality of the space, or a negative trend in public behaviour following the overreliance on digital media, the problem remains a fact and a challenge to the existing public setting which is transforming into a lost space.

## 6.2 Users' perception of park qualities before digital media tools implementation

Following the demographic assessment, the participants proceeded in the questionnaire to identify how they evaluate each quality of success in the park. Sub-qualities from the literature review were introduced as a checklist to mark whenever each one is present. Hence every quality is defined by its own parameters, which therefore are used to assess the overall quality score and how far it is present in the existing park situation. This section is focusing on each quality segregation and the sub-qualities evaluation.

When assessing visual qualities, the degree of legibility of the park takes the lead with 26 votes. The distinctiveness has the least points, only 12 participants say the park is distinctive.

Inclusiveness, access and linkage defined in proximity and accessibility qualities exceed the coexistence value, 46 to 22 points consequently.

As for protection, it seems that the park is highly protected against traffic and accidents, 36 participants affirm they felt secure from vehicles' movement. While the protection against climate conditions is not a clear priority in the design, only 6 users assume they are protected against environmental aspects.

The user centred approach evaluation concludes that the proportion of both sub-qualities is three-quarters to one quarter, with human scale standing out as a major aspect of the park design.

In activities and functionality assessment, more than half of the users (28 user) admit that various activities are offered at the park. On the other hand only 13 participants vote for the functionality of the space.

Comfort can be referred to a lot of factors, including walkability which is the most distinctive possibility at the park, with 43 participants votes. The least common one (12 votes) is the ability of the users to play and unwind.

Assessing enjoyment, scale and the sense of enclosure are definitely impactful in terms of people enjoyment. 23 participants say that they enjoy the park thanks to its ambiance. Only 4 participants mention that they enjoy their experience and activity in the park.

As for liveability and vitality, 31 users assume that the park has an effective role in nature preservation and sustainability. 13 participants vote for the park's cleanliness, which can indicate a certain deficiency in the maintenance of the park.

Finally, communal qualities is reflected in the interesting fact that the park visitors see the public space as a reflection of the city policy and interest in open spaces, and the value of their involvement in the decision making process. 25 participants vote for the park being an active sector of the city policy. As for the least scoring sub-quality, only four users mention the park as having a cultural and historical heritage to communicate.

The following pie charts (figure 4) show each quality division, and points reached for every sub-quality :



Fig. 4: Pie charts showing the public perception for sub-qualities presence at the initial park status.

### 6.3 Selected tools and their implementation

A set of digital tools were selected according to the preceding studies comparing different media technology applications and their effect on the public space where they are implemented. Hence, the four most impactful tools were introduced to the survey's participants as suggestions for implementation to assure the greatest possible impact on the park's quality. The four tools were theoretically proposed to the public, with relevant illustrations and descriptions, but without their actual implementation due to several limitations.

The four tools are adaptive lighting system, mobile application, public art interactive screen and media facades.

Interventions can be described as follows:

Intervention 1: Adaptive lighting system, varying between the ground spots and the light fixtures, both responding to public presence by becoming more warm in colour. This is in addition to the lit seats at the centre of the park, and the lighting fixtures for the plants and trees.

Intervention 2: Mobile application that is downloadable and shows its user whenever there is an event occurring in the park. The application also can be connected to the public screen to show information about the park and its entourage. In addition to this, the user can select a certain music instrument to play when he/she comes by the light fixtures. Hence more people will be moving around experimenting different sounds and interacting with other application users.

Intervention 3: Interactive public screens are installed at the centre of the park, inviting users to spend time there experimenting and making public art and drawings that will be projected on the building's facade behind the screens.

Intervention 4: A video mapping technology facade, where the drawings are projected on the screens, making the space more intimate and personal to each of the users, who can easily feel ownership and see his/her own effect and contribution.

The following figures (figure 5-8) show the suggested interventions.





Fig. 5: (left) interventions 1 and 2, Fig. 6: (right) intervention 1.



Fig. 7: (left) interventions 1,2,3 and 4, Fig. 8: (right) intervention 1 and 2.

#### 6.4 Users' perception of park qualities after digital media tools implementation

Participants in the survey were asked to re-assess the space qualities -after going through the illustrations and suggestions of interventions- following the same preceding process of the sub-qualities evaluation in terms of the suggested media interventions. Thus, the assessment remains theoretical, and not evidence based, however it closely interprets and anticipates the public's reaction to media interventions. Qualities were identified and evaluated to reach the following conclusions:

Visual qualities are greatly affected by the proposed interventions. Sub-qualities are differently affected, to the extent that they varied in order. Distinctiveness and attractiveness are major impacts of the interventions, from being last two before the media tools implementations, to scoring 30 points each after interventions. This was followed by artistic values, then by the degree of legibility which actually decreases after the intervention.

Inclusiveness increases, with no distinctive transformation in sub-qualities proportions. Proximity and accessibility are still at the top with nearly two third of the participants votes.

Protection is also affected as a total value, not on the scale of sub-qualities proportions. However the least scoring qualities from the initial stage rise up to represent about (50%) of total votes for the quality. Still, the traffic protection is at the top of the parameters with 42 points. Climate protection is last with only nine votes.

The user centred approach witnessed a major improvement, specifically in its dedication for people needs and interest. Still it comes second with 34 participants' votes against 40 for respecting human scale.

Activities and functionality show a general increase. Functionality improves greatly, to move from last to second position, almost first with the activities availability with only one vote difference. Efficiency and quality come last with 19 votes.

Regarding comfort, lots of new possibilities emerge. Still the walkability is at the top, with 52 points. Standing and staying increase to score second of the group with 37 points. Then, there is the ability to see around, very close to the sitting facilities that are added by the proposal to reach 32 points after only scoring 17 points. Hearing and talking come next, and finally the possibility to play and unwind, which remains last. However it increases by 9 votes.

Enjoyment improves while maintaining the same hierarchy. Nonetheless, the enjoyment of positive aspects and positive sense of experience are subjected to the greatest increase, scoring 23 and 22 points which is approximately (20%) of the quality each, when they were only (7%) and (14%).

As for liveability and vitality, sustainability decreases, healthiness and sociability rise to score first and second with 40 and 31 points. Afterwards, there is sustainability. And finally cleanliness which increases considerably indicating that having this sort of projects implemented in public spaces will definitely mean more maintenance and responsibility from both sides, decision makers and users.

Last but not least is the communal value. Still maintaining their approximate proportions, the participation of the park in city policy reaches 38 points, followed by its social value (26 points), and afterwards the cultural and historical impact with 8 points. Charts are shown in the next figure (figure 9).



Fig. 9: Pie charts showing the public perception for sub-qualities presence after the suggested digital media interventions.

Sub-qualities are subjected to major changes reflected in the large improvement when comparing their scored points before and after the media interventions. Some sub-qualities are more impacted, nonetheless no category shows a decrease in its attained points.

### 6.5 Comparing the park status before and after the experiment

An analysis was undertaken to compare each quality score of points -whenever a sub-quality is achieved a point is added to the overall quality score- before and after the suggested digital media interventions. However the score of the qualities are not to be compared to each other as it depends greatly on the number of factors and sub-qualities for each one which varies from two to six sub-qualities.

What can be viewed in proportion to each other is the score of each quality before and after the digital tools interventions and how much it improved.

Visual qualities has improved from 74 points to reach 107 points after the media interventions, which means the visual values are (45%) more present. Inclusiveness, access and linkage begun with 68 points. then has increased by (19%) to achieve 82 points after implementation. Protection has risen from 63 points to 85

points. A total of an increase of (35%). User centred approach scored 44 points before and 74 points after, with an impressive jump of (68%). Activities and functionality had 59 points, then they have escalated to 90 points improving by (53%) of the total quality. Comfort has made it from 155 points to 203 total points with (31%) additional points. Enjoyment begun with 57 and has reached 113. Digital media has succeeded in raising the enjoyment state by (98%) which is a huge impact factor. Liveability and vitality have been transformed from 87 points to 124 points, with (43%) more quality evidence. Communal qualities had 44 points and have reached 72 point after media involvement. (64%) of the quality has developed thanks to the innovated interventions. The results are shown in figure 10.

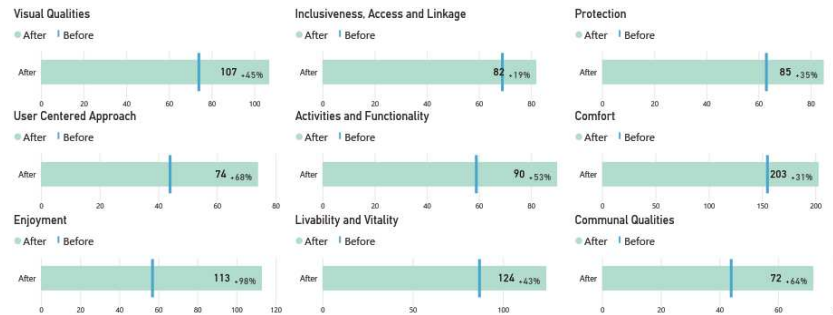


Fig. 10: Indicating each quality total points before and after the digital media tools implementation, as well as the added percentage due to media interventions.

According to the previous analysis, it is undisputable that -when confronted by the digital media tool implementation into the public space- all qualities improve greatly, showing more impact on some sub-qualities than others, however always reaching the same conclusion. Digital tools succeed in attracting more people into the public space and engaging them within, creating new interrelations between users and the space, which ensures the memorable, enjoyable experience in the open space.

## 6.6 Impacted qualities scale

Depending on the previous findings, the next step is to analyse the relation of qualities growth -putting the participants total number and each quality ranking in the equation-, in order to determine the most and least affected qualities by the interventions suggested. This will definitely lead to better decision making for future implementation of media tools into different public spaces.

The space respect for user centred approach is the lead quality with (22.7%) more configuration of the quality from the initial stage to the proposed one, respecting the total amount of increase possibility. Followed by enjoyment and communal qualities which both score (21.2%) improvement when taking the digital tools into consideration.

Activities and functionality come third with (15.7%) difference. Afterwards come liveability and vitality of the park (14.0%). Visual qualities come next (12.5%), more aesthetics are achieved. Comfort evolves closely, with (12.1%). Inclusiveness access and linkage score (10.6%) more points. And finally, protection with (8.3%) additional weight after media implementation.

The qualities order generally reflects the users perception of the improvement of each quality from its initial stage which was the park state, to the final stage after the suggestion of the implementation of all media tools, the interactive lighting, the mobile application, the interactive art screens and the media facade on buildings in front of the park, taking into consideration the total number of survey's participants, and each quality sub-qualities number.

The next graph (figure 11) represents the impact factor on each quality (how much it has improved from the initial stage, to the final stage with the suggested tool use).

People seem to acknowledge more the fact that integrating technology into their public spaces will definitely increase how it is dedicated to them and reacts to their needs and aspirations, their enjoyment in the park, and how well they feel influential and heard, simply by being in the public realm and how they sense ownership and pride when they spend time there.

In parallel, they seem to appreciate the effect of media implementations but not exceeding protection measurements in public spaces. However, the least impacted quality is still accredited as being positively affected by media tools interventions.

These were the results of the whole sample of survey's participants. The next analysis shows a comparison between certain groups leading to a better understanding of each groups' needs and interests.

### 6.6.1 Analysis of impact according to user's dependence on digital media

When applying the rank order of qualities to certain groups, interesting facts and orientations became clear. One of the most important filters is the degree of dependency of the users on digital media. Since the main problem definition was related to media overreliance, it is anticipated that the solutions offered will have more impact on people who actually suffer from media addiction and depend on media tools greatly. The results of this comparison are shown in the next graphs (figure 12).

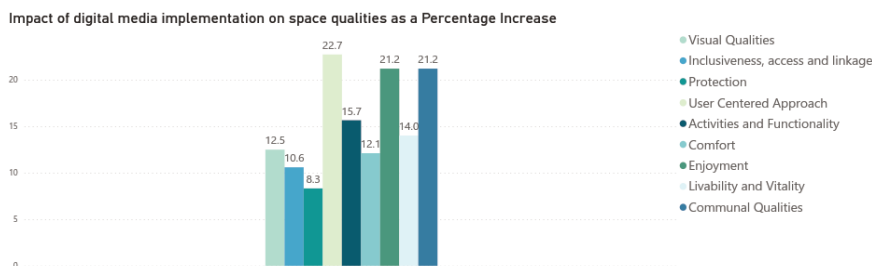


Fig. 11: Chart showing the impact percentage of digital media implementations on each quality.

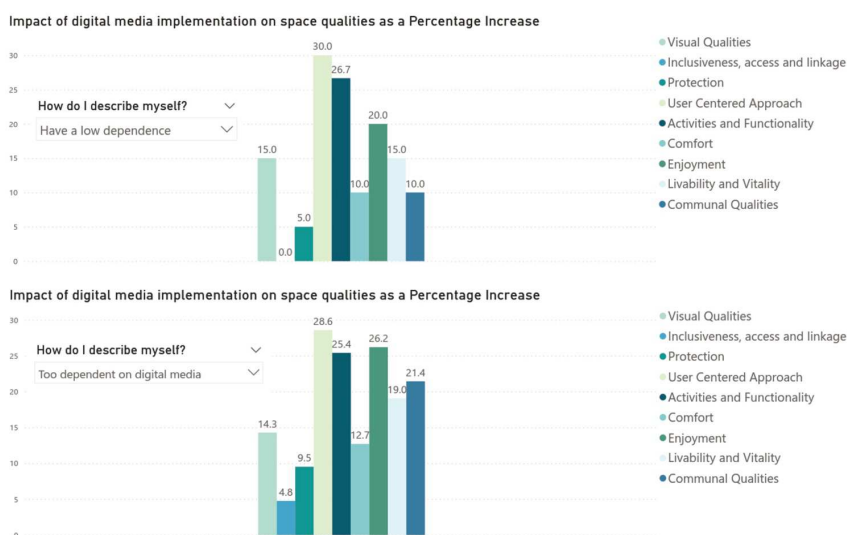


Fig. 12: Graphs comparing the impact of media implementation on qualities of success for both groups, the one with the least dependency on digital media, and the one with the highest dependency on media.

Most of the qualities improvements are more significant for the group with major media overreliance. Visual qualities, user centred approach and activities and functionality are the qualities which achieve better scores of people with low dependence on media. The fascinating fact is that inclusiveness, access and linkage evolution seem to be have no significant weight for people with the least addiction rates.

Hence, while the highest improvement factor is identified by the low dependent on digital media group, the overall assessment of the qualities' evolution is greater for the highly dependent on digital media group, which was anticipated.

### 6.6.2 Analysis of impact according to user's frequency and duration of visit to the park

The next applied filters are consecutively the frequency of the users' visits to the park and the duration of their stay. The selected groups are the ones with the highest frequency and the ones with the highest duration of visit respectively, since these are the groups that recorded meaningful findings. It is a necessity to mention that when reviewing the groups with the lowest frequency and duration of stay, a similar and close result to the overall impact of digital media on space qualities was registered. Hence, came the necessity of exploring the impact on space qualities according to the opposite groups, and the results were astonishing, as shown in the next graphs (figure 13, 14).

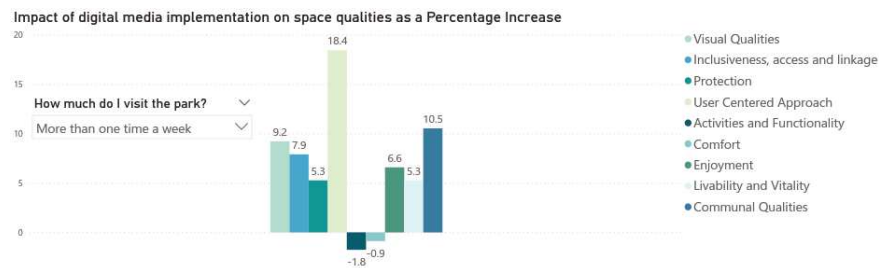


Fig. 13 Showing the impact of digital media on space qualities according to people visiting the park for more than once a week.

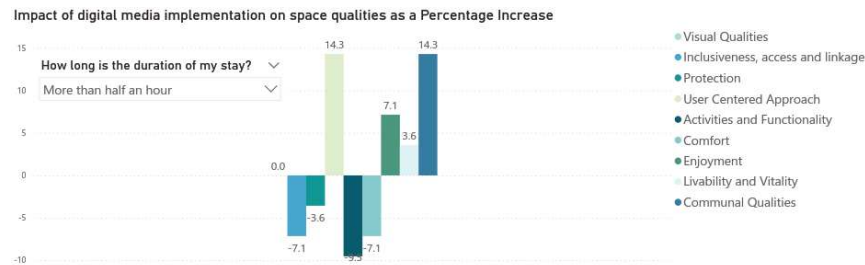


Fig. 14 Showing the impact of digital media on space qualities according to people visiting the park for more than half an hour.

It seems that users with the highest frequency of visits, and the highest duration of stay have a certain resistance to the change suggested in their beloved public space. Qualities such as activities and functionality and comfort have scored lower grades after the interventions according to both groups. This is in addition to inclusiveness, access and linkage and protection, which both witness a remarkable decrease after the media interventions according to the group with the highest duration of stay in the park. Visual qualities seem to remain constant according to this same group too.

## 7 CONCLUSION AND RECOMMENDATIONS

Public spaces will definitely remain a core element to each society. However, the innovative public behaviour that leans towards media overdependence has shown great impact on personality traits and consequently on their behaviour towards the public realm. Public spaces are becoming more deserted than ever with this tendency to overcompensate physical and concrete interactions with virtual ones.

This does not have to be the case since digital media can be used in both ways, as a harmful tool causing people isolation and introversion as well as being used as a space revitalisation enhancer. The research case study affirms the credibility of media tools' use in order to improve public space attraction and people's engagement in it.

According to the findings, qualities assessed for Smouha's neighbourhood park before media interventions greatly improve to reach new benchmarks of the space qualities when suggesting the four media interventions (interactive lighting, mobile application, interactive art screen and media facade).

When ordering the qualities depending on the participants perception of how they were promoted, the reached conclusion is that the user centred approach of the public space comes first as being the most affected by the digital implementation. Public enjoyment alongside with the space's communal value come second. Then there is the space's activity and functionality impact, followed by its liveability and vitality. Visual qualities have improved considerably too, taking the fifth place. Comfort comes next. Inclusiveness, access and linkage also are enhanced but slightly less than the preceding qualities. And finally there is the protection evolution.

People with the highest media dependence seem to benefit more from the implementation suggested, since they record better rates of qualities' improvement. People with less dependence assume that qualities will be affected less by those interventions, even the media tools effect on inclusiveness, access and linkage quality may not be significant at all according to them.

Additionally, when taking the regular visitors as the filtering group, it seems like they have some resistance to the change, which appears in some of the qualities regression rather than improvement. Casual visitors on the other hand show different results, they seem to be more willing to visit and spend time at the park. Based on novelty, this might be a short term effect of the media installations, that definitely cannot compensate the

actual users who seem to be resentful of the suggested interventions. Though, the questionnaires' participants acknowledge the effect of media tools not only on their willingness to visit the park more often - which could be a short term consequence of the innovative offered experience- but mainly on all park's qualities. They record an improvement in the park's visual qualities, its attractiveness, access and inclusiveness, its safety measurements, its dedication for users, the activities held inside, people's enjoyment within, its livability and its communal effect. Hence, since the overall quality of the park is anticipated to improve with these installations, affirmatively media have positive long lasting effects concerning people's attraction and engagement. This could be accredited by a concrete assessment after the in-site implementation of the media tools, and their integration into the park's life for a year or more to investigate longer terms' impacts.

Interestingly, by exploring the participants needs, it is clear that the listed missing elements and problems in Smouha's park, are ones that could be easily addressed by the use of media, whether with the suggested interventions or similar ones, since most of the park users are highly dependent and attached to media technologies. Which is the case for most of the public nowadays, and can be generalised as a major prospect for public spaces revitalisation. Media involvement in the design can definitely guarantee more people attraction and consequently their engagement in the offered renovated public realm.

At the end, this study offers new prospects for further research on public spaces needs and capabilities. Alongside with these findings, a clear understanding of the degree and significance of urgency and priorities can be reached. Merging field surveys to determine the weak qualities in the public space, with the anticipation of the impact of specific media tools on each quality, will ensure the revitalisation of those public domains. The assessment of the affected qualities is crucial in helping the decision makers setting-up action plans, devise budgets and establish effective phases for implementations, finally leading to a remarkable public space development process.

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