POTENTIAL OF DIGITAL MEDIA FOR PUBLIC SPACE VITALITY THEMATISATION

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ABSTRACT

The presence of digital media in everyday life and the shift of the public sphere from physical to virtual spaces influence how we plan and design public spaces. As places of urban vitality, public spaces become living laboratories for examining how the choice of digital media affects ambience through urban planning and design. This research aims to promote the vitality and resilience of traditional urban structures in today's networking society. This research evaluates media as integral to public space, examining their capacity to convey information and serve as a core spatial component of thematisation. Four morphologically diverse spaces in Belgrade were analysed according to distinct criteria for effectively integrating digital media within physical urban space. The findings of this research highlight various links between digital media and urban space, allowing for the interactive embodiment of planning and design concepts from child-friendly *ludic cities*, particularly in relation to adapting spatial information for entertainment and educational purposes across *creative cities* and *historic city*, regarding the capacity of digital media to convey social values in public spaces, extending to the concepts of *smart cities* and *liveable cities*, in terms of utilising interactivity to meet the everyday needs of inhabitants.

KEYWORDS _ *Vital place, digital media, public space, interactivity, mixed-reality space*

INTRODUCTION

The novelty in this research lies in the potential of digital media to aid in implementing urban design concepts through the thematisation of public spaces. This paper examines the relationship between the characteristics of public space and the conveyance of values associated with urban design concepts, including *Historic, Creative, Ludic, Smart*, and *Liveable cities*. It outlines specific prerequisites for the space and technology required to implement one or more of these concepts in public spaces. Taking over the role of traditional spatial elements to convey various kinds of information about urban space – its activities, meanings, and networks - digital media levels with traditional markers of spatial information within existing urban design concepts.

The paper is divided into three sections. The first section provides an overview of urban design concepts and site analysis principles that serve as a basis for exploring the vitality of urban spaces by integrating traditional urban design principles with their contemporary potentials and features. The second section addresses the ability of digital media to act as an element of urban design for thematising public spaces. It identifies benchmarks for evaluating their potential to convey the vitality values of various urban areas by establishing their ability to guide, present information, connect various information networks and persist in public space.

The paper's third section tests the criteria and principles of communicating the vitality of urban spaces in four distinguished contexts in Belgrade. The chosen sites for testing the characteristics and methods of vitality thematisation through digital media include 1) Kalemegdan Park and Fortress; 2) the dense urban core of the historic city centre around Students' Square; 3) New Belgrade riverbank; and 4) open modernist blocks in New Belgrade – Sava Blocks 70 and 70a. When evaluating media for spatial thematisation on sites with entirely different vitality indicators, it is possible to define the thematisation potential applicable in distinct urban contexts and those linked to the existing users and habits in public space.

This research analyses four spaces in Belgrade, each with different dominant functions: culture, education, play, heritage, and recreation. Cross-referencing these functions with urban design concepts reveals the potential for thematisation of urban spaces through digital media. This method is tested in specific areas, leading to broader conclusions about digital media in urban contexts. The findings provide a new approach to site analysis and outline steps for linking spatial characteristics and habits to digital media features, thereby enhancing media applications in contemporary urban planning based on established design concepts.

BACKGROUND RESEARCH

To perceive the spatial multifunctionality of space in a relational and multidimensional way (Živković et al., 2019), digital media should assist in reactivating spatial values through interactivity environments. The concept engages visitors in communicating with public spaces through interactivity and storytelling, as described in the *Creative City* concept by Charles Landry (2006). Artistic installations, open-air galleries, street art, and spatial markers convey meanings to users. In historical cities like Belgrade, creative industries and public space revitalisation thematise public space and articulate its vitality (Landry, 2006, p. 45). Mixed reality environments optimised for youth and gamified elements provide a new design approach for a child-friendly city, creating spectacles as defined by Stevens in the *Ludic City* (Stevens, 2007).

Utilising digital media creates complex datasets that link physical spaces to intangible information. This transforms locations into references within the virtual world (Del Signore & Riether, 2018). As urban connectors, digital media focus on a specific physical space while allowing interaction across various spaces and times (Ethier, 2016). Therefore, digital media enable the experience of the continuities of the time-space-society link, as proposed in defining the *Historic City* (Özarslan, 2003).

Finally, this paper proposes using the *Smart City* concept to assess how digital technologies can enhance public spaces and interactions from the perspectives of digital infrastructure, information sharing, and user engagement (Aurigi, 2012). This contributes to various aspects of daily life and supports the *Liveable City* concept, promoting residents' well-being through promoting community values (Chazal, 2010). Leveraging urban design principles, digital media are viewed through interactivity, conveyed information, required physical infrastructure, and user engagement, thus linking them to implementing specific urban design concepts.

DIGITAL MEDIA CHARACTERISTICS

In establishing a connection between digital media and physical space, it is essential to consider spatial and morphological aspects of media. In their broadest categorisation related to the spatiality of the virtual realm, media can be divided according to the following criteria: permanent or temporary, personal or public device, range of virtuality of interaction (entirely virtual, mixed, and entirely physical), and their ability to establish interaction between user and space as a point, path or network (Mladenović, 2023). From the aspect of interaction with users, media is observed through its elements of interaction, such as active or passive, individual or collective experiences, or gamified or formal storytelling abilities. Following these sets of criteria, each category has either/or choice, which determines the appropriate application of digital media in urban design (Table 1).

Table 1: Criteria for choosing digital media

Digital media type	Permanent	Personal device		Offers choice	
	Temporary	Public device		Is predefined	
Interaction with the user	Active	Immersive		Individual	
	Passive	two-dimensional		Collective	
Spatiality	In-situ	Requires physical 'anchors'		Virtual	Point
	Remote	Independent of physical space		Physical	Path/ Network
Information sets	Text	Image	Game	Video	Sound

When thematising urban places, it is crucial to examine existing information in the physical space and define the character of planned interventions. For educational areas, key criteria include proximity to institutions, safety of public space, and the area's storytelling potential. Digital media enhances experiences by adding layers of information based on spatial potentials and limitations. Using an algorithm based on doctoral research as a checklist (Mladenović, 2023), designers can identify the most suitable media for each space, with specific details (such as VR, AR, QR codes, 3D projection mapping, etc.) guided by the expert's choices for space usage. Thus, digital media reveals spatial information sets and shapes the space's character by adapting data to design concepts.

Thematisation by digital media

Thematising public spaces with digital media involves analysing key features such as functions, dominant users, spatial habits, and the potential for thematic communication. The educational and entertainment value relies on the effectiveness of the presented information and engaging elements. Media act as networking tools in urban design due to their mobility and role as enhancers in public spaces. Various media (QR codes, VR, AR, holographs, 3d projections, interactive boards) can cater to specific spatial needs, while large or stationary devices like VR and immersive installations are excluded.

The potential for thematisation is based on recognising existing spatial patterns and extending meanings into a virtual realm. It follows urban design concepts (*Historic City, Creative City, Ludic City, Smart City, Liveable City*) by gamifying, informing, and connecting spaces to enhance urban vitality.

POTENTIAL FOR DIGITAL THEMATISATION OF BELGRADE'S CASE LOCATIONS

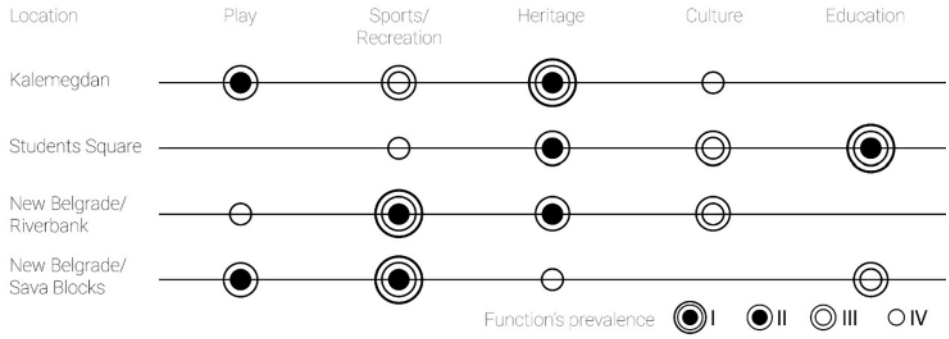


Figure 1: Function's prevalence in each location

In the following section, four central urban locations in Belgrade are analysed concerning their potential for digital thematisation. Each site is examined through the lens of the previously discussed design concepts. Selecting more extensive urban networks as case locations demonstrates the potential for integrating multiple media along paths or networks while focusing on individual characteristics. Locations are assessed based on the presence of playgrounds, sports and recreation facilities, heritage sites, and cultural and educational institutions to determine each space's key traits (Fig. 1).

Kalemegdan Park and Fortress

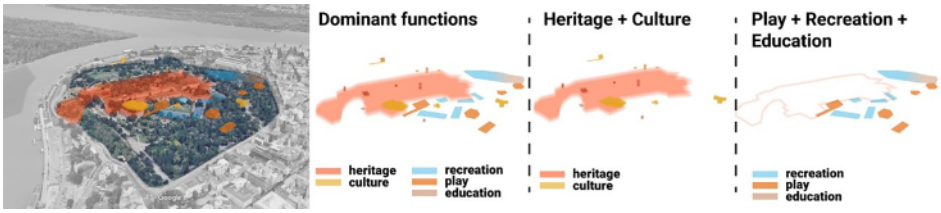


Figure 2: Dominant functions of the Kalemegdan Park and Fortress area

Situated in Belgrade's historical core at the confluence of the Sava and Danube Rivers, Kalemegdan Park and Fortress is a prominent tourist site with a cumulative heritage area spanning from the Roman period to the present, as well as a contemporary neighbourhood park. Its spatial structure is divided into the Lower Town and the Upper Town. The Upper Town, enclosed within fortress walls, features monuments from various periods and seven cultural institutions, including museums, exhibition spaces, a planetarium, and conservation institutes. The Lower Town primarily serves as a recreational zone, featuring five playgrounds, five tennis and basketball courts, amusement parks, and the Belgrade Zoo, which supports both recreational and educational functions (Kruger & Viljoen, 2023).

Key findings: The urban infrastructure characteristics of this space make it a safe area, as it is entirely pedestrian-friendly. The majority of children-oriented spaces in Lower Town determine the major user group of potential digital media, whereas the secondary group of users are tourists. These groups define the dual potential of digital media assessed by using space as a gamified spatial spectacle. It provides contemporary interaction between users and space by extending physical playgrounds into the virtual realm, serving as interactive guides that offer additional information about Kalemegdan, its heritage, and its surroundings. This way, digital media can potentially thematise space through two concepts: 1) a child-friendly *Ludic City* through a playful space of mixed-reality play and 2) a *Creative City* as an interactive exhibition network connecting Kalemegdan's cultural heritage sites.

Students' Square

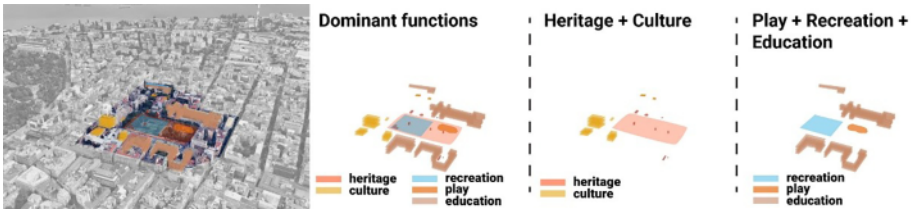


Figure 3: Dominant functions of the Students' Square area

Students' Square is situated in the centre of the historical area of Belgrade, surrounded by the buildings of eight faculties and three museums, defining the primary character of the space as a leisure park area among educational institutions. As a secondary carrier of the character of this space, there are nine monuments and markers of heritage sites, as well as numerous heritage layers hidden beneath the contemporary urban tissue (Mladenović & Živković, 2023), providing the location with storytelling data. The park has recreational spaces divided into a playground on the eastern side and pathways and urban greenery to the west (Fig. 3).

Key findings: Digital media in this location provide the potential for designing mixed-reality spaces for informal education by linking urban space to higher education, defining interaction as edutainment in a digital environment. They can enhance heritage sites and extend faculties and museums into virtual spaces, transforming Students' Square without physical changes. Using outdoor education and mixed-reality exhibitions, they help implement the *Creative City* concept through various multimedia displays that connect virtual and physical locations of the park and surrounding museums and heritage sites. In line with the *Smart City* concept, digital media can play educational roles, providing content that enhances understanding and showcases local faculties in virtual spaces.

New Belgrade Riverbank

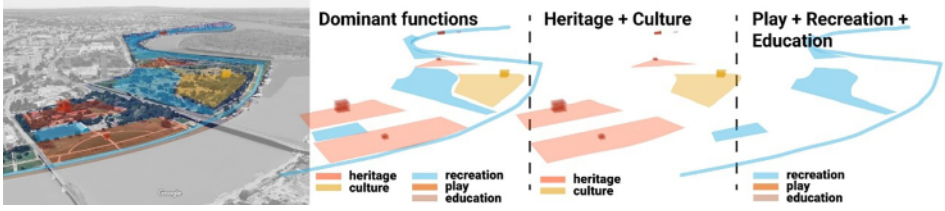


Figure 4: Dominant functions of the New Belgrade Riverbank area

Following the Danube and Sava Rivers, the New Belgrade Riverbank features a linear network of public spaces, stretching from the Staro Sajmište site on the Sava to the Zemun quay on the Danube. While the quay primarily serves recreational purposes, the adjacent zones shape how digital media is effectively utilised. Starting with the Staro Sajmište Memorial—an important dark tourism site located between the Old Sava and Branko's Bridges—this commemorative area is separated by urban greenery, giving it a distinct spatial character. Beyond the greenery, the influence of the Museum of Contemporary Art and its gardens, which extend into Friendship Park, shifts the character of the quay. The riverbank continues toward Zemun, incorporating recreation areas near the ruins of Hotel Yugoslavia and the former Zemun Railway Station.

Key findings: A sectioned thematic approach is needed due to the area's diverse character. The former WWII concentration camp zone requires a respectful application of *Historic City* values, utilising digital media for musealization and education in non-gamified, discreet forms, such as interactive boards. Around the Museum of Contemporary Art, digital installations can support the *Creative City*

concept, integrating virtual and digital art into the surrounding park and quay. For the broader quay area, digital media can enhance sports and recreation through smart checkpoints and exercise monitoring, aligning with *Smart City* goals.

New Belgrade Sava Blocks (70 and 70a)



Figure 5: Dominant functions in Sava Blocks 70 and 70a

The dominantly residential area of the Sava Blocks in New Belgrade represents a typical morphology of modernist blocks in a broader urban context. While the architecture of the residential buildings is considered a valuable example of modernist architectural heritage, it primarily functions as a residential zone (Dragutinović & Nikezić, 2020). As such, it is complemented by recreational elements, such as playgrounds and sports fields, which define the neighbourhood's character on the left bank of the Sava River. In the observed blocks (70 and 70a), there are sixteen sports fields and sixteen playgrounds, as well as two promenades: one on the quay, connecting the quay and the marina, and the other inside the residential zone, connecting the recreational spaces of four Sava Blocks by the river. There are four educational buildings – kindergartens and schools - and one library located in the middle of the commercial area of Block 70.

Key findings: Optimising the use of digital media for spatial thematisation in this area is linked to strengthening the community and providing new types of interactions with everyday spaces. While some thematisation can be associated with promoting modernist heritage through methods of the *Creative City* concept, the primary nature of the area as a residential zone with spaces for recreation and play presents the potential for thematising space as gamified recreation within an extended *Ludic City* space in mixed reality. Additionally, it can serve as a governance tool for engaging citizens on important community issues. In this way, digital media not only enhances interaction with space but also optimises the liveability of the neighbourhood and treats spaces as inclusive by offering a multilayered interface for communication between communities and institutions.

CONCLUSION



Figure 6: Roles of digital media related to urban design concepts

Based on their ability to convey different information about space, digital media have the potential to take over the functions of physical installations, enhancing vitality in urban areas. Following urban design concepts common to "physical" design and translating them into the potential for digitising urban areas offers a broader field for creating interactive spaces.

Structuring the potential of media according to the dominant functions and users, the thematisation of urban areas and their vitality can be implemented seamlessly by emphasising the elements that already exist in space. With a thematisation role, media can become key spatial features of storytelling in historical sites, such as in the Upper Town of Kalemegdan, or expand the existing activities of cultural and educational institutions beyond the buildings into open spaces via virtual and mixed reality, as seen in the dense area of Students' Square. Additionally, digital media can act as checkpoints and monitors, impacting the digitisation of recreational activities, and serve as a communication platform for community strengthening, thus implementing the Smart City values into dominantly residential areas, such as Sava Blocks. The media's potential to gamify public spaces influences the contemporary design of child-friendly spaces by expanding playgrounds and interactive zones of spaces into the virtual realm, connecting the analogue and digital habits of users through urban spaces.

The implications of this research, which form a step in evaluating spatial character for thematisation, lay the groundwork for design guidelines for the subsequent selection of specific digital media applications and individual media for each spatial situation. Ultimately, this approach supports a more context-sensitive integration of digital media into urban design, positioning technology not as an add-on but as an active agent in shaping spatial identity, fostering public engagement, and enriching everyday urban experience.

REFERENCES

- Aurigi, Alessandro. 2012. "Reflections towards an Agenda for Urban Designing the Digital City." *URBAN DESIGN International*, no. 18 (December): 131-144. https://doi.org/10.1057/udi.2012.32.
- Chazal, Jacqueline de. 2010. "A Systems Approach to Livability and Sustainability: Defining Terms and Mapping Relationships to Link Desires with Ecological Opportunities and Constraints". *Systems Research and Behavioral Science*. No. 27: 585-597. https://doi.org/10.1002/sres.1058
- Dragutinović, Anica, and Ana Nikezić. 2020. "Unforeseen Impulses of Modernism: The Case of New Belgrade Blocks". In: *100 YEARS BAUHAUS: What interest do we take in Modern Movement today?*, edited by Uta Pottgiesser, Franz Jaschke, and Michel Melenhorst, 32–45. Lemgo: Technische Hochschule Ostwestfalen-Lippe. doi:10.25644/J4D2-6227.
- Ethier, Guillaume. 2016. "Connecting the Dots: How Digital Culture Is Changing Urban Design." *Contour Journal,* vol. 1, no 2: 1-10.
- Kruger, Martinette, and Adam Viljoen. 2022. "Encouraging Pro-Conservation Intentions in Urban Recreational Spaces: A South African Zoo Perspective." *International Journal of Tourism Cities,* vol. 9, no 1: 244-267. https://doi.org/10.1108/ijtc-06-2022-0156.
- Landry, Charles. 2006. *The Creative City: A Toolkit for Urban Innovators*. London: Routledge
- Mladenović, Milja, and Jelena Živković. 2023. "City as Palimpsest: Visible and Invisible Memory of 'Students Square' in Belgrade." *Facta Universitatis - Series: Architecture and Civil Engineering*, vol. 21, no 2: 275-297, https://doi.org/10.2298/fuace231003016m.
- Mladenović, Milja. 2023. *Modaliteti primene digitalnih medija u prezentaciji kulturnog nasleđa u javnim gradskim prostorima.* Doctoral dissertation. Belgrade: University of Belgrade – Faculty of Architecture
- *Özarslan, Nuray. 2003. "Understanding the Historic City". Tasarim+Kuram*, no. 3. Accessed on 12. April 2025 at https://dergipark.org.tr/en/download/article-file/209269
- Del Signore, Marcella, and Gernot Riether. 2018. *Urban Machines: Public Space in a Digital Culture.* Barcelona: ListLab
- Stevens, Quentin. 2007. *The Ludic City: Exploring the Potential of Public Spaces.* London: Routledge.
- Živković, Jelena, and Ksenija Lalović, Milica Milojević, Ana Nikezić. 2019. «Multifunctional public open spaces for sustainable cities: Concept and application». *Facta Universitatis - series: Architecture and Civil Engineering,* Vol. 17, no. 2: 205-219. https://doi.org/10.2298/FUACE190327012Z