



American Journal of Innovation in Science and Engineering (AJISE)

ISSN: 2158-7205 (ONLINE)

VOLUME 4 ISSUE 1 (2025)



PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

Inquiry AI Architecture as an Application to a Post-Pandemic Situation in Dhaka

Rabaya Nusrath Niva*

Article Information

Received: February 02, 2024

Accepted: March 05, 2024

Published: March 06, 2025

Keywords

Community Interaction, Community, Interactive Architecture, Pandemic (COVID-19), Rooftop

ABSTRACT

The COVID-19 pandemic in 2020 has increased domestic violence. People must spend most of their time indoors, forcing them to use technologies like smartphones. Many individuals have gone through periods of unemployment, economic hardship, and faith-damaging family ties. People had no choice but to engage with the virtual environment in these circumstances. In Dhaka, the rooftop was used only as a playground and outdoor recreation location during this incident. Interactive architectural installations modeled after residential neighborhoods may significantly encourage a sense of community belonging, particularly for young and elderly people. Residents may use their rooftops and connect with collaborative architecture that uses all of their senses to communicate with people. This kind of interactivity could be used to combat the pandemic melancholy by mounting interactive architecture on the roof. This article discusses a potential interactive architecture that may be built on the rooftop and foster community spirit to aid the impoverished community during or after a pandemic. The initial objective is to deliver a more comprehensive and up-to-date review of the literature, along with some recommendations for an interactive design that could be used going forward to encourage neighborhood activities and allow the depressed population to engage in a home community. Expanding upon this analysis, the study makes the case for a method that intentionally takes into account the societal, psychological, and environmental aspects of existence.

INTRODUCTION

In December 2019, a coronavirus disease (COVID-19) emerged in Wuhan, China, inducing widespread terror and dread (Hossain *et al.*, 2021). It has spurred a worldwide concern. It is a global health issue (Chen *et al.*, 2020). At the beginning of 2020, the World Health Organization (WHO) labeled COVID-19 a global pandemic. Bangladesh got infected with the virus in March 2020. Bangladesh has been named the second most devastated country in South Asia (Hossain *et al.*, 2021). Self-quarantine practices, mandatory quarantines, travel limitations inside or outside the city, restrictions on overseas flights, and finally, curfews were all used to start social distancing in various countries. Flexible and home office practices have begun at companies, while physical education has been halted and online education has begun (Güzel *et al.*, 2020). Bangladesh's government enforced social separation by putting the country under lockdowns like other countries such as China, Italy, Spain, and India (Rahman & Islam, 2020). People in Bangladesh face economic, psychological, medical, and sociological problems, as well as domestic violence. It entails thusing violence and other forms of abuse to establish dominance and terror in a relationship, making it vulnerable (Hossain *et al.*, 2021). The occurrence of brutality is random or continual in pattern (Kaur & Garg, 2008). During the Pandemic period, familial violence has skyrocketed (Campbell, 2020). Boredom and depression are common psychological phenomena for people. There

is no recorded report on how to treat family violence survivors' physicians in literature (Sharma & Borah, 2020). As a result of the pandemic, people have been compelled to confine their lives to their homes, which has resulted in increasing community activities rather than public space. The pandemic changed people's lifestyles, interactions, jobs, and social and emotional status (Rahman & Islam, 2020). Physical activity and proximity to natural features and greenery are prominent for preserving contentment and physical and mental health, according to studies on health and wellness (Mitra *et al.*, 2020; Jacob *et al.*, 2020; Alessandro *et al.*, 2020; Amerio *et al.*, 2020; Sinha *et al.*, 2020; Hanzl, 2020). The impact of COVID-19 on shared environment like rooftops ground floors or front streets, as well as changes in cities and neighborhoods, make changes at an urban scale (Rahman & Islam, 2020). During a pandemic, residents' mobility has been restricted, forcing them to spend more time at home, raising the challenge of how they meet their demand for open space. The use of roofs and verandas has increased in this period, as has neighborly interaction on the rooftop and ground level (Rahman & Islam, 2020). People of all ages suffered in numerous ways because of their inability to engage in even the most basic physical and social activities. Life was trapped in a virtual environment that was increasingly private. A playground or social interaction was difficult for children. Individuals are forced to spend their time at home in this situation, and they choose their rooftop as an interaction zone. For example, many occupants have

¹ Department of Architecture, Premier University, Chittagong, Bangladesh

* Corresponding author's e-mail: snniva@gmail.com

used their roofs as outdoor playgrounds, and flying kites. They have been stranded in their home for over a year. The rooftop is used for various purposes in Bangladesh, but during this horrific period, people have found it the sole place where they could interact with others and nature. It would be a great development for the community if the rooftop is utilized as a communal interaction space for a certain neighborhood.

In this condition, the use of technology has achieved its pinnacle, but it is restricted to the virtual realm and more personal areas. Using interactive technology on rooftops may be able to shift the contact between residents into a new realm, allowing Bangladesh to move in new and beneficial directions. “Interactive architecture can be defined as the total integration of the disciplines of interaction design and architecture” (Fox, 2010). Physical structures are static and do not respond to others. Instead, interactive architecture responds to its users as if they are already living entities. When interactive technology is used in architecture, an environment will be able to rearrange itself and automate physical reactions inability to answer, interact, adapt, and be responsive. Interactive technology is created to create settings and objects that can adapt to changing interpersonal, social, and environmental needs (Fox, 2010).

The purpose of this study is to contribute to the resolution of this horrific social condition and that inhabitants in the context of Bangladesh are connected through communal participation using interactive technology in their communities. Searching through the case studies on how interactive technology can affect the physical setting of a community positively in many cases and finding the futuristic notion of using an interactive architecture that could change the emotional health of the neighborhood positively and collectively.

LITERATURE REVIEW

Interactive architecture merges communication art and construction fields, combining embedded computation and practical analogs for adaptive environments. It encourages interaction and adaptability, viewing individuals as participants rather than users. The future of architecture relies on innovation and uncharted techniques, with modernization from other industries continuing to advance interactive architecture. This study explored how technology, such as electrically driven actuators and human-machine interfaces, changed traditional mechanical and hydraulic control methods in the automotive industry with “drive-by-wire” technology.

Interactive architecture is preprogrammed with a sense of responsiveness, creating a relationship between humans and machines. We can say interaction is a ‘mutual reaction’ between artificial intelligence and humans (Hoberman, 1999). Using interactive technologies to aid in the planning and enhancement of the rooftop’s use could result in a location for proper relaxation and activity. Building space can be used for more than just physical interaction owing to communicative embedded technologies. Changing from a well-communicating space neighborhood to a new, unknown collaboration space is a possibility. To improve people’s interactions, several interaction technologies were deployed. Emotionally, mentally, and physically, embedded interactive devices can connect with individuals. Sensor systems based on technology can read human emotions and, by doing so, they may be able to change their character, which will benefit people. Additionally, since buildings produce half of all CO₂ emissions, interactive technology has a significant advantage in terms of safety, security, and ecological advantages. It also makes installation, connection, and fabrication simple and increases the building’s adaptability to the surrounding neighborhood. Interactive Architecture investigates how elements in the physical environment may present just when they have been required and then vanish or change once they are no longer required. They are well-suited to adaptation and react to emerging requirements (Fox, 2010).

MATERIALS AND METHODS

In this study, a mixed-methods technique is used. Review of the legal framework for acquiring information in the event of a pandemic through literature review. Based on the paper’s objective, review the most recent secondary sources to gather data and look through pertinent information from about thirty-five (35) books, websites, journals, and online documents. Words, photos, and objects are used to create information output. Eight (08) Built interactive projects are considered to better understand the concept of interactive technology in architecture and the development of design concepts. The rooftop will communicate with the entire neighborhood through some futuristic technologically advanced installation that will give residents a communal feeling of togetherness.

PROJECTS AND DISCUSSION

In addition to the built projects, embedded or interactive architecture or installation procedures can be performed



Figure 1: D-Tower, Doetinchem, 2003

Source: [https://www.bollinger-grohmann.com/en.projects.d-tower.html](https://www.bollinger-grohmann.com/en/projects.d-tower.html)

in the subcontinent. Interactive architecture is a way to connect people to the most advanced technological system. In some project, people are connecting their

emotions to the project and get feedback from it which give a collective notion for the city. Citizens of the city are able to know about others' feelings through the project.



Figure 2: Bubbles, 2019
Source: https://foxlin.com/portfolio_item/bubbles/



Figure 3: Bloom, Los Angeles, 2012
Source: <https://www.archdaily.com/215280/bloom-dosu-studio-architecture>



Figure 4: DUNE, Rotterdam, 2007
Source: <https://www.studioroosegaard.net/project/dune>

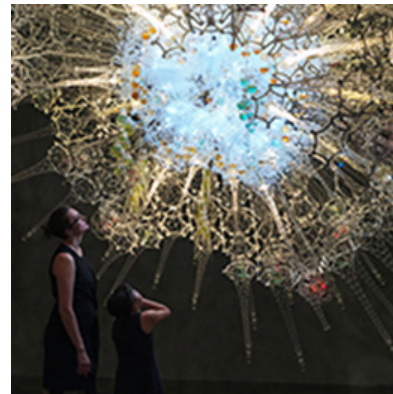


Figure 5: Futurium Noosphere, Berlin, 2019
Source: <https://livingarchitecture.com/project/futurium-noosphere/>



Figure 6: Open Burble, Singapore Biennale 2006
Source: <https://www.haque.co.uk/work/burble/>

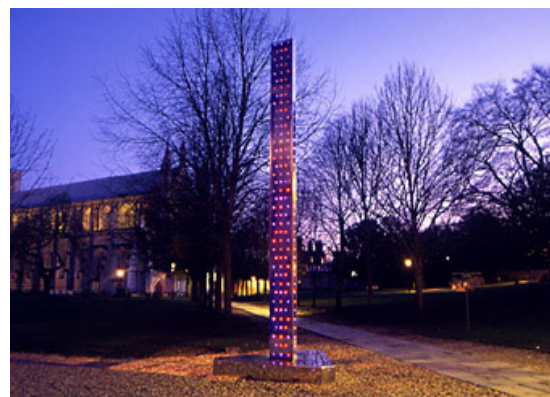


Figure 7: Luminous motion, Winchester, 2002
Source: <http://www.peterfreeman.co.uk/winpg.htm>



Figure 8: Sky Ear floating above Greenwich Park, 2004
 Source: <https://haque.co.uk/work/sky-ear/>

Project D-tower

According to Spuybroek, “the tall premade epoxy construction in a bulbous, vegetal form catches interest day and night in its various incarnations, which is related to a Gothic dome with the legs and facade connecting with the same continuity, and it is a seamless combination of multimedia,” says Spuybroek, “where architecture is part of a larger interactive system of relationships.” Every evening, the D-tower light goes on from the street illumination, so observers can monitor the tower’s color through a webcam at www.d-toren.nl/webcam. It consists of three components which are a physical construction (the tower), a poll of the questionnaire, and a website. Each of the three components communicates with the inhabitants. Its written website (www.d-toren.nl) records People who have higher emotions in response to a questionnaire created by artist QS Serafijn, assessing the degree of their love, hatred, happiness, and terror experiences. 50 residents will complete the questionnaire every six months after that the responses are then translated into various ‘landscapes’ that are shown on the internet after the questions are exacted. Based on the response from the residents, the technique reveals the emotional life. according to Spuybroek, every one of the ins and outs of individual feelings, involves ongoing discussions about different connotations. Each month, the questions get increasingly specific, and the replies are plotted in distinct “landscapes” on the website. based on these responses to the questions The tower abstracts the sensations using color, displaying “the State of the Town” in the color of the heartfelt feelings that are output as the results of a vote regarding individuals’ emotions on the D-website, showing blue for happiness, red for love, green for hate, or yellow for fear. However, according to Lars Spuybroek of NOX, it still has not been yellowed (for fear). The landscape will portray the highs and lows of moods in each of the town’s zip codes. Someone could identify which emotions would be the strongest that day after walking through Doetinchem in the evening. The project shows intense (sensations, characteristics) and the comprehensive (space, amounts) start to play separate roles, wherein individual interaction, coloring, wealth, values, and emotions become linked

realities,’ says the artist. Conducting romantic life or expressing the deepest ideas in an architectural vehicle, which looks to be replaced by the classic country greens in which people who chat and share togetherness, is an advanced sociological idea. It also allows locals to leave their personalized messages underneath the tower, which are displayed on the website’s emotive landscapes, and post a picture and a short statement to the portal, which will be connected to the environment through a little interactive digital flag. To connect the inhabitants strongly, the tower will send handwritten love notes and flowers from “love addresses” to “hate addresses,” Community is surprised at the end of each year, and the tower will give a \$10,000 award towards the location to the most powerful emotions. It is a wider engaging connection system with the residents using a communication architecture system in a collective manner. Community engagement is high in this installation.

D-Tower, for example, used a questionnaire poll to collect data from individuals based on their emotional state, which was subsequently saved on a website. The d-tower has changed color because of this information, indicating the collective emotional state of most citizens (NOX,2005). Some influential strategies are employed in this project to engage citizens in the feedback collection process. This initiative has an impact not just on the neighborhood but also on the city. Through the collective concept, individuals may observe and grasp the emotional state of all citizens Figure 1.

Project Bubbles

Another exploration project that adapts well to the urban context named Bubbles which is a flexible spatial inflatable performance artwork. The installation is made up of enormous pneumatic volumes that expand and compress in response to the arrival of viewers and in the absence of visitors, the spatially distributed bags occupy the entire site with the formation of a transparent bubble with transparency filling. A technologically advanced sensor system detects occupants’ movement, and increasing activity enables the space to open and become accessible (Lin, 2019).

In Bubbles several simple systems interact in a way

that causes more complex behaviors to emerge as a collective and occur as emergent behavior. In Bubbles several simple systems interact in a way that causes more complex behaviors to emerge as a collective and occur as emergent behavior. It creates a robotic environment that is built using mechanical assemblies. These projects have prompted visitors to command as emergent and bottom-up (Fox, 2010). It makes visitors believe that it can respond or react to its unexpected behavior. It is an urban scale project which allows visitors to interact with Figure 2.

Project Bloom

There are numerous examples throughout the world in which architects have discovered how interactive technology and architecture have positively impacted the environment and human feelings. “Bloom,” an architectural research project by DOSU Studio Architecture, is on display at the Materials and Application Gallery in Los Angeles. The project is intended to monitor instrument indexing time and temperature using a materialistic experiment, structural modernization, computational system, and pattern building into an environmentally conscious model. It is covered with a smart thermobimetal which turns into curls when heated by the sun or ambient temperature changes. The research claimed to have developed a passive, sustainable technique for minimizing dependency on artificial climate-control technologies. It demonstrated a unique structural strategy that prioritized distributed structural stresses while reducing infrastructure requirements. It showed how computer technologies may be used to design, analyze, and fabricate complex surfaces. The highly interactive skin interacts with the temperature and response to provide shades and ventilation in a certain area of the shell without power or controls. With the use of progressive digital software, the skin is made up of around 14,000 laser-cut parts, which necessitate the function. The structure is self-supporting with 414 hyperbolic paraboloid-shaped fixed panels which examine the materials’ ability to act as a shell. The ultimate prolog shape is lightweight and flexible, grounded on the complete geometry and material combination to ensure inclusive stability. One portion of the surface faces the sun directly, while the other side is shaded, causing no reaction, or curling in a single panel. As a result, each panel has a wide range of tile shapes and functions. In “Bloom”, the total structure is completely associated with the structural capability of each hyper panel. Sung is working on bris-Soleil systems and curtain-wall panels that include responsive thermobimetal and glass in passive shading systems (Furuto, 2012). Bloom, another project, raises awareness about solar energy and its influence on tourists. It is an environment-conscious design that provides shade to visitors while also providing a city-scale space beneath it Figure 3.

Project DUNE

Investigating the interactions between people, technology, and the environment is the fundamental objective of Daan

Roosegaard (1979), with the concern of a sociological visionary who collaborates on future landscapes with his team in Studio Roosegaarde. The project DUNE is his light-based interactive landscape installation that reacts with human action. Hundreds of fibers in this alloy of nature and technology glow in response to the sounds and actions of visitors. Visitors become active participants in the project, strengthening social interactions with others as well as community participation in the landscape, with the creation of future relationships between urban space and people, where hundreds of interactive LED (Light Emitting Diode) lights and noises are included in DUNE (Roosegaard, 2006-2018; Studioroosegaard, 2010). DUNE is an interactive landscape built on motion and sound sensors. This form of the interactive landscape is appropriate for youngsters to interact with (Roosegaard, 2007). This proposal introduces a tremendous new concept of the technologically interactive urban environment that can be installed anywhere, even on a tiny balcony. This project is installed in numerous locations as an example of the tunnel that secures the environment for passersby with its sensor system that interacts with the passers and offers them a smile by glowing and whispering. This project is much appreciated in many aspects, including the enhancement of social interaction between people, children, and the provision of a sense of security based on on-site demand Figure 4.

Project Noosphere

Noosphere is a spherical artificially intelligent structure created by architect Philip Beesley, who was inspired by the fast-evolving technology and culture of responsive and interactive systems. His major idea is that future architecture may incorporate living functions and that structures may start thinking and caring for themselves. According to human Individual sounds that swell to strong melodies and soften to faint murmurs are generated by networks of high-fidelity, panoramic speakers. Hundreds of microscopic processors respond to viewers’ movements and gestures with unique illumination, audio, and movement. “SmartWrap,” a customizable nylon membrane base, and polymeric cover that could modify its accountability level, light, or coloring, and show photos. “Kinect Motion Sensors” are used to learn a visitor’s body posture, profundity, and proximity. Over time, through Physical Data, Vocal Detection, Systems “Shape memory alloys” and mode-developing materials that can change their molecular, electromagnetic, tensile, electrical, or thermodynamic conductivity dependent on their connection (Beesley, 2019; Futurium, 2020). Another artificially intelligent installation that reacts to visitors by glowing, changing shape, and producing sound. Its reaction has changed based on its memory, which is why visitors find it completely different on each visit. This intelligent structure provides visitors with a sense of interaction with the robot, which has the memory to recognize specific movements and gestures, as well as a sense of communal interaction Figure 5.

Project Burble

The Burble has taken on a variety of embodiment and has performed at events and gatherings all over the globe. It was inspired from the tale of 'Jack and the Beanstalk.' considering the distinct situation, each version is composed and constructed to the requirements of the site. The Burble was originally constructed from 1 km of carbon composite poles and 1 km of Mega D12 high-performing cruising cord, making it one of the largest global interactive architecture installations. The project's goal was to see how regular citizens can create, develop, and influence the local civic environment on a large scale, even if it is just for a single evening. The color of the pattern varies in reaction to how it is modified instantaneously by individuals clinging to the railing below. Visitors' activities have an impact on either the runtime reaction (color changes) or how the structure reacts to individuals since they designed the architecture in the first instance. It is the 'multi-mediated' interactive design that is revolutionizing and redefining our workplace, recreation, and home environments in every sphere of professional and personal life as a visual platform.

The Burble experience is a revolutionary idea that has been implemented in a variety of events around the world. It is large enough to modify the city's skyline for one night. It is animated as it sails on a massive scale with the wind. Individuals can use a smart device and their fingers to create patterns, lines, and circles that change color and pattern depending on the surface of the burble. This is a collaborative and collective interaction with the installation. It has a significant impact on community activity and improves the cohesiveness of events Figure 6.

Project Luminous Motion

The Light Art Project is an interactive luminous sculpture erected in Winchester Cathedral. The installation is a futuristic illumination appearance of stainless-steel optical fibers that is motivated by the medieval Christian concept of the 'axis Mundi.' Through the vocabulary of illumination, the designer intended to investigate notions of paths and communication networks in the modern metropolis. During the day, the powerful fiber optic light points are very visible, and at night, they are magnificent. Everyone with a cell device can manipulate and adjust the colors of the illumination, allowing for virtual conversation across the realm. A user can modify the color coding of a telecommunication tower by using a smart telephone. As a result, a vast number of individuals would be able to see it (Freeman, 2008). The focus of this work is on state-of-the-art routes, both actual and virtual (Freeman, 2002).

Luminous Motion is a construction that connects people with their smartphones and provides illumination based on the actions of visitors. The idea of the project links the physical and spiritual worlds. This sculpture facilitates virtual connections between people and responds to them. People's collective action allows the light to shine promisingly at night and promotes communal interaction Figure 7.

Project Sky Ear

Now Electromagnetic fields (EMF) are common everywhere in our environment. It is a very responsive installation on an urban scale that floats in the sky with 'LED-embedded balloons' and listens for 'electromagnetic waves. Now ' Electromagnetic fields (EMF) are common everywhere in our environment. The sky ear creates an electromagnetic environment just outside our natural sensibilities with a luminous cloud of tens of thousands of helium balloons and sensors device the cloud demonstrates natural electromagnetic surroundings to modernize the environment, as well as how personal cell phone calls and texts influence existing and future electromagnetic fields. Devices with a connection to the internet, all start contributing to a vibrant and dynamic strain culture in metropolitan centers. This project aims to research spatially in the urban context for the communal neighboring connections. The cloud analyzes the electromagnetic environment caused by events, cell phones, police, and paramedics frequencies, and TV stations because it lifts into the sky. The balloons vary in color depending on the amount of electromagnetic energy they receive and connect with one another to form broader rhythms. Folks call to cellphones attached in the cloud to hear environmental microwave "whistlers" and "spherics." These calls have changed the colors and patterns that show all over its cover. It floats with the wind and different electromagnetism then the cloud shines and varies. The "spherics" and "whistlers" those individuals hear on smartphones are the noises in the environment. Sky Ear is a one-night festival wherein visitors can call into a shimmering "cloud" of cell devices and helium balloons and hear the sounds of the sky (Haque, 2004). Finally, an outstanding project Sky Ear is an interactive installation that floats in the sky and communicates with users via smart devices. It alters the environment by changing the colors and sounds. When it floats and witchpers at night, the entire environment changes magnificently, which connects people. Collaboration on a one-of-a-kind action improves the community environment in a collective manner Figure 8.

CONCLUSION

We are unable to move static architecture such as buildings, but we can propose some interactive, adaptable, and embedded architectural interventions that could be constructed in any location in the neighborhood while keeping the Bangladeshi context in mind. Interaction design in architecture has become increasingly prevalent. The interaction will be truly seamless. However, while we will use interactive systems, we must also recognize that it is the responsibility of useful design to express interaction from a design standpoint (Fox, 2010). An interactive system that connects the entire neighborhood could be effective for residents. Keeping in mind that some interactive installations are considered as installation projects on the top of the roof in this study to achieve collaboration, interaction, and collectiveness within the neighborhood. These proposed futuristic installations are experimental installations in the context of Bangladesh.

Acknowledgments

The faculty adviser (Arch 6502), Dr. Asma Naz, introduced the term paper topic and accompanying materials to the students at a session for the postgraduate program at BUET's April 2021 session. The data presented in this course is correct to the best of the writers' knowledge. Any potential instances of false information or fraud are the responsibility of the authors. As long as they acknowledge the course (ARCH 502), the Department of Architecture, and BUET for its creation, the writers are free to amend and/or publish this working paper in the future. Only for academic purposes may a copy of this paper's material be used without the authors' express permission.

REFERENCES

- Amerio, A., Brambilla, A., Morganti, A., Aguglia, A., Bianchi, D., Santi, F., Costantini, L., Odone, A., Costanza, A., Signorelli, C., Serafini, G., Amore, M., & Capolongo, S. (2020). COVID-19 lockdown: Housing built environment's effects on mental health. *International Journal of Environmental Research and Public Health*, 17(16), 5973. <https://doi.org/10.3390/ijerph17165973>
- Anon. (n.d.). *Project description: D-Tower*. Bollinger + Grohmann. <https://www.bollinger-grohmann.com/en/projects.d-tower.html>
- Anon. (n.d.). *4dsocial - interactive design environments* (Edited by Lucy Bullivant). Scribd. <https://pt.scribd.com/document/75997038/4dsocial-Interactive-Design-Environments-Edited-by-Lucy-Bullivant>
- Beesley, P. (2019). *Futurium Noosphere*. Philip Beesley Architect Inc. <https://www.philipbeesleystudioinc.com/sculptures/Futurium/index.php>
- Bullivant, L. (2005). D-tower, NOx, Doetinchem, the Netherlands, 1998–2004 and Son-O-House, Son en Breugel, NOx, the Netherlands, 2000–2004. *Architectural Design*, 75(1), 68–71.
- Campbell, A. M. (2020). An increasing risk of family violence during the COVID-19 pandemic: Strengthening community collaborations to save lives. *Forensic Science International: Reports*, 2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7152912/>
- Chen, P., Mao, L., Nassis, G. P., Harmer, P., Ainsworth, B. E., & Li, F. (2020). Coronavirus disease (COVID-19): The need to maintain regular physical activity while taking precautions. *Journal of sport and health science*, 9(2), 103-104.
- D'Alessandro, D., Gola, M., Appolloni, L., Dettori, M., Fara, G. M., Rebecchi, A., Settimo, G., & Capolongo, S. (2020). COVID-19 and living space challenge: Well-being and public health recommendations for a healthy, safe, and sustainable housing. *Acta Bio-Medica: Atenei Parmensis*, 91(Suppl. 9), 61–75.
- Fox, M. A. (2010). Interactive architecture will change everything. *Zhuangshi*. Published by Academy of Art and Design, Tsinghua University, Beijing.
- Freeman, P. (2008). Email communications and telephone conversations. C. Calderon.
- Freeman, P. (2002). *Luminous motion*. Peter Freeman. <http://www.peterfreeman.co.uk/winpg.htm>
- Furuto, A. (2012). Bloom / do: Su studio architecture. *ArchDaily*. <https://www.archdaily.com/215280/bloom-dosu-studio-architecture>
- Futurium. (2020). *Noosphere (EN)* [Video]. YouTube. <https://www.youtube.com/watch?v=JrPxxO8euKY&t=9s>
- Glover, T. (2020). Neighboring in the time of coronavirus? Paying civil attention while walking the neighborhood. *Leisure Sciences*, 1-7. <https://doi.org/10.1080/01490400.2020.1774014>
- Güzel, P., Yıldız, K., Esentaş, M., & Zerengök, D. (2020). “Know-how” to spend time in home isolation during COVID-19; restrictions and recreational activities. *International Journal of Psychology and Educational Studies*, 7(2), 122-131.
- Hanzl, M. (2020). Urban forms and green infrastructure – the implications for public health during the COVID-19 pandemic. *Cities & Health*, 1-5.
- Haque, U. (2004). *Usman Haque – Sky Ear (2004)*. Usman Haque. <https://haque.co.uk/work/sky-ear/>
- Hoberman, P. (1999). The standard definition of interactivity is something with feedback, where you trigger something and get a direct response. *Art Orbit, No. 4* (February 1999). http://artnode.se/artorbit/issue4/i_hoberman/i_hoberman.html
- Hossain, M. M., Asadullah, M., Rahaman, A., Miah, M. S., Hasan, M. Z., Paul, T., & Hossain, M. A. (2021). Prediction on domestic violence in bangladesh during the covid-19 outbreak using machine learning methods. *Applied System Innovation*, 4(4), 77.
- Jacob, L., Tully, M. A., Barnett, Y., Lopez-Sanchez, G. F., Butler, L., Schuch, F., López-Bueno, R., McDermott, D., Firth, J., Grabovac, I., Yakkundi, A., Armstrong, N., Young, T., & Smith, L. (2020). The relationship between physical activity and mental health in a sample of the UK public: A cross-sectional study during the implementation of COVID-19 social distancing measures. *Mental Health and Physical Activity*, 19, 100345. <https://doi.org/10.1016/j.mhpa.2020.100345>
- Kaur, R., & Garg, S. (2008). Addressing domestic violence against women: An unfinished agenda. *Indian Journal of Community Medicine*, 33(2), 73. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2784629/>
- Lin, F. (2019). *Bubbles*. FoxLin Architects. https://foxlin.com/portfolio_item/bubbles/
- Manovich, L. (2001). *The language of new media*. MIT Press.
- Mehta, V. (2020). The new proxemics: COVID-19, social distancing, and sociable space. *Journal of Urban Design*. <https://doi.org/10.1080/13574809.2020.1785283>
- Mitra, R., Moore, S. A., Gillespie, M., Faulkner, G., Vanderloo, M., Bozzer, T., Rhodes, R. E., Brussoni, M., & Tremblay, M. S. (2020). Healthy movement behaviours in children and youth during the COVID-19 pandemic: Exploring the role of the neighbourhood environment. *Health & Place*, 65, 102418. <https://doi.org/10.1016/j.healthplace.2020.102418>

- org/10.1016/j.healthplace.2020.102418
- Penny, S. (1996). 'An interactive system is a machine system which reacts in the moment, by virtue of automated reasoning based on data from its sensory apparatus,' quoted in Simon Penny, From A to D and back again: The emerging aesthetics of interactive art. *Leonardo Electronic Almanac*, 4(4).
- Rahman, A. A., & Islam, Z. H. (2020). Adaptations to the COVID-19 pandemic: Open spaces in residential neighborhoods of Dhaka, Bangladesh. *Cities People Places: An International Journal on Urban Environments*, 4(2), 25.
- Roosegaard, D. (2010). *Visions of public art: Social design* | *Daan Roosegaarde* [Video]. YouTube. <https://www.youtube.com/watch?v=nf-q5zs8HgE>
- Roosegaard, D. (2006–2018). *Project DUNE*. Studio Roosegaard. <https://www.studioroosegaard.net/project/dune>
- Sharma, A., & Borah, S. B. (2020). COVID-19 and domestic violence: An indirect path to social and economic crisis. *Journal of Family Violence*.
- Sinha, M., Kumar, M., Zeitz, L., Collins, P. Y., Kumar, S., Fisher, S., Foote, N., Sartorius, N., Herrman, H., & Atwoli, L. (2020). Towards mental health-friendly cities during and after COVID-19. *Cities & Health*. <https://doi.org/10.1080/23748834.2020.1790251>