

A New Way of Presenting: Redefining Architecture and Design Exhibition through Virtual Realms

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ABSTRACT: This research offers a thorough examination of the online exhibition organized by Bahçeşehir University, highlighting its methodology and development within the framework of architecture and design department. The exhibition was a reaction to the COVID-19 pandemic's problems and marks a major move away from conventional physical exhibits and toward virtual formats. This paper's main goal is to investigate how the institution used digital technology to showcase student work in an immersive, interactive setting. In order to successfully display student work, the virtual exhibition made use of a variety of digital tools and platforms, such as 3D modeling, and interactive web-based apps. The study looks at how the virtual environment was designed and implemented, emphasizing how it promoted accessibility, engagement, and interaction for a worldwide audience. The study also places the university's virtual exhibition in the larger context of educational exhibitions' digital development. It offers a thorough overview of the state of digital exhibition practices in architecture and design education today by drawing similarities with the methods used by other institutions. This research adds to the increasing conversation about the future of academic exhibits by speculating that, in the digital era, virtual exhibitions may serve as a good substitute for or addition to physical exhibitions, in addition to serving as a temporary fix during times of crisis. In order to help educators, students, and exhibition planners in the domains of architecture and design navigate the changing requirements of exhibiting creative work in a world that is becoming more and more digital, the research intends to offer insightful information.

KEYWORDS: exhibition, virtual exhibition, architecture, design

INTRODUCTION

Humans have an innate propensity to exhibit their creations to others and display them in accordance with their individual preferences. This circumstance can be traced back several centuries. Even caveman art depicts the transmission of knowledge to future generations, and their sharing of personal experiences. As a result, individuals have always been on the lookout for a suitable place for presenting. Due to this requirement, museums and exhibition halls have acquired prominence. This study explores the contemporary trend toward virtual exhibits, which was made possible by the COVID-19 pandemic's extraordinary obstacles and supported by the quick development of digital technology.

The turn of the twenty-first century brought about a paradigm shift in people's understanding of and interactions with exhibition venues. Integration of technology and design has taken on a greater significance in this modern era. As a result of technological advancements, exhibition spaces are moving into the virtual world. Due to the difficulties in accessing tangible exhibition spaces with covid-19, virtual exhibition spaces have grown in significance. During this time, many of the world's most famous museums used virtual environments.

Universities are also subject to a comparable circumstance. At the end of the semester, many universities have decided to conduct their exhibitions in digital environments. The shift to virtual exhibitions has been especially noteworthy in disciplines like architecture and design, where visual representation is fundamental to creative expression. In order to display student works, universities and other educational institutions have adopted digital platforms as a means of addressing the issues presented by the pandemic. This method not only provided consistency in the face of difficulty but also expanded the possibilities for teaching and display techniques. The shift to virtual exhibits has presented opportunities as well as challenges, leading to a reassessment of conventional exhibitions and audience engagement paradigms. Virtual spaces provide a cutting-edge platform that cuts through geographical barriers to reach a wider and more inclusive audience. This change is a proactive strategy that reimagines the relationship between the exhibit and the audience.

This paper explores the development of virtual exhibition spaces, concentrating on the exhibition held by the host university's department of architecture and design between the 2020–2022 academic years. This time frame is important because it represents the convergence of past years' experiences and input, resulting in a more polished and functional virtual exhibition setting. The process of moving from physical to digital media will be examined in this study, with a focus on the collaborative efforts of academics and students.

The study seeks to provide light on the creative application of digital technologies like SketchUp, Enscape, and iStaging by closely examining the virtual exhibition's concept, development, and execution stages. The initial selection and modification of student designs, the modeling of virtual worlds, the incorporation of interactive components, and the overall effect on viewer engagement will all be covered by the structured study. The paper

will also go over the wider ramifications of this digital revolution for exhibitions in educational settings going forward, especially in the fields of architecture and design. It aims to shed light on the possibilities of virtual platforms as a viable—and maybe even better—than-temporary replacement for conventional exhibiting techniques. In light of the constantly changing landscape of architecture and design education, the research emphasizes the value of adaptation, creativity, and perseverance in the face of adversity.

1.0 THE EVOLUTION OF EXHIBITION SPACES

1.1. Historical perspective of exhibition spaces

Exhibition spaces are more than just physical venues; they are representations of cultural histories and intellectual developments. Due to their evolution as spatial entities and the effect of different architectural, social, and political settings, they have become important venues for exhibiting art and artifacts (Simonsson 2014). They have changed over time, reflecting a wide range of cultural, technical, and educational developments. This evolution captures not just the evolving aesthetics of architecture and design, but also the changes in society about people's perceptions of and interactions with art, history, and knowledge. A growing democratization and accessibility of information has characterized the history of exhibition venues, from the private collections of the Renaissance to the public museums of the Enlightenment. The *cabinets of curiosities* of the Renaissance were the earliest kind of private collections, emphasizing the individual's quest for knowledge and curiosity with the natural and creative worlds (Findlen 1994). These private collections, which combined the intellectual and the eclectic, were the forerunners of contemporary museums. A paradigm change was brought about by the Enlightenment, which emphasized the value of public access to information and culture. Public museums began to appear during this time, such as the British Museum, which opened its doors in 1753. These establishments sought to benefit the general people as well as the elite, democratizing access to information and the arts. This progression tells the tale of how exhibition spaces went from being exclusive cultural strongholds to becoming open-access hubs for interaction and teaching (Bennett 1995).

1.2. The role of exhibitions in architecture and design

Exhibitions have a critical role in forming students' professional growth and the instructional approach in architectural and design education. Physical exhibitions have long been a mainstay of educational settings, giving students a concrete venue to present their models, sketches, and design concepts. According to Salama and Wilkinson (2007), these exhibits are more than just showcase events; they are essential to the educational process since they encourage public participation, peer review, and critique. Exhibitions provide students a chance to network with industry experts, prospective employers, and the academic community. They provide as a platform for networking where students may exchange ideas, get feedback, and establish relationships that could result in future employment prospects.

1.3. Transition from physical to virtual exhibitions

The introduction of digital technology in the twenty-first century has the potential to completely change the idea of exhibition venues. The COVID-19 epidemic has expedited the transition to virtual exhibits, which signifies a fundamental transformation in the curation and experience of art and cultural objects in addition to a technological adjustment.

Virtual settings may not entirely duplicate the distinct sensory experience that physical displays give. The knowledge of architectural and design concepts is greatly enhanced by the tactile quality of materials, the scale of models, and the spatial connections in physical presentations (Pallasmaa 2012). But the advent of digital technology has made it possible to combine conventional techniques with virtual exhibits. The teaching toolset has been enlarged by this dual approach, enabling more creativity and flexibility in presenting techniques (Oxman 2008). Virtual exhibits have the potential to transcend both physical and geographic boundaries, providing increased accessibility and facilitating interaction between student work and a worldwide audience (Jabi 2013).

It has been observed that virtual exhibitions may eventually take the place of actual ones depending on how quickly technology advances. Since there are now virtual exhibition spaces, the locations are no longer as significant. Technology bridges cultural divides and shortens distances. According to Dumitrestu et al. (2014), virtual exhibits are said to include attributes including accessibility, relevance, localization, and interaction. It is crucial to follow these guidelines and not omit them while creating virtual exhibits. The same study suggests that virtual exhibitions might be designed or altered faster than real ones. This was viewed as a favorable aspect as well. Furthermore, virtual exhibits are said to have many benefits over physical ones by Ciruera et al. (2016). These are the convenience of repurposing the space, the lower costs, and the fact that the things on exhibit pose no security concern. Considering these advantages, one of the long-standing debates is whether virtual exhibits can take the place of real ones. Lester (2006) conducted a research to investigate the possibility of this debate. The author contended that because the exhibition is a sort of communication in and of itself, it interacts with visitors in an indirect manner. In this sense, neither can be replaced, but their positive and negative qualities mutually reinforce one another. Lester noted in the same study that a virtual exhibition cannot be real in the strictest sense of the word, but he also mentioned that the visitor has much more flexibility in the virtual world.

Universities have been using virtual exhibitions more and more in the past several years to display student work, especially in disciplines like architecture, design, and art. A lot of colleges' architecture departments were used virtual exhibitions to showcase student work, especially considering recent restrictions like the COVID-19 epidemic.

In a study conducted on virtual exhibitions held in design faculties of universities, a total of 50 virtual exhibition examples were examined (Çalışkan 2023). According to this study, 33 virtual exhibition samples were developed on one single website. The most prevalent method in these instances was to display student names and project images. The student project may be seen with one click. Additionally, tools like *Anyflip* are used to display items like catalogs or magazines. This software allows page switching. Two institutions uploaded exhibition films on *YouTube*. It was fascinating that *Instagram* was used for the virtual display in addition to *Youtube*. Again, intermediary tools like *Artsteps* and *Hubs Mozilla* that provide templates and virtual exhibitions are used. Many institutions use *Artsteps*, a web-based program that lets users design three-dimensional spaces/exhibitions with an intuitive interface. This program supports three-dimensional models and two-dimensional pictures and videos. This creates a more sociable platform. In addition to building their own designs, users may use templates. These programs simplify and speed up model preparation. For their virtual presentations, fifteen institutions produced 3D models. Daekin University, one of them, made the exhibit by 3D scanning real studios and transferring the images to a computer environment. Yaşar University used the same method to exhibit student projects.

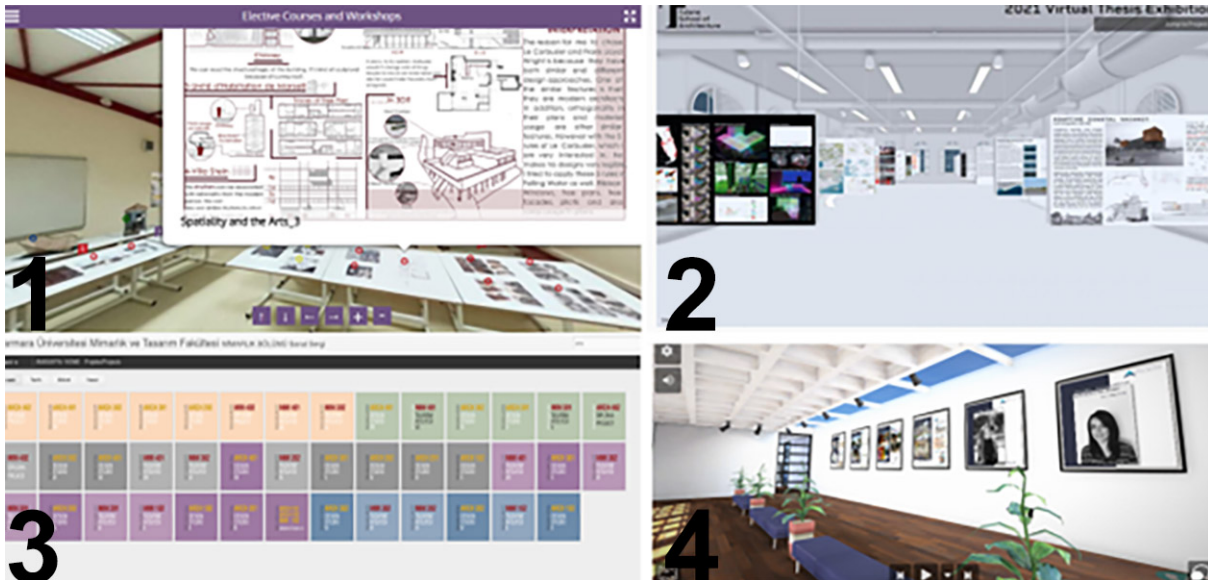


Figure 1: Different ways of applying Virtual Exhibitions. (1-Yaşar, 2-Tulane, 3-Marmara,4- Antalya Bilim) Source: (Yaşar University 2023, The Architect's Newspaper 2021, Marun Mimarlık 2023, Antalya Bilim University 2023)

Others have used exhibitions that are fully computerized. Three of them, the University of Nocias, Tulane School of Architecture, and Istanbul Technical University, replicated their actual spaces. Others took advantage of the pre-built locations that were linked to their application (figure 1). Bahcesehir University's exhibition was the only exhibition under review to have its display created in a fully made-up virtual environment. It might be argued that this particular circumstance is significant for drawing viewers' attention and setting it apart from other examples.

2.0 THE VIRTUAL EXHIBITION EXPERIENCE

2.1. The motivation for the virtual exhibition

Sharing the results produced in courses or extracurricular activities is one of the most motivating aspects of architectural education for students. It ensures that their work is disseminated to a broader audience and be appreciated by people. According to Toloudi (2016), exhibition brings the students towards the public through a celebratory process, by inspiring and supporting them with confidence. It also provides the chance for them to inspect each other's work and conduct comparisons, leading to informal competitions which are also motivational for students of architecture (Ilkovičová & Ilkovič 2018).

Before the pandemic struck the whole world with its undeniable effects on all aspects of life, student work exhibitions were conducted conventionally in physical environments with printed material. However, in 2020, during the lockdown due to Covid-19 pandemic, many things including the methods of architectural education were changed. Architectural courses, as well as extracurricular activities were transferred to online and virtual environments. This led architectural education institutions to search for new methods for sharing the products of the activities conducted during the academic semesters (Ceylan et al. 2020). With this aim, Bahcesehir University Faculty of Architecture and Design generated a new way of exhibiting student work through a virtual exhibition, which throughout several years evolved to a comprehensive presentation of faculty and university activities.

2.2. The evolution of the virtual exhibition

The idea of sharing student work on online platforms firstly led to social media applications. Participating students were encouraged to share their work on Pinterest, which then led to a collaborative board on the platform. Additionally, faculty Instagram account was started to be used more effectively and frequently to present student work during and at the end of the semester. However, that was not enough to satisfy either the students or the faculty regarding the dissemination and inclusiveness of the exhibitions. At that point, the idea of a comprehensive virtual exhibition emerged and methods for creating the exhibition started to be investigated. In the beginning, the

idea was simple: To design an exhibition space for each academic year's design studios and populate it with selected student work. The initial layout for the exhibition space consisted of a lobby in the middle and 4 connected exhibition rooms reserved for each academic year's design studio (figure 2). The overall place was modelled in Sketchup by the coordinators of the exhibition, and each exhibition room was designed by the research assistant assigned to that studio. When all the student work was added to the exhibition rooms and all rooms were assembled in a single model, the virtual exhibition for 2019-2020 Bahcesehir University Faculty of Architecture and Design Spring Semester Design Studio became ready for visitors. Actually, there were multiple exhibitions because each department in the faculty; architecture, interior architecture and environmental design, and industrial design departments, had their own models and independent exhibitions. Thanks to Enscape (<https://enscape3d.com/>), a software being used as a plugin on Sketchup and several other 3d modelling software, it was possible to generate an executable file that can operate standalone on any PC. Moreover, the executable file made it also allowed an immersive VR experience through a suitable VR headset. Thus, the link to the executable file was shared on social media and the faculty website, so that anyone could download it to interactively experience the virtual exhibition. Following the publication of the executable file, within the designers' team it was argued that it would have been better if the exhibition could also be visited using mobile devices. That could ensure the virtual exhibition to be disseminated to a much broader audience. Therefore, a third application was used: Cloudpano, a website for generating 360 degrees virtual tours. 360-degree panoramic images were rendered on Enscape and uploaded to the virtual tour on Cloudpano. After a few quick adjustments on Cloudpano for adding tags and assorting the images, the virtual tour became ready to be visited via any device including mobile phones (<https://app.cloudpano.com/tours/JQoO76Xw2>).



Figure 2: 2019-2020 Academic Year Virtual Exhibition. Source: (Authors 2024)

As a result of the positive feedback received from visitors, participating students, faculty members, and the university administration, it was decided to repeat the virtual exhibition for 2020-2021 Academic Year, this time with a broader scope. It was aimed in that year's virtual exhibition, in addition to design studio outcomes, selected student work from other courses, extracurricular activities, and faculty announcements were presented in the exhibition. These additions did not change the workflow too much, but they affected the required effort to be put on the design and modelling processes. The design team came up with a new layout which was linear, consisting of two corridors connected to each other in the middle with the lobby (figure 3). The lobby included a welcoming area, starting point of the tour, as well as overall information about the faculty and connected units. A mezzanine floor was added on top of the lobby for exhibiting extracurricular activities conducted in the faculty such as workshops, seminars, and conferences. Two corridors connected to the lobby contained student work from design studios and other courses, one for the Fall and the other for the Spring semester. The exhibition coordinators decided which course would be exhibited in which space, but the design of each space was carried out by the assigned teaching assistant of the relevant course. Additionally, it was also aimed that year's virtual exhibition was more interactive and dynamic. Therefore, a careful investigation was conducted on websites and software providing virtual tours. As the result of the investigation, a website called iStaging was selected as the most effective and feasible option (www.istaging.com/en). iStaging had its own built-in application that allows adding images, tags, videos, and embedding external websites. Even though these operations were quite time consuming in the post-production phases, the resulting tour had been much more dynamic and therefore interesting for the visitors (https://livetour.istaging.com/dbe6941e-b03d-41ac-bfd4-9099f028c220?_ga=2.39688609.309255714.1625561957-1238256088.1625561957&index=1).



Figure 3: 2020-2021 Academic Year Virtual Exhibition. Source: (Authors 2024)

In its third year in 2022, the virtual exhibition became a tool for presenting the faculty and its departments, as well as the administrative units that collaborate with them. The layout changed once again, allowing a continuous circulation that gets back to the starting point after the tour is over. This layout also allowed more efficient interior-exterior relationships in addition to a courtyard that was also utilized as part of the exhibition (figure 4). The software and applications used for the virtual exhibition remained the same. There were no major changes in the workflow, but only minor adjustments and improvements caused by the increase in the amount of provided information. Additionally, as the 360-degree virtual tour platform iStaging offered new and improved features, it was possible to add new elements to the virtual tour such as teleport between different tours and more advanced tags for items (<https://livetour.istaging.com/4bda49f9-a32e-4de6-9ab7-95d8f98826cc?index=1>).

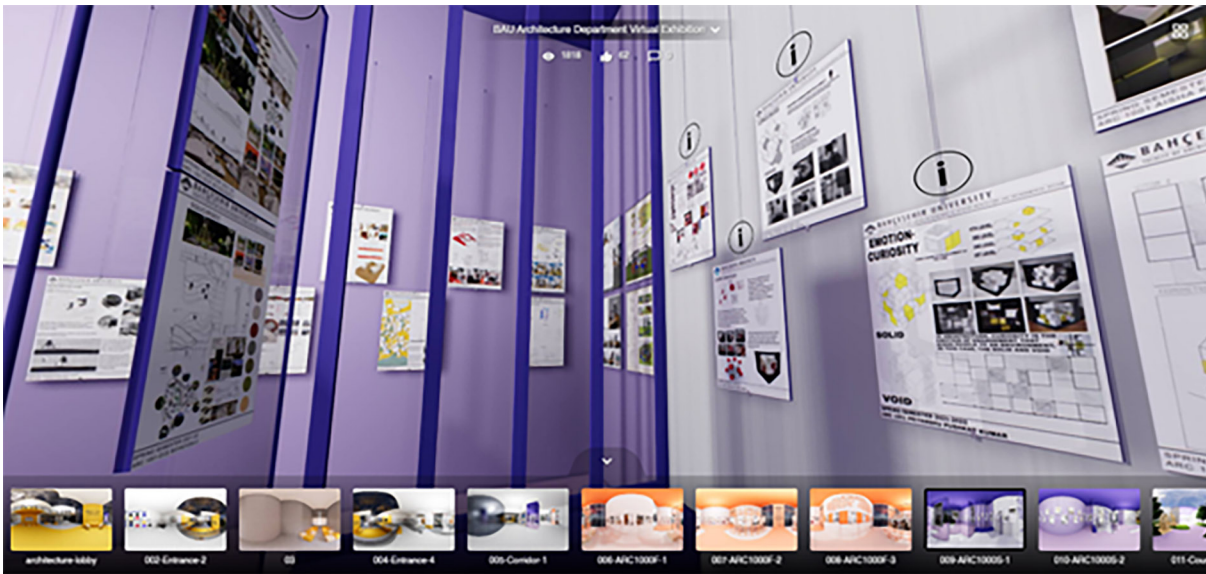


Figure 4: 2021-2022 Academic Year Virtual Exhibition. Source: (Authors 2024)

2.3. Workflow of the virtual exhibition

Composing the virtual exhibition each year from scratch requires a lot of work by various stakeholders such as students, research assistants, studio coordinators, and the core design team. Moreover, it requires strong collaboration and efficient use of time. Preparations for the virtual exhibitions need to start at the beginning of the spring semester to be ready for the summer period. In the light of the experience gained from three years of virtual exhibition, the workflow consists of 7 sequential and/or simultaneous steps that are executed by different stakeholders: *selecting and collecting student work, designing and modelling the common exhibition space, designing individual rooms/spaces for each studio/course, gathering all exhibition spaces in a single model file, completing fine adjustments and rendering 360 panorama views on Enscape, transferring rendered images, adding multimedia, tags, and external links to the tour on iStaging, and testing the virtual exhibition in VR and mobile devices for publishing and announcing the virtual exhibition on faculty website and social media platforms.* Executing these steps in a successful way ends up with a thriving virtual exhibition.

Selecting and collecting the student work for the virtual exhibition is performed at the end of each semester, after the final exams or submissions are completed. The assigned research assistant for each course defines a template

relevant to the virtual exhibition and shares it with the owners of the selected work. Students adapt their final work to the given template and submit the posters to the research assistant, if available they can also submit a 3d model of their work. Additionally, students are asked to fill in a consent statement form for their work to be included in the virtual exhibition and published online as open source.

The core design team gathers to discuss and define the general concept and form of that year's virtual exhibition. After the decision is made for the overall layout and locations for each studio and course are decided, the template of the exhibition space is modelled on Sketchup and shared with all research assistants to add the designated exhibition rooms for the studios or other courses they are responsible for. The core design team is also responsible for the design and modelling of the lobby which includes a welcoming space in addition to the exhibition of extracurricular activities, faculty news, and university units that are important for the architecture and design students. As the lobby holds important common information about the faculty, it is the same for each department's exhibition with minor differences such as colours or furniture.

Each studio and course included in the virtual exhibition is located in a separate room or space. Therefore, each of them needs to be designed by the instructors and research assistants of that particular course. That process is different in each course, whether to be designed by the instructor itself, or by the research assistant of the course. After the design and modelling of the space is completed and relevant student work is added, the Sketchup file is shared with the core design team to be added to the main model file.

After the core design team has received all model files of separate exhibition spaces for design studios and other courses, they put them back into the template file they shared with everyone in the beginning. At this point, they deal with problems like loss of texture, overlapping surfaces, and points that don't match with each other due to version differences or scale issues. After the problems are fixed and final controls are done, the virtual exhibition is ready for further steps on other software.

Next step of the virtual exhibition is executed on Enscape, a plugin for real-time rendering running on Sketchup and other 3d modelling software. This process is covered by the core design team, adding lighting, furniture, and other amenities to the model, walking through the model to check potential mistakes, and testing the exhibition on immersive VR using headsets. After the checks are complete, 360-degree images are rendered from each necessary space for design studios and other courses to constitute the VR exhibition for mobile devices.

All 360-degree panorama images are transferred to iStaging, a web-based platform for virtual tours. The images are assorted in a reasonable way regarding the circulation in the space. As soon as the assortment is completed, it is time to work on each image separately to add multimedia, tags, and external links where necessary. The core design team is responsible for the images from the lobby and common spaces for faculty activities, as the exhibition spaces of the studios and other courses are dealt with by the designated research assistants.

Following the final checks on the virtual tour on iStaging regarding the functionality of the tags, links, and multimedia, and trial runs on the tour, the virtual exhibition is made public and the links for each department's exhibition is shared online on faculty website and social media accounts. Thus, through a single link, anyone on anywhere on earth is able to visit the virtual exhibition for Bahcesehir University Faculty of Architecture and Design. The second option for the virtual exhibition is the executable file generated on Enscape. It is also uploaded to the faculty website and announced on social media. It is accessible for anyone on a PC, allowing real time walkthrough in the virtual space for exhibition.

3.0 DISCUSSION AND CONCLUSION

3.1. Outcomes

The long and hardworking process of the virtual exhibition pays off in several ways. First of all, it has a significant contribution to the dissemination of the academic year outcomes. In cases where the outcomes are exhibited in physical environments, the visitors are limited to the people that are directly related to the faculty; instructors, students, and the people they personally invite. This situation makes the physical exhibition less effective for reaching a large audience. On the other hand, the exhibition conducted on social media can reach relatively larger audience thanks to the number of followers of the faculty account and related accounts, but the screening time for the social media exhibition is limited to several seconds only. Therefore, it is not effective as expected. The virtual exhibition as explained in the scope of this paper reaches a relatively large number of audience. Table 1 shows the viewing numbers of the virtual exhibitions each year from 2020 to 2022, based on the departments of faculty of architecture and design. The table shows that in 3 years, the virtual exhibition has been visited more than ten thousand times. In addition to the viewing numbers, virtual exhibition also provides a more effective experience, dragging people in with its immersive design, mimicking the attributes of a physical exhibition.

Table 1: Viewing numbers of each virtual exhibition. Source: (Authors 2024)

Year \ # of visits	Architecture	Interior architecture	Industrial design	Total
2020	1710	803	1272	3785
2021	1784	786	758	3337
2022	1817	767	714	3298
Total	5311	2356	2744	10420

Second important contribution of the virtual exhibition is that motivates students to be better at their courses so that they can be a part of the exhibition. Unstructured talks with students from different departments revealed that they care about the virtual exhibition and having their work showcased in its scope. It is on one hand an informal competition between students that leads them to be better in the future, and on the other hand it is prestigious for them to show their work to people outside the faculty such as relatives and friends in such an immersive and futuristic digital environment.

Last but not least, the process of preparing the virtual exhibition contributes significantly to the teamwork capacity of the faculty. As stated in the scope of this paper, preparing the virtual exhibition requires strong collaboration and dedicated teamwork. Even though it is not always easy and requires sacrifice for the faculty members to reserve time for this extracurricular activity in addition to all the existing workload, it is good to get out of the regular work, be a part of something successful that adds a value to the identity of the faculty itself and be appreciated by the people from within and outside the faculty.

CONCLUSION

The case of virtual exhibition at Bahcesehir University Faculty of Architecture and Design exemplifies how a virtual exhibition as a new way of communication can contribute to the educational and academic environment regarding various aspects. The process and workflow explained in the scope of this paper can be a sample for virtual exhibitions in the future, forming a useful model. However, requirements and opportunities based on the location, time and subject may affect the virtual exhibition to alter in the future. Especially, becoming more interactive, dynamic and appealing to the user must be considered to be aims of virtual exhibitions. Therefore, using alternative and more advanced software like Twinmotion, Blender, and game engines such as Unreal and Unity must be studied to come up with more effective and successful virtual exhibitions in the future.

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