



SPATIAL ANALYSIS OF DIGITAL INTEGRITY OF DISPLAY TECHNOLOGIES

İsmail Emre KAVUT¹ (Assoc. Prof. Dr.), Mehtap Karsak

¹ekavut@msu.edu.tr. Sinan Ercan Caddesi. 12, B Blok Pınar Apt D: 40, 19 Mayıs Mah., 34724, Kadıköy, Istanbul, Turkey

ABSTRACT

This study was carried out by selecting two decors that uses LED screen technology from music-entertainment programs of TRT television productions by evaluating the relationship between digital screen content and real decor through the concept of "integrity" in interior design. The importance of the subject is emphasized through the importance of visual comfort so that the three-dimensional studio decor attracts the attention of the audience from the two-dimensional screens. As a method, it was preferred to examine the documents of the qualitative research type. The decors of the selected television programs were evaluated by discussing the interior design criteria over the concepts of form, function and meaning and by answering the determined questions. The study is intended to induce further research.

Keywords: Visual technology, Virtual technology, Space design

1. INTRODUCTION

Stage decoration of television shows has always been an important subsection in interior design discipline. Yıldız states that "this subject is crucial for both affecting the visual comfort of the audience positively or negatively and has a great appeal for the general audience. Television studio design is performed by taking for granted, the know how of various disciplines such as painting and architecture. It is carried out according to the content of the broadcast, considering the cost and by providing various technical and aesthetic conditions (Yıldız, Televizyon Stüdyolarında Aydınlatma, 2007).

Visual dominance and formalist behavior in architecture has been one of the issues discussed by designers. Pallasmaa, in her 'Eyes of Skin', emphasizes the importance of the sense of touch rather than sight, expressing that the sense of sight has been prioritized over other senses since ancient times, and that the design is realized with the concern of sight (Pallasmaa, 2011). While multi-sensory architecture emphasizes the importance of designs that appeal to all senses beyond sight, the primacy of sight is evident in television broadcasting, particularly in television studio design. The transmission of three-dimensional studios and broadcast content from two-dimensional screens to the audience has caused television studio designers to prioritize "visionally appealing design concerns". Here, the intention is to convey the depth of the three-dimensional decor to the audience. The studio attempts to express the viewpoint of the space to the audience via the screens by using color contrasts, forms of height and lowness, the interaction of fullness and space, and light and shadow dimming to create depth.

The most important things to pay attention to in the decor, which is designed according to the program content to be transferred to the audience, are the color and tone of the decor, the light

that illuminates the decor and the acoustic features in the studio. Taştan notes that “although the studio is acoustically sufficient, the materials chosen should not disturb this acoustic set up. The most preferred decor components are fabrics, curtains, carpets, screens, and various platforms in various sizes. There are distinctions between decor seen with the naked eye and decor seen with a camera. The colors used and the positions of the accessories or designs should be decided by considering the camera angles. In addition, a wide variety of visual effects are achieved by applying hybrid lighting designs on the designed decor. In this way the decor can be adapted to many programs, with small lights and different light settings” (Taştan, 2014).

In general, due to the light fixtures on the ceiling in television studio design, the approval of the light technician/ designer should be obtained for every design detail to be applied on the ceiling. A ceiling plan that is large enough to prevent this apparatus should not be designed. Furthermore, since all kinds of accessories to be hung on the ceiling will cause undesired shadows, its planning should be done meticulously compatible with lighting fixtures. Background design is very important in television studio design, and it is the element that completes the decor, contrary to the design limitation in the ceiling.

In some cases, for the background design, which is designed to complement the decor and in accordance with the content, sometimes graphic design units with technological features are used to reduce the cost. The most widely utilized background elements include cycloramas, panels, rear projection, front projection, animation screens, and LED screens. Besides, today, virtual studio applications, which are electronic projection, in which images are prepared with computers, are also used. Taştan stresses that, the use of green box is important in terms of providing unlimited creativity, reducing the time and cost of decor production (Taştan, 2014).

The main purpose in studio design is "to create a decor in accordance with artistic, practical and economic criteria". Sometimes these criteria can be considered to conflict. Unfavorable costs can be revealed by a creative and practical decor project. In this context, using technology can be a method that both reduces costs and provides practical solutions for decor design. Drury convincingly stresses that according to the content of the program, the background used can be images that complement the decor, it can also be animations or videos independent of the decor. (Drury, 1982).

Design, evolves and develops through technology. It is evident that, development of digitalization from the 20th century to the present day has also affected stage design. In recent years, the use of LED screen technology in stage design has become widespread. LED screens do not only create a background atmosphere in the studio, but also become a part of the scene, enriching the decor and enhancing the visual effect of the decor. Today, technologies such as LED screen, projection and holography are used as digital images. Recent examples for the use of 3D holography have been the 'Ruan Lingyu' program at the '2018 China Spring Festival' gala and the use of projection in the 'San Ti' program with multimedia stage design. Among these technologies, the LED screen is the most widely used technology in stage design and provides immersive experiences to the audience. The effective application method in stage design has been a subject that designers think about.

It is important to coordinate the preparation of the digital image with the director, stage designer and lighting engineer to prevent any negative images from forming during the shooting. The LED screen image consists of pixels and the appropriate screen resolution moves so that the shot does not suffer any deformation (Hu, 2018). Another important factor in the use of LED is that the pixels of the image can be hidden in the camera. The decor must be at a certain distance from

the LED screen so that the pixel image of the LED screen is not transmitted to the audience. The position of session accessories is important to be able to control the distances of artists, actors, or speakers to the LED screen. In addition, the video or graphic content to be shown from the background must be in accordance with the style of the program, the director's request and the decor designed by the stage designer.

Ching, who defines interior design with the phrase "Interior design consists of the planning, arrangement and design of interior spaces within buildings", also points out that for the design processes, there should be harmony and integrity of every unit involved in the design (Ching, 2016). The atmosphere that the spaces designed at first as two dimensions acquire volume on their journey becoming three dimensional spaces once they acquire texture, color, material, and accessories. Television studio design in terms of interior architecture therefore requires such harmony. Each component of the design should be in integrity that positively affects the visual comfort of the viewer.

With the developing technology, the integration of LED screens with the decor, which is increasingly used in studio decor, affects the visual preferences of the audience. This factor is important in terms of viewing rates of the television channel. For this reason, two-dimensional graphics and three-dimensional animations placed in LED screens should be integrated with the decor and should be in accordance with the general grammar of the design.

The article seeks to to evaluate the use of LED screens as digital decor in television studio decor design from the perspective of interior architecture, based on the dominant role of technology in many disciplines today, and to raise awareness of the importance of the relationship between digital decor and real decor, which emerges with LED screen technology in decor design.

In the study, it is put forward that the depth perception in television studio decor is properly obtained if the digital decor content continues the real decor in perspective and provides a formal integrity in the space. The integrity in question here is the integrity created by the continuation of the three-dimensional design created with the real decor with the graphic used in the digital decor. With this study, it is aimed to attract attention with the title of integrity in design in connection with digital decor and real decor in television studio design.

The study was carried out with the research method of examining the documents of the qualitative research type. In the research, TRT television programs in the field of music entertainment were targeted as the scope of the research, and the two programs selected as a sample were examined and compared. In the study, only the data from these two selected programs are tested. Therefore, the results obtained in this context do not cover the whole variety of LED display usage. It is also a significant goal to draw attention to the subject through these programs. Although the manuscript proceeds centrally through the interior architecture discipline, it is also important in terms of fields such as stage and decor design, cinema and television, graphic design and as well as visual communication design.

2. MATERIALS AND METHODOLOGY

The method of the research is the examination of documents of qualitative research, and TRT broadcasts using LED screen technology as the research universe were examined. The sample was determined as two programs among these broadcasts, in which the content of the LED screen was handled differently. These programs are "Dilhan", and "Evening Delight (Akşam Sefası)" programs broadcast on TRT Music channel. The relationship of the selected programs is examined with the defined methodology. The data collection technique is document/record

review. The videos of the programs are watched on the internet and the visual samples are examined.

The examined programs are evaluated through the concepts of form; function and meaning that provide conceptual integrity and questions that ensure the integrity of the space in terms of form.

Form (depth): Three-dimensional space in television programs is the "main concern to give the audience the depth of space", which is seen as an important problem when it is transferred from the screens to the audience in two dimensions and on which the studio designers emphasize". In this study, the contribution of LED screen contents used in selected programs to this criterion is discussed. Regardless of whether the contents are two-dimensional graphics or three-dimensional animation, the depth they add to the space is important for this title. Questions to discuss:

- a) Is the content of the LED screen compatible with the geometry of the space?
- b) Does the content of the LED screen provide depth to the space?

Function: The way of using LED screens should be examined through selected spaces. Effective use of this technology has several advantages. This application provides impressive visuality, as well as the practical use of LED screens, considering the production cost and sustainability of real decors.

Questions to discuss:

- c) Have the advantages of this technology been utilized with the content used?
- d) Does the program fulfill the function of LED screen in decor design or has it lost its function?

Meaning (content): Television studio decor design should be designed in accordance with the program content, the identity of the channel and the wishes of the producer or director. Therefore, the designed decor should have a meaning that it adds to the space with its design line and language. The content of the LED screen should support the integrity of the space in a design parallel to the design language of the main decor.

Question to discuss:

- e) Is the content of the LED screen suitable for the design language to be given in the decor design and how does it affect the integrity?

3. FINDINGS AND EVALUATION

The decor designs of the selected programs are examined through the visuals and evaluated with the titles and questions determined in the material and method section. What is intended to be done in the decor design of the programs has been conveyed with the information received from their directors or decorators/ interior/ stage designers.

3.1. TRT Music ‘Dilhan’ Program



Figure 1

Reference:

https://www.youtube.com/watch?v=EzDz5tyTRxw&ab_channel=D%C3%BCnyaTekin

In the decor design of the music program “Dilhan” broadcast on TRT Music channel, it was aimed to give a street image with the information received from the decorator Bensu Yarkın. The old Ankara houses, which are formally in real decor, have been continued by preserving the perspective in the LED screen content. Besides, by giving the image of the city view in the background, integrity with the real decor has been tried to be achieved. (Figure1).

As seen in Figure 1, the continuation of the old Ankara houses on the LED screen is designed in harmony with the geometry of the space and the program content. The concern of giving depth, which is an important criterion in the design of the television studio, is resolved with the city view in the background. The venue has gained a wider view with the LED screen display. Thus, it has become easier to reach the perception of a three-dimensional design of the space from two-dimensional screens.

When the use of LED screen in the decor is examined functionally; the only function of screens is to reflect the background. In television studios, LED screens may form the background, as well as reflecting different videos and graphics depending on the purpose of the program. However, if another video or graphic content is projected from the LED screen in this program, the desired city view image will be lost. Therefore, the function of LED screens in decor has been to project a two-dimensional graphic image of the background image, which gives depth to the space and integrates only with the real decor.



Figure 2

Reference:

https://www.youtube.com/watch?v=EzDz5tyTRxw&ab_channel=D%C3%BCnyaTekin

Since the program was broadcast in Ankara and a concert was held in the style of Turkish folk music, it is tried to highlight the local textures in a semantic decor. For Ankara, the old Ankara houses, where historical textures are dominant, have been the inspiration for the design of the decor. The old Ankara houses, designed with Styrofoam material in real decor, are designed by preserving the perspective in the real decor with two-dimensional graphic design in the LED screen content. The city view in the graphic provided integrity with the real decor and played a significant role in reflecting the design concept.

3.2. TRT Music 'Evening Delight (Akşam Sefası)' Program

"Evening Delight (Akşam Sefası)" is a music-entertainment program broadcast on TRT Music channel. Formally, the two-dimensional graphic pattern in the content of the LED screen is in the language that continues the design geometries of the space. The decor and digital LED content are only integrated in terms of design geometry. The LED screen content is not continuous with the decor perspective. The pattern designed on black seems to hang in space with occasional shimmering moving effects. With this move, the intention is to add a depth to the space. The star-like lighting on the black screen behind the LED screen also contributes to this depth. Although not as deep as the city view in Dilhan program gives, LED screens show the decor of the program quite wide.

LED screens reflect two-dimensional and three-dimensional graphic contents as a visual function. Since LED screens do not maintain the perspective of the space, it can be thought that the diversification of these contents in accordance with the purpose will not disrupt the integrity of the decor. Graphic contents are also used in different colors from time to time in the program (Figure 4). LED screens in the decor have gained the function of reflecting the two-dimensional graphic and animation contents that give depth to the space and integrate with the decor design geometry.



Figure 3

Reference:

https://www.youtube.com/watch?v=Qu3ceYng-5Q&ab_channel=TRTM%C3%BCzik

With the information received from its director, Hasan Taş, traces of "old casino designs" were tried to be reflected in the decor design of the program. An ordinary Turkish citizen's eye can easily grasp the heavy casino atmosphere at the program at first sight. This classic but semi-conservative stage with its red curtain and colors is evident at the program (bkz. Görsel:3). The design language in the real decor is tried to be continued graphically in the content of the LED screen.



Figure 4

Reference:

https://www.youtube.com/watch?v=Qu3ceYng-5Q&ab_channel=TRTM%C3%BCzik

Studio decor designs, which were examined through the determined criteria, were discussed with separate questions for each criterion. It has been tried to be expressed with sample spaces that the contents of the LED screen affect the decor design formally, functionally, and semantically in these two examples, LED display technology is used in different styles. Contributing to the depth of field by maintaining the space perspective is possible, as seen in the example of the 'Dilhan' program. However, the fact that LED screen technology continues the decor perspective in television studios can also give erroneous results. Various camera angles must be considered during the design process of the space. The two-dimensional perspective effect that continues the decor can provide or break the continuity according to the camera angle. In LED screen technology applications that reflect graphics in a language suitable for the design geometry of the space, the criterion of depth of field is important.

4. DISCUSSION AND CONCLUSION

In this study, the use of LED screen technology in television studio decor design and the relationship of digital decor with real decor have been discussed through two decor samples, with the concepts of form, function and meaning of interior design criteria, and the document analysis method of qualitative research type, and it has been tried to draw professional attention in the subject. It is important that the television studio decor design is realized by considering the visual comfort of the audience in order not to decrease the viewing rates of the channel. Since three-dimensional studio spaces are transferred to the audience from two-dimensional screens, studio decor designers are trying to make designs that will reveal the depth of the studios on two-dimensional screens by turning to designs where the sense of sight is important.

Today, there are some technological methods used to reduce the cost and create more effective visual designs for television studio design. Especially the endless background cycloramas, panels, reflection from the back and front surface, animation curtains, greenbox applications and LED screens are the most common methods. LED screens provide advantages such as presenting impressive visuals to decor design, reducing production costs and practicality. Therefore, the effective use of LED screens has been an important criterion for designers to focus on.

In the study, the use of LED screens in television studio decor and the relationship of digital

content with real decor have been discussed over two different television programs, and it is aimed to emerge a scholarly interest for the researchers by directing new studies. Although the research has been studied in the field of interior architecture, it is important for various design disciplines. In accordance with the depth of field criterion of the television studio design, which is defended as hypothesis, the idea that the digital decor content can be provided with a formal integrity from a perspective has been supported in the 'Dilhan' program as seen in the findings. However, camera angles should be considered in order to avoid mistakes in real decor applications, which are maintained in perspective with LED screens. On the other hand, in the "Evening Delight" decor, it has been concluded that digital content can give depth to the space without providing a continuity and formal integrity in terms of perspective. Thus, it has been seen that the use of LED screens in television studio design can provide the integrity of the real decor and digital content with different methods. While the city view effect and street view desired to be given in the 'Dilhan' program are provided practically with the LED screen, it has been concluded that the use of LED screens in terms of functionality only provides a background for the decor. In the 'Evening Delight' decor, on the other hand, the two-dimensional graphic and animation effect designed on LED screens and the pattern floating in the air added depth to the space, but this depth was not as strong as in the 'Dilhan' program since it did not provide continuity to the real decor in terms of perspective.

In the study, the styles of using LED screens in studio design with the two selected decors are tried to be examined, and although the evaluation of only these two decors is the limitation of the study, it is anticipated that this study will shed light on future research. By developing studies, the advantages of LED display technology in decor design can be further increased. Nick Moran stage and technology designer, mentions that "as the cost of the equipment needed to capture, process, project and control images continues to decrease, these technologies will become more prevalent on stage. How theater producers use or avoid the lure of the screen, and how researchers describe how it works, will remain controversial for some time (Moran, 2010). Considering the developing technology, the studies to be done in this field will contribute to the decor design in the media sector.

REFERENCES

- Butler, J. G. (2012). *Television : Critical Methods and Applications* LEA's Communication Series (4 b.). New York: Routledge.
- Ching, F. D. (2016). *İç Mekan Tasarımı* (6. b.). İstanbul: YEM Yayın.
- Daemen, J., Haufs-Brusberg, P., & Herder, J. (2013). Markerless Actor Tracking for Virtual (TV) Studio Applications. *International Joint Conference on Awareness Science and Technology & Ubi-Media Computing* , 790-795.
- Drury, G. (1982). Digital techniques in the future television studio. *IEE Proceedings A (Physical Science, Measurement and Instrumentation, Management and Education, Reviews)* , 129(7), 413-426.
- Hu, Y. (2018). LED Digital Image Design and Production in Large Stage Performance, Take "Shanghai Science and Technology Festival" Series of Performances for Example . *Art and Design Review*(6), 148-159.
- Koçer , K. Z. (2005). *Televizyon'da Dekor Yapma Prensipleri ve Bu Bağlamda Televizyon Kanallarından Biri İçin Bir Dekor Uygulaması*. Yayınlanmamış Yüksek Lisans Tezi. İstanbul, Türkiye: Mimar Sinan Güzel Sanatlar Üniversitesi.
- Lamb, B. (2014). Narrative Form and the British Television Studio 1955–1963. *Historical Journal of Film, Radio and Television*, 34(3), 357-368.
- Moran, N. (2010). Resisting the Lure of the Screen. *International Journal of Performance Arts and Digital Media*, 6(1), 77-88.

- Pallasmaa, J. (2011). *Tenin Gözleri*. İstanbul: YEM Yayın.
- Taş, H. (2021, Aralık). Akşam Sefası Programı. *Kişisel İletişim*.
- Taştan, Ö. (2014). Türkiye Televizyonlarında Haber Stüdyolarında Mekansal Özellikleri Üzerine Bir İnceleme. İstanbul: Maltepe Üniversitesi.
- Yarkın, B. (2022, January). Dilhan Programı. *Kişisel İletişim*.
- Yıldız, P. (2002, November). Televizyon Stüdyoları İç Mekan Düzenlemelerinin Amaca Uygun Esnek ve Değişebilir Nitelikte Kullanımı. *Yayınlanmamış Sanatta Yeterlik Tezi*. Ankara, Türkiye: Hacettepe Üniversitesi.
- Yıldız, P. (2007). Televizyon Stüdyolarında Aydınlatma. *Natural and Applied Sciences*, 2(2), 112-126.