

Music: A Muse for Architectural Design Creativity

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Abstract:- This study investigated the relationship between music and architectural design creativity. It examines the potential benefits and challenges of using music as an inspiration in the design process, as well as the influence of different types of music on creativity. The study was guided by a theoretical framework that integrates theories of music and creativity, with a particular focus on the function of music in enhancing operations that underlie creative thinking. This was strengthened with case studies of architectural edifices inspired by music, around the world. Purposive sampling was used to engage participants who have experience in architectural design, music, and education. Data was collected through questionnaires and the analysis included thematic analysis and descriptive statistics. The outcome of the study shows the benefits of using music during architectural design included; increased creativity, improved focus, improved concentration, and reduced stress and anxiety. It was also revealed that the selection of music used during the design process can be based on personal preference, random selection, genre-specific playlists, curated playlists and mood. While challenges such as music have been considered as a distraction or noise and personal preference differences for music genre existed when a team worked together in the studio. The implication of this is particularly relevant for architects, designers, and educators who can benefit from the use of music to enhance their creativity and optimize the design process. Hence, the study asserts a holistic approach to inspiration for architectural design that incorporates the use of music as a creativetool.

Keywords:- Music; Architectural Design; Creativity; Education; Cognitive Process.

I. INTRODUCTION

Music and architecture are two art forms that have a significant impact on human emotions and experiences (Murodova, 2021). Both music and architecture use similar elements such as rhythm, harmony, and texture, to create their effects. Music can evoke emotions and create a mood, while architecture can create a physical space that affects the occupant's emotions and experience. Music and architecture are two forms of creative expression that have been intertwined throughout history (Laylo, 2022). Music has been used as an inspiration for architectural design throughout history, including the Renaissance and Baroque eras. More recently, architects such as Frank Gehry and I.M. Pei have been known to use music as a source of inspiration for their designs. Research has shown that listening to music can have a positive impact on creativity, leading to increased divergent thinking, flexibility, and originality (Liu, Wang, Chen, Sun, & Shi, 2022). However, the specific

influence of music on architectural design creativity has yet to be fully explored. Understanding the connection between music and architectural creativity is important for architects, designers, and educators to improve the creative process and produce more innovative designs.

In addition to the potential benefits for the creative process, there may be additional practical implications for the connection between music and architectural design. For example, architects may be able to use music to create a certain ambience or mood in a building, which can have an impact on how people feel and behave in that space. As technology continues to advance, there may be new opportunities to integrate music and architecture in innovative ways (Mele & Russo-Spena, 2022). For instance, architects could use soundscapes or interactive installations to create more immersive and engaging environments.

It is also necessary to consider the role of music in shaping cultural and social identities. Music is often deeply embedded in cultural traditions and can evoke strong emotional responses, making it a powerful tool for cultural expression and identity formation (Sutton, Paton, Buergelt, Sagala, & Meilianda, 2021). In the context of architecture, the integration of music into design could potentially help to reinforce or challenge cultural norms and values. There may be differences in the way that music influences architectural design creativity across different cultures and geographic regions. Exploring these variations could help to broaden our understanding of the relationship between music and creativity in general.

It is worth considering the potential for interdisciplinary collaboration between architects and musicians. The shared use of creativity and expression in these fields could lead to exciting and innovative projects that blend music and architecture in unexpected ways. By exploring these potential intersections, we may be able to uncover new possibilities for creative expression and design. Therefore, the goals of this study are to: i) examine the connection between music and architectural design creativity; ii) identify potential obstacles and challenges to incorporating music into the design process; and iii) look into the potential effects of cultural and regional differences on the connection between music and design creativity.

II. NEED OF THE STUDY

Studying the relationship between music and architectural design creativity can provide valuable insights into how different forms of art and design can inspire and influence each other. Here are some specific reasons why this relationship is worth exploring:

- Cross-disciplinary inspiration: Both music and architecture involve the manipulation of space, rhythm,

and harmony. By studying the connections between these two disciplines, architects and musicians can potentially draw inspiration from each other's work and develop new ideas that they may not have considered otherwise.

- **Enhancing creativity:** Exploring different forms of creativity can help architects and musicians develop their skills and creative abilities. By studying the relationship between music and architecture, designers and musicians can expand their artistic horizons and create more innovative and unique work.
- **Understanding the emotional impact of design:** Music and architecture both can evoke emotional responses in people. By studying how music can influence architectural design, designers can gain a deeper understanding of how to create spaces that evoke specific emotional responses in those who experience them.
- **Finding common ground:** Music and architecture are both cultural expressions that can bring people together. By exploring the relationship between these two forms of expression, designers and musicians can find common ground and create more inclusive, diverse, and culturally relevant work.

In summary, this study provides insights into how music and architectural design inspire and influence each other, enhance creativity, understand the emotional impact of design, and find common ground between different cultural expressions.

III. LITERATURE REVIEW

A. *Studies on the Effects of Music on Creativity*

Numerous studies have looked generally at how music affects creativity. However, there is a growing body of literature seeking to explore the connection between music and the creativity in architectural design. Some key findings and references from this literature are outlined below:

- Exposure to music can enhance creative thinking and problem-solving abilities. Several studies have found that listening to music can increase divergent thinking, which is the ability to generate multiple solutions to a problem. For example, a study by Wang and colleagues (2021) found that listening to music improved the creativity of participants when they were asked to come up with ideas for new products.
- Different types of music can have varying effects on creativity. Research suggests that the characteristics of the music, such as its tempo, complexity, and mood, can influence the type and quality of the creative output (González, García-Huidobro, & Fossa, 2022). For example, upbeat and fast-paced music could potentially enhance performance in tasks that demand a greater high level of energy and motivation, while slower and more soothing music may be more effective for tasks that require relaxation and focus.
- Music can be particularly effective for enhancing creativity in certain stages of the creative process. Some studies suggest that listening to music during the ideation phase, when the goal is to generate new and original ideas, may be particularly effective for enhancing creativity (Eskine, Anderson, Sullivan, & Golob, 2020). Other studies have found that music can be beneficial

during the incubation phase when the goal is to allow ideas to incubate and develop unconsciously (Huovinen, 2021).

- Cultural and individual differences can impact the relationship between music and creativity. Studies suggest that cultural background and individual preferences can influence the way that people respond to music, and that the effectiveness of music as a tool for enhancing creativity may vary across different cultural contexts (Bhat & Rao, 2015).

Overall, the existing literature suggests that music can be a valuable tool for enhancing creativity in a variety of contexts, including architectural design. However, more research is needed to better understand the specific ways in which music influences the creative process of architects and to identify strategies for optimizing the application of music to the creative process.

B. *Studies on the Relationship Between Music and Architectural Design Creativity*

While there has not been a lot of research specifically looking at the connection between music and creativity in architectural design, several studies have looked at the connection between music and creativity more generally, and some of these studies have implications for architectural design. A study by Ritter and Ferguson (2017) found that listening to music can enhance creativity in the ideation phase of the design process, particularly when the music is personally meaningful to the designer. The authors suggest that music can help to stimulate divergent thinking and inspire novel ideas and that the emotional and motivational aspects of music can also help to sustain engagement and persistence in the design process.

Páez-Mendoza et al. (2019) investigated the relationship between music, emotion, and architectural creativity in the context of urban design. They found that music can have a positive effect on the emotional experience of the designer, which in turn can influence the quality and creativity of the design output. They suggest that music can help to foster a sense of creativity and openness and that it can also help to mitigate the negative effects of stress and anxiety on the design process.

Another study by Zhang and Ritter (2019) explored the relationship between music and creative problem-solving in a design task and found that listening to music can improve the quality and quantity of creative solutions generated by participants. The authors alluded that music can help to enhance cognitive flexibility and reduce cognitive inhibition, which is both important factors in creative problem-solving.

While there is limited research specifically investigating the relationship between music and architectural design creativity, these studies assert that music can be a valuable tool for enhancing creativity and emotional experience in the design process.

C. Case Studies

There are several examples of buildings that were influenced by music in their design. Here are a few noteworthy examples from around the world:

- The Opera House in Sydney, Australia: Designed by Jorn Utzon, a Danish architect, is a unique architectural design inspired by music. The architect, was inspired by the shape and structure of the instrument that was central to his culture, the Chinese Biwa. He also drew inspiration from the segments of an orange, and the way they fit together to form a cohesive whole.

In addition to the overall design, Utzon was also interested in creating a space that would provide excellent acoustics for musical performances. He worked closely with acousticians to develop a design that would enhance the sound quality of the opera house, and he incorporated many innovative features, such as the unique shape of the shells and the use of concrete as a sound-reflecting material.

The large shell-like structures are arranged in a repeating pattern to create a complex three-dimensional form (Figure 1). The shells are made from precast concrete panels, which were cast in a complex curved shape to match the design specifications. The panels were then assembled on-site to create the finished structure. The Sydney Opera House is also known for its striking exterior design, which is made up of over one million glazed ceramic tiles. The tiles are arranged in a series of interlocking patterns, which create a shimmering effect as the light changes throughout the day.

So, while the Sydney Opera House is not necessarily a direct representation of a particular piece of music, its design, construction and interior finishings (Figure 2) were heavily influenced by the principles and aesthetics of music.



Fig. 1: Sydney Opera House exterior view



Fig. 2: Sydney Opera House Concert Hall

Source: (Wikimedia, 2018)

- The Walt Disney Concert Hall, USA: Designed by Frank Gehry, the Walt Disney Concert Hall in Los Angeles is an architectural masterpiece that was inspired by the curves and undulations of musical instruments (Toyota, Komoda, Beckmann, Quiquerez, & Bergal, 2021). The building's stainless-steel exterior reflects light and creates a sense of movement as in Figure 3, while its interior is designed to create a rich and immersive acoustic experience for audiences, Figure 4.

Since its inception in 2003, this location has served as a distinctive centre for music, art, and architectural design. It is, without a doubt, one of Los Angeles' most recognizable landmarks and the world's most renowned concert venue. The design embodies the energy of Los Angeles and conveys a sense of musical motion. The primary auditorium employs the use of Douglas fir and Alaskan Yellow Cedar to create a visually and acoustically appealing atmosphere.



Fig. 3: Walt Disney Concert Hall exterior view

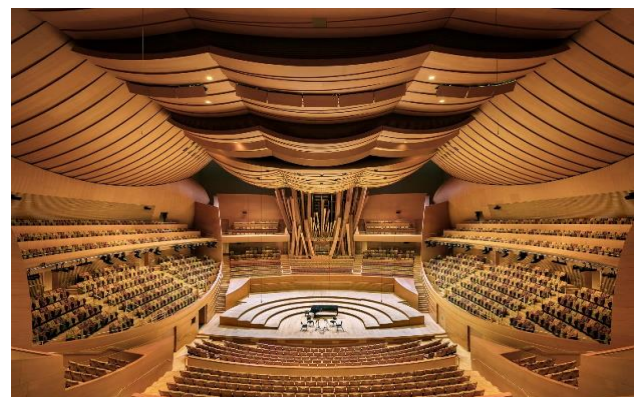


Fig. 4: Walt Disney Concert Hall interior view

Source: (Wikimedia, 2018)

- The Harpa Concert Hall and Conference Center, Iceland: The Harpa Concert Hall and Conference Center, located in Reykjavik, was designed by Henning Larsen Architects and the Icelandic firm Batteríid Architects. The building's

striking glass façade is inspired by the unique basalt formations found in Iceland's landscape, Figure 5. And its interior spaces are designed to create a dynamic and immersive experience for audiences, Figure 6.



Fig. 5: Harpa Concert Hall and Conference Center, Street View

Fig. 6: Harpa Concert Hall Interior View

Source: (Wikimedia, 2018)

Like the representation of the ancient Colossus of Rhodes - one of the original seven wonders of the world - the Harpa straddles its harbour with such sheer luminosity and eye-catching height that it is hard not to compare it to this ancient monument. In reality, both monuments share comparable symbolic principles. Centuries ago, the ancient monument represented freedom and triumph over the tyrannical rule, while its contemporary equivalent embodies a fresh start and cultural triumph for a nation that endured a devastating economic collapse.

- The Philharmonie de Paris, France: The Philharmonie de Paris, designed by French architect Jean Nouvel, is a modern and spectacular structure inspired by the shape of musical instruments. The building's unique architecture incorporates many interlocking metal panels that create a sense of movement and fluidity, Figure 7. While its interior spaces are meant to produce superb acoustics for both classical and contemporary music concerts, Figure 8.

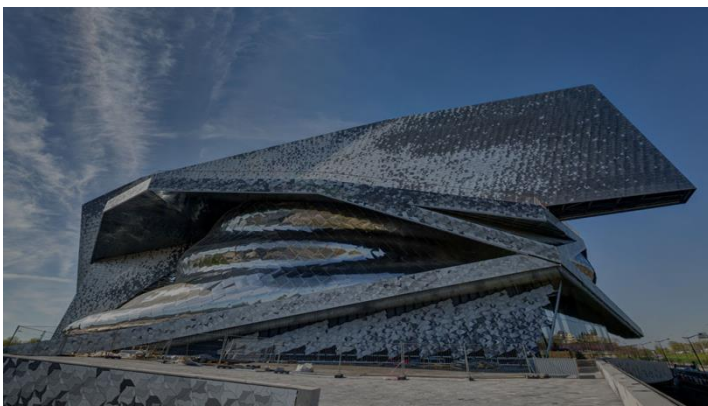


Fig. 7: Philharmonie de Paris Street View

Fig. 8: Philharmonie de Paris Concert Interior View

Source: (wikiarquitectura, 2023)

These examples demonstrate how architecture was influenced by music in various ways, from the shape and form of the building to the acoustics and overall experience of the space. By taking inspiration from music, architects created buildings that are functional and aesthetically pleasing for events and concerts that enhanced the experience of music for audiences. However, this inspiration can be deployed in the design process for other building types for the occupants to have the same experience.

D. Cultural and Regional Influences on the Relationship Between Music and Architectural Design Creativity

➤ *The Influence of Gamelan Music on Balinese Architecture*

Gamelan is a traditional ensemble of music from Indonesia that has influenced various aspects of Balinese culture, including architecture. Balinese architects often incorporate elements of Gamelan music into their designs, such as the use of repetitive patterns and rhythmic structures. The use of these musical elements in Balinese architecture creates a unique sense of harmony and balance, reflecting the cultural values of the Balinese people.

➤ *The Influence of Jazz Music on New Orleans Architecture*

New Orleans is renowned for its vibrant jazz music scene, which has had a significant impact on the city's architecture. The city's architecture often features elements of improvisation and spontaneity, similar to the improvisational nature of jazz music. Additionally, the use of bold colours, intricate patterns, and ornate details in New Orleans architecture can be traced back to the city's jazz heritage.

➤ *The Influence of Maqam Music on Middle Eastern Architecture*

Maqam is a traditional system of melodic modes used in Middle Eastern music, which has influenced the architecture of the region for centuries. The use of intricate geometric patterns and arabesque designs in Middle Eastern architecture can be traced back to the influence of Maqam music. Additionally, the use of calligraphy and decorative motifs in Middle Eastern architecture reflects the importance of language and literature in the region's cultural heritage.

➤ *The Influence of Reggae Music on Jamaican Architecture*

Reggae music is a popular genre of music that originated in Jamaica and has had a significant impact on the country's architecture. Jamaican architecture often features bright colours, organic shapes, and natural materials, reflecting the country's tropical climate and the laid-back, free-spirited nature of reggae music. Additionally, the use of recycled materials and repurposed objects in Jamaican architecture reflects the country's resourcefulness and creativity, which are also important values in reggae music.

These examples demonstrate how cultural and regional differences can influence the relationship between music and architectural design creativity. By examining the specific ways in which different musical genres have influenced architecture in different regions, it is possible to gain a better understanding of the complex relationship between music and architecture, and how this relationship varies across different cultures.

Certainly, here are some case studies on how cultural and regional differences influence the relationship between music and architectural design creativity in Africa:

➤ *The Influence of Traditional African Music on West African Architecture*

Traditional African music has played a significant role in the development of West African architecture. In countries such as Ghana, Mali, and Senegal, traditional music is closely linked to local architecture. For example, the use of mud-brick construction and thatched roofs in West African architecture reflects the region's rural and agrarian traditions, which are also reflected in the music. Additionally, the use of intricate geometric patterns and natural materials in West African architecture reflects the region's rich cultural heritage and connection to the environment.

➤ *The Influence of Highlife Music on Ghanaian Architecture*

Highlife music is a popular genre of music that originated in Ghana in the early 20th century. Music has had a significant impact on Ghanaian architecture, particularly in the design of public gathering spaces such as dance halls and concert venues. The use of vibrant colours, bold patterns, and dramatic lighting in Ghanaian architecture reflects the lively and dynamic nature of highlife music.

➤ *The Influence of Swahili Music on East African Architecture*

Swahili music is a popular genre of music in East Africa, particularly in Kenya and Tanzania. Music has had a significant influence on the region's architecture, particularly in the design of coastal cities such as Mombasa and Zanzibar. The use of ornate carvings, intricate mosaics, and elaborate doorways in Swahili architecture reflects the region's Islamic heritage and connection to the sea, which are also themes in Swahili music.

These case studies demonstrate how traditional music and popular music genres in Africa have influenced the architecture of different regions. The use of natural materials, geometric patterns, and bold colours are recurring themes in the architecture of Africa, and they are often connected to the cultural heritage and musical traditions of the region.

➤ *The Influence of Afrobeat Music on Nigerian Architecture*

Afrobeat is a popular genre of music that originated in Nigeria in the late 1960s and was popularized by the legendary musician Fela Kuti. Music has had a significant impact on Nigerian architecture, particularly in the design of public gathering spaces such as nightclubs, concert halls, and music studios.

- One example of how Afrobeat has influenced Nigerian architecture is the iconic New Afrika Shrine in Lagos, which was built in 1970 by Fela Kuti. The design of the building reflects the lively and energetic nature of Afrobeat music, with its large dance floor, bold colours, and open-air stage.
- Another example is the Music House in Ibadan, which was designed by architect Seun Oduwale and completed in 2011. The building houses a music studio and a performance space, and its design is heavily influenced by Afrobeat music. The building's façade features colourful murals of Fela Kuti and other prominent Nigerian musicians, while the interior is designed to facilitate the recording and production of music.

These case studies demonstrate how Afrobeat music has influenced the architecture of public gathering spaces in Nigeria, particularly in the design of nightclubs, concert halls, and music studios. The use of bold colours, open-air spaces, and vibrant murals are recurring themes in the architecture of these spaces, and they are often connected to the energetic and lively nature of Afrobeat music.

E. Theoretical Framework for the Study

The theoretical framework for this study draws upon the following theories and concepts from the fields of architecture, music, and creativity:

- **Sensory Experience Theory:** This theory posits that the built environment can have a profound impact on our sensory experiences and emotional responses (Abusaada, 2020). It suggests that architecture can be used to create meaningful and immersive experiences for users, which can in turn foster creativity and innovation.
- **Embodied Cognition Theory:** This theory suggests that our physical experiences and interactions with the environment play a critical role in shaping our cognitive processes and creative thinking (Schiavio, Gesbert, Reybrouck, Hauw, & Parncutt, 2019). It posits that the body and the environment are interconnected and that the design of the built environment can have a direct impact on our cognitive and creative abilities.
- **Flow Theory:** This theory suggests that when individuals are fully engaged in an activity that is challenging and meaningful, they can enter a state of "flow," which is characterized by deep concentration, a sense of timelessness, and heightened creativity (Mandhana & Caruso, 2022). It posits that certain environmental factors, such as the presence of music, can either facilitate or hinder the experience of flow.
- **Psychoacoustics:** This field of study explores the psychological and physiological effects of sound on the human body and mind (Devkota, 2019). It suggests that music can have a direct impact on our emotional and cognitive states and that the design of a building's acoustics can affect our experience of music.

Drawing upon these theories, this study comprehensively explores the connection between music and architectural design creativity.

IV. RESEARCH METHODOLOGY

The research design and approach for this study involved a mixed-methods approach, incorporating both quantitative and qualitative data collection and analysis methods. Quantitative data was collected through a survey and interview of practising architects, student architects, and designers, which aim to gather information on their use of music in the design process and their perceptions of the impact of music on architectural design creativity. The survey was distributed through online platforms for professional organizations to ensure a diverse sample of participants. Data analysis involved descriptive statistics and content analysis. This approach allowed for the collected data to be integrated and analyzed in a meaningful way.

A. Sampling Strategy and Participants

The sampling strategy for this study involves both probability and purposive sampling techniques. For the survey, probability sampling was used to obtain a representative sample of practising architects and designers. A list of professional organizations and networks was used to obtain a sampling frame. A random sample of members from each organization was invited to participate in the survey. For the qualitative interviews, purposive sampling was used to select a subset of participants from the survey respondents who indicated a willingness to participate in further interviews. Participants were selected based on their responses to the survey and their perceived level of engagement with music in the design process.

The criteria for inclusion in the study:

- Participants who are practising architects or designers with a minimum of five years of experience in the field.
- Participants who have completed at least one architectural project in which music played a role in the design process.
- Participants who are students in accredited schools of architecture in Nigeria.
- Participants who are willing to complete the survey and participate in a follow-up interview if selected.

The goal of the sampling strategy was to obtain a diverse sample of participants with a range of experiences and perspectives related to music and architectural design creativity. This allowed for a more comprehensive and nuanced understanding of the relationship between music and architectural design creativity.

B. Data Collection Tool and Technique

The data collection tools and techniques for this study include a survey, interview, literature review, and case study analysis. The survey and interview were the primary data collection tool, which was used to gather quantitative data on the use of music in the design process and the perceived impact of music on architectural design creativity. The secondary data was gathered from literature and case study analysis. The survey was administered online using Google Forms, and distributed through professional organizations and networks to obtain a diverse sample of participants.

C. Data Analysis Method

The data analysis plan for the study involved both quantitative and qualitative methods of analysis. For the survey data, descriptive statistics such as frequencies, and percentages were used to summarize the data and provide an overview of the use of music in the design process and the perceived impact of music on architectural design creativity. Data collected via case study and literature review was analysed using content and comparative analysis.

V. RESULTS AND DISCUSSION

A. Demographic Characteristics of Respondents

Table 1: Descriptive Statistics of Respondents Profile

S/N	Demographic Characteristics	Frequency (n=150)	Percentage (%)
1	Age	18-24 years=20 25-34 years= 104 35-44 years= 12 45-54 years= 12 55 and above=2 Total= 150	13.3 69.4 8 8 1.3 Total=100%
2	Gender	Male= 112 Female= 38 Total= 150	74.7 25.3 Total=100%
3	Highest Level of Education	Diploma= 48 Bachelors=54 Masters= 48 Total= 150	32 36 32 Total=100%
4	Occupation	Architect= 144 Interior Designer= 4 Landscape Designer= 2 Total= 150	96 2.7 1.3 Total= 100%
5	Use of Music in the Design Process	Yes=126 No= 16 Maybe= 8 Total= 150	63 10.7 5.3 Total= 100%

Table 1 Displayed the frequency and percentage of the respondent’s characteristics. The total number of respondents utilized for this survey was 150 professionals including architects and interior designers.

B. Relationships Between Different Types of Music and Architectural Design Creativity

A total of 97.3% of the respondents claim to utilize music at varying levels in their design process, while 2.7 % rarely or never use music in their design process as seen in Figure9. The potential benefits of the use of music in the design process according to respondents include enhancing creativity, improving focus, boosting mood, and enhancing

collaboration. Some professionals make use of music like Pop, classical, jazz, afro beats, rock, DJ mix, soul music, and fuji music during the design process with pop and classical leading and having the highest positive effect on design creativity. About 92% of respondents state that the use of music is important in the design process (Figure 10), while 60.8% have not had any negativity about using music in architectural design (Figure 11). It was also revealed that the selection of music used during the design process can be based on personal preference, random selection, genre-specific playlists, curated playlists and mood as shown in Figure 12.

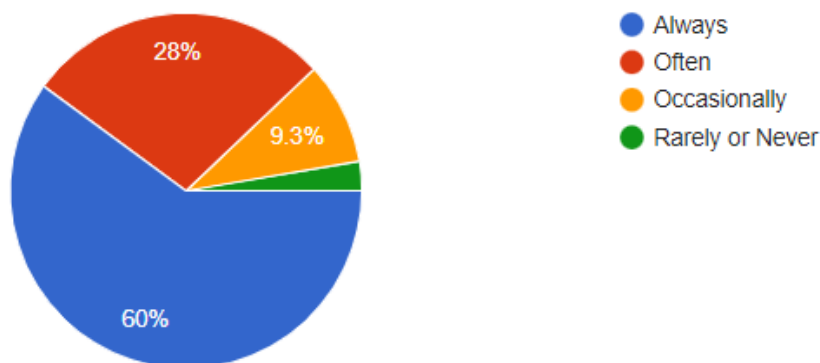


Fig. 9: Use of Music in Architectural Design Projects

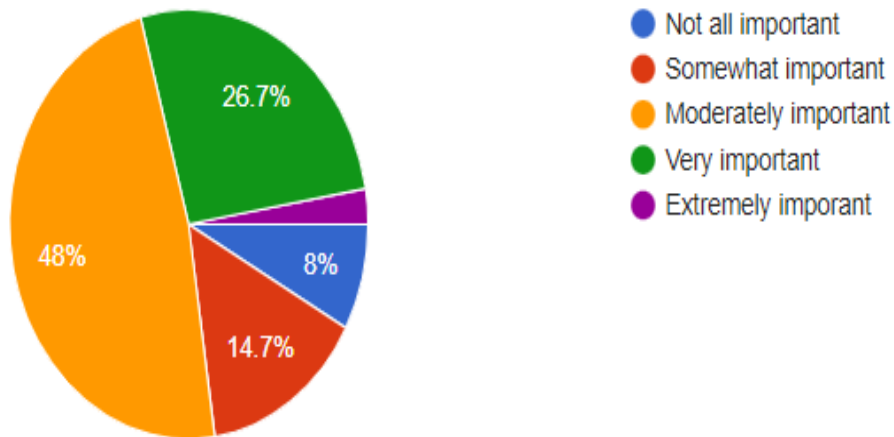


Fig. 10: Importance of Music on Design Creativity Process

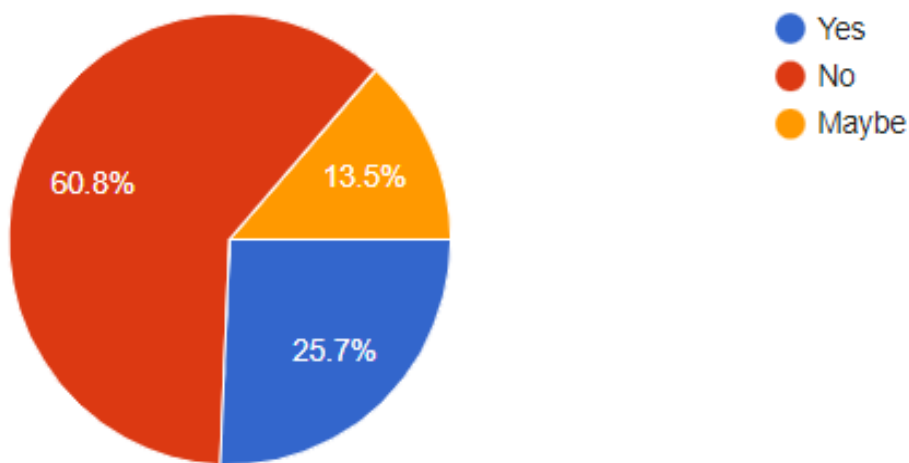


Fig. 11: Negative Experience Listening to Music During Design Process

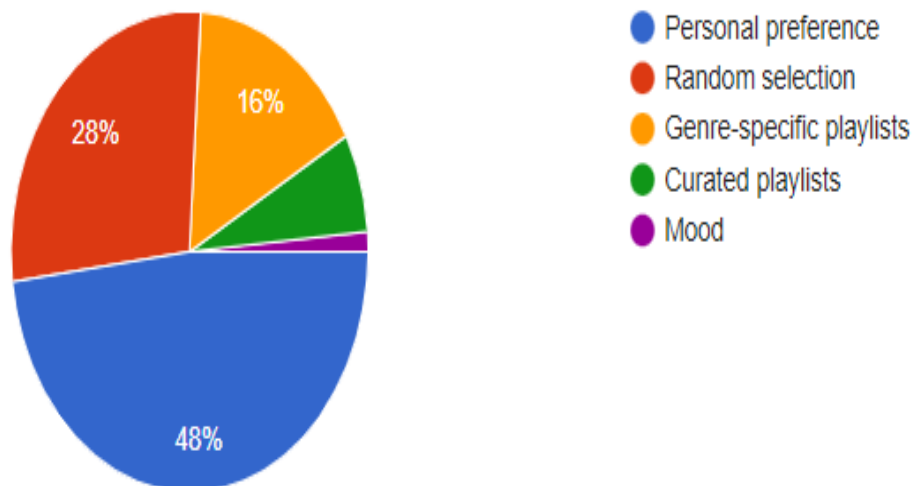


Fig. 12: How Professionals Select Music Utilized During the Design Process

C. The Potential Challenges and Barriers to Using Music in the Design Process

According to the respondents, some of the potential barriers uncounted in utilizing music in the design process are; distraction, personal preference differences among team members while in a design class, and noise pollution (Figure

13). Some identified ways by the respondents to overcome these challenges include; the use of noise-cancelling headphones, having a designated quiet zone, stating guidelines and policies on the use of music in the design process and providing music option that suits individual preferences, especially in design studios (Figure 14).

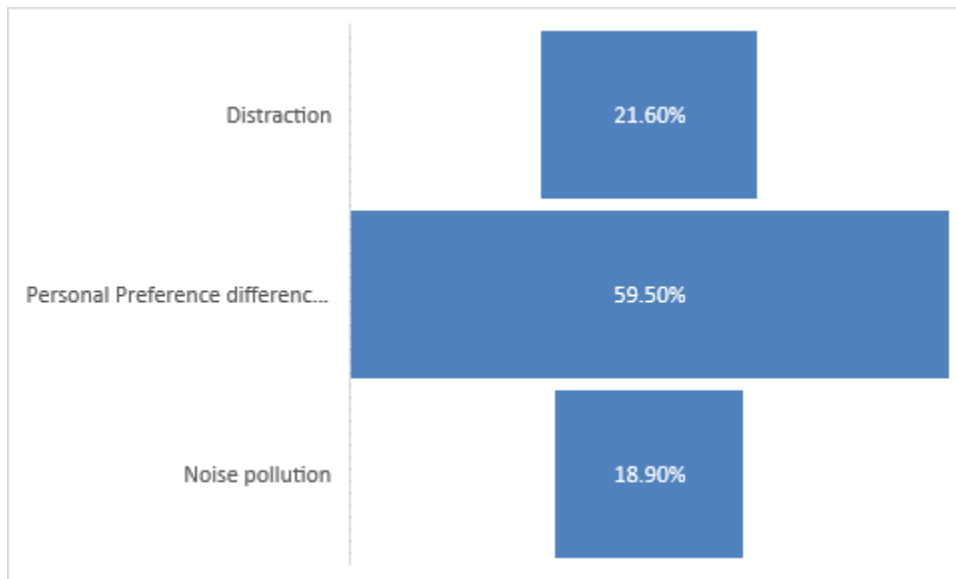


Fig. 13: Potential Challenges and Barriers to Using Music in the Design Process

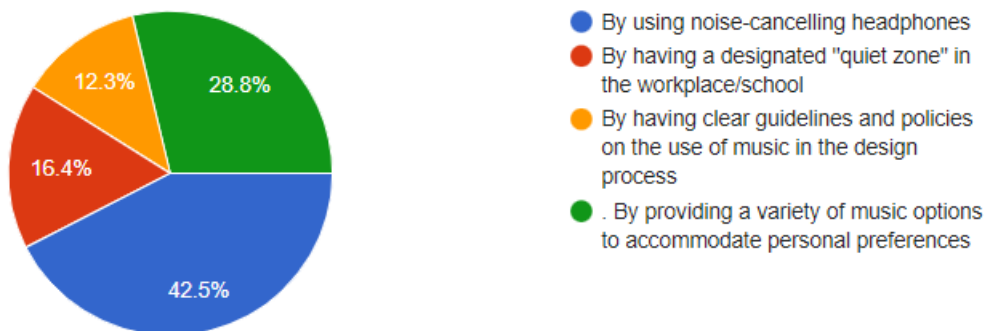


Fig. 14: Overcoming Barriers Associated with the use of Music in the Design Process

VI. CONCLUSION AND RECOMMENDATION

Both music and architecture are forms of creative expression that are deeply connected to emotional experiences and evoke powerful feelings in those who experience them. They complement each other in many ways. Whether it is by using music as a source of inspiration or incorporating musical elements into architectural design, the connection between the two can lead to innovative and inspiring creations, as it has been established by several designers, architects and educators. Some designers have implemented the rhythm and flow of music in their design process with the outcome visible in the form and movement of the building. While others have been inspired by the dynamics and harmonies of music to use certain colours, textures, and materials in architectural design to create a spatial experience in buildings that evoke a specific mood or atmosphere.

Many architects use music to help them focus and get into a creative mindset. Similarly, it breaks up the monotony of long hours spent at the drafting table or computer, providing a source of increased creativity, reduction of stress and anxiety, motivation and improved energy.

In conclusion, music can be a powerful muse for architectural design creativity, inspiring architects to explore new patterns, proportions, forms, materials, and moods in their designs. By using music as a source of inspiration, architects can create buildings that not only serve their functional purpose but also evoke a sense of beauty, emotion, and inspiration in those who experience them.

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