

The Relationship Between Architecture and Music, their Role in Design Across Eras

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Abstracts: Architecture, with its artistic, scientific, and technological aspects, profoundly influences the human environment and interacts in an integrated relationship with various human factors—ranging from material, social, and cultural aspects to geographical and political conditions. Architectural development traditionally emphasizes visual perception over auditory elements, with architects and architecture enthusiasts primarily focusing on visual experiences. However, as architectural understanding has evolved, it has become essential to recognize that spatial perception cannot be achieved solely through visual stimuli. It also requires an appreciation of auditory experiences, particularly the qualities and effects of sound, including music, and its sensory and physical impact on architecture and its users. This research identifies a knowledge gap concerning the relationship between music and architecture, specifically how music influences architectural outcomes. The study aims to explore and analyze the fundamental principles shared by architecture and music throughout history. It further seeks to investigate how these principles can be derived from musical compositions and applied to architectural forms and configurations to enhance the design and quality of both local and global architectural products.

Keywords: Architecture, Music, Musical Architecture, Architectural History, Musical Architectural Composition.

1. INTRODUCTION

According to Tolstoy, art is the ability to convey emotions and feelings from the artist to the recipient, facilitating the transfer of experiences between individuals. When an artist undergoes an emotional experience, they express the resulting feelings through their medium—whether it be colors, shadows, sound, or movement—allowing the recipient to experience similar emotions through an understandable artistic work[1]. The relationship between architecture and music stands as one of the most ancient and profound connections among the arts, with both fields striving to achieve aesthetic and spiritual harmony that reflects human emotions and visions. This connection is particularly evident in the philosophical and aesthetic foundations that link the geometric proportions in architecture with musical rhythm, creating a noticeable harmony in building designs and musical compositions alike.

In ancient times, both the Greeks and Romans relied on ideal mathematical proportions in their architectural and musical designs, as mentioned in the previous chapter. A prime example of this integration is the "Golden Ratio," which was used to create visual and auditory harmony that symbolized ideal beauty. During the Renaissance and Baroque periods, both architecture and music underwent significant developments, which reflected upon each other. For instance, Baroque architecture benefited from the complexity and diversity of Baroque musical compositions, resulting in architectural designs characterized by dynamism and movement.

From an artistic perspective, the connection between architecture and music is also reflected in the philosophical theories of the arts, where the focus is on the relationship between texture, harmony, balance, and symmetry. These theories can be applied to architectural design to achieve balance and harmony within architectural spaces and to enhance the overall aesthetic qualities of buildings.

It can be argued that the relationship between architecture and music is dependent on the artistic and cultural approach adopted by the architect or musician. This approach may be philosophical, emphasizing aesthetic and spiritual aspects, or practical, focusing on the application of mathematical proportions and rhythm in design[2].

2. Architecture and Music Across Eras

2.1. Pharaonic Era

Egypt was a center of musical culture, inspiring ancient kingdoms such as the Persians, Assyrians, Greeks, and Romans. The musical instruments of that time were characterized by a high degree of craftsmanship, accompanied by a broad musical renaissance. This level of craftsmanship can also be observed in Pharaonic architecture, where the ancient Egyptians excelled in sculpture and the use of various architectural styles, such as columns, obelisks, and other architectural elements. Each architectural element was meticulously designed to serve a specific function, much like the careful design of musical instruments [Figure 1].



Figure 1. Craftsmanship as a Common Element Between Architectural Features and the Making of Pharaonic Musical Instruments.

The Pharaohs regarded the art of music and singing as a means to elevate the soul, bring clarity to the spirit, and provide comfort to the ear. This is clearly reflected in the inscriptions and drawings found on the walls of Pharaonic temples and on papyrus scrolls, where images of musical instruments are engraved or carved on ancient buildings. One of their most notable musical innovations was the three-stringed harp, which symbolized the three seasons of the year through three distinct tones: the high tone represented summer, the low tone represented winter, and the middle tone represented spring. They composed songs for every festival, God, month, age group, gender, and stage of life. In their funerary celebrations, they adhered to specific musical rules, including chanting, toning, and hymns. This attention to musical detail was also reflected in their architecture, which was divided into various types, including funerary, religious, civil, and military architecture, showcasing their diverse rituals and respect for the afterlife and religious culture.

To listen: <https://www.behance.net/gallery/82009879/Ancient-Egyptian-Music-Land-Of-The-Pharaohs>

2.2. Romanesque Era (1000-1150 AD)

sacred church music underwent significant development, with the introduction of musical notation and the formalization of religious chant structures. Prominent composers of this period include Pope Gregory, Boethius, and Guido of Arezzo[3]. Romanesque architecture was characterized by a focus on constructing churches, with particular attention given to their design [Figure 2]. Romanesque architecture is known for its strength and solidity, reflecting the influence of clergy on artists to express the durability of the Christian faith, which spread and prevailed across European countries. The robust buildings symbolized victory and religious stability during this era[4].

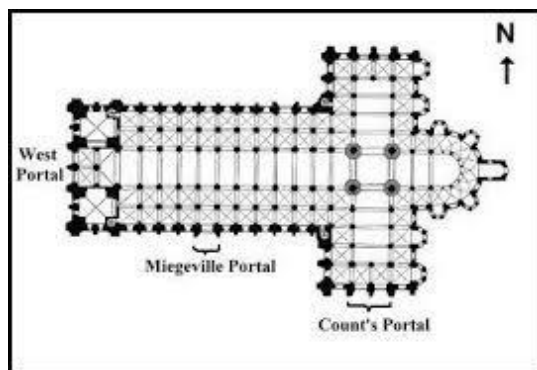


Figure 2. The floor plan of the Romanesque Church of Saint Sernin in France, reflecting religious concepts in the floor plan and architectural design elements.

2.3. Gothic Era (1150-1400 AD)

Gothic thought was predominantly religious in nature, with the cathedral emerging as a primary religious center during this period. The cathedral integrated various arts such as oratory, music, live drama, sculpture, and painting. Religion served as the primary source of inspiration for the arts and intellectual pursuits in this era, which is named after the Gothic architectural style. This style was characterized by massive churches with towering spires that soared towards the sky, symbolizing and reinforcing human spirituality. In music, this era saw the development of polyphonic style, as previously explained in the preceding chapter, where multiple melodic lines interwove horizontally, creating a similar auditory expression[3].

Gothic music was distinguished by polyphonic choral singing, where a basic melody was followed by second and third melodies, enhancing religious expression with increasing intensity, much like the internal and external structure of Gothic churches, which symbolized their dignity and grandeur, serving as the center of the arts of the time [Figure 3].

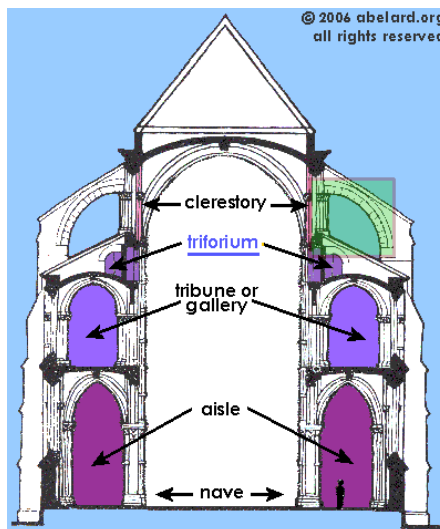


Figure 3. A cross-section of the nave of Laon Cathedral, showing the horizontal and vertical gradation of the building.

The musical style was referred to as Gothic, paralleling the architecture that inspired it. Both shared a common expression, where the melody was not only broad and beautiful but also infused with dense and expressive elements layered upon it. This approach was necessary to evoke the sense of towering and serene structure [Figure 4]. This was in direct contrast to the preceding Romanesque era, which was characterized by somber and dark melodies that expressed absolute faith, devoid of human thought or the presence of free will in worship.



Figure 4. Feeling majestic and calm at the same time in Strasbourg Cathedral in France.

The aesthetic values in music during the Gothic period were closely aligned with the aesthetic expression in architectural design, particularly in conveying the dignity and grandeur of the church. The primary melody was known as Gregorian chant (named after Gregory in the 6th century AD), characterized by its calm and broad nature. This melody was accompanied by free counter-melodies that together achieved a spiritual and intellectual expression, mirroring the Gothic architectural expression of the church. In parallel, Gothic architecture relied on the cruciform layout, upon which all the spaces of the church were organized [Figure 5].



Figure 5. General site plan of Strasbourg Cathedral in France, showing the cruciform layout.

Similarly, in music, the principal broad and steady melodic line was known as Gregorian chant, upon which all other melodic lines were layered to form what is called choral polyphony. In summary, Gothic architecture was based on the addition of multiple elements, one upon the other, starting from a simple and broad foundation and building up towards a soaring peak. Likewise, Gothic music was constructed on successive echoes between the various polyphonic lines of composition[3].

To listen: https://www.behance.net/portfolio/editor?project_id=82011671

2.4. Renaissance Era (1400-1600 AD)

Europe experienced a widespread artistic movement during this period, known as the Renaissance. It was a unified and comprehensive movement encompassing various aspects, blending elements of thought, imagination, and the love of art for its own sake, valuing beauty in both form and substance.

Rational renewal manifested itself in all areas of human existence, including the arts, music, politics, religion, literature, and scientific and geographical discoveries. The 15th century saw the rise of a humanistic intellectual

movement, led by figures such as Petrarch and Boccaccio. A defining characteristic of this movement was an unbounded love for art, literature, and learning. Key features of Renaissance humanism include:

A- Visual and auditory richness: This was reflected in the immense capabilities of oil painting and the stunning choral forms of the motet and mass, in which the musicians of the Low Countries (present-day Netherlands and Belgium) excelled.

B- Human rhythm in dance music: This was evident in instrumental music, especially in keyboard instruments (a precursor to the piano), and group musical performances.

Religious figures showed great concern for maintaining the purity of secondary vocal lines in polyphonic religious music, fearing that secondary voices might overpower the primary melody. They sought to preserve the clarity, dignity, and purity of the main voice.

This same principle applied to architectural characteristics, where there was a focus on highlighting and emphasizing the structural integrity of the building[5] [Figure 6].



Highlighting the structural elements of the columns outside.



The interior design is rich in oil paintings.

Figure 6. St. Peter's Basilica, showing both the internal and external concepts.

In England, the Renaissance took on a distinct scientific form, focusing on harmonic blending of different voices to achieve musical compositions that moved away from complete consonance. This innovation in sound paralleled the blending of colors in oil painting, providing a fresh auditory experience.

To listen: <https://helsinginkaupunginorkesteri.fi/en/renaissance-era?lesson=13135>

2.5. Baroque Era (1600-1750 AD)

The term Baroque is derived from the Portuguese word meaning "irregular pearl." Art critics in the 18th and 19th centuries coined this term, as they saw the art of this period as characterized by grandeur and excessive ornamentation.

Baroque music is known for its complexity and difficulty due to the variety of dominant forms, such as opera, orchestral works, piano compositions, keyboard instruments (which evolved into the modern piano), and chamber music. These musical forms spanned both sacred and secular contexts and integrated with the architecture, painting, sculpture, literature, and philosophy of the time, collectively conveying a sense of magnificence and awe. Baroque art is powerful, bold, and monumental, surpassing any previous standards of grandeur.

The drama of the Baroque period was grand, with highly intricate scenes. As a result, the music and singing in opera, combined with the intensity and force of organ sounds and orchestral instruments, particularly wind and percussion, created a musical art form that paralleled the architectural, visual, and sculptural arts of the era. These arts were marked by massive spaces, monumental scale, and detailed ornamentation, evoking a sense of reverence and awe in those who experienced them.

Baroque architecture featured curved forms and intricate, skillful use of columns, sculptures, and decorative panels

for ornamentation[3] [Figure 7].



Figure 7. The appearance of wide spaces and the complexity of details in the decorations of the Palace of Versailles in France

Religious music of the Baroque era sought to convey feelings of piety, devotion, and reverence, aiming to move the emotions and souls of worshippers. The faithful, when gazing at the magnificent Baroque churches with their decorated ceilings, towering ornamented columns, and hearing the sacred melodies, felt a powerful connection between the visual and auditory expressions of faith. The era employed the greatest artists, sculptors, architects, and musicians in a cohesive artistic endeavor [Figure 8].



Figure 8. Using decorations from drawing and sculpture to convey the concept of spirituality to the worshippers in the Church of the Gesù.

To listen: <https://helsinginkaupunginorkesteri.fi/en/baroque-era?lesson=13135>

2.6. Neoclassical Era (Mid to Late 18th Century)

The Neoclassical period extended from the mid-18th century to its end and represented a return to the aesthetic values of ancient Greek and Roman arts, encompassing painting, architecture, sculpture, music, and literature. Artists—including writers, poets, visual artists, and musicians—looked to the ancient civilizations, drawing inspiration from the artistic achievements of the ancient Greeks. Neoclassical art was dominated by clear, unified characteristics: clarity, balance, logical and organized composition, simplicity, serenity, elegance, and intellectual restraint, avoiding impulsiveness and whims.

The emergence of Neoclassical thought was a natural reaction to the grandeur, complexity, and opulence of the Baroque art that had preceded it. In Neoclassicism, emphasis was placed on objectivity and universality in expression. It represented craftsmanship at its highest level of refinement, showcasing elegance, simplicity, clarity,

and precision. Neoclassical arts were considered a Sensitive Style, which highlighted structure, form, balance, and a refined sense of control guided by reason, avoiding extremes[3] [Figure 9].



Figure 9. Schermerhorn Symphony Center Nashville, Tennessee, USA, 2006. The figure shows classical design elements and imitation of the Greek style in structural elements and architectural principles.

To listen: <https://helsinginkaupunginorkesteri.fi/en/classical-era?lesson=13135>

2.7. Music and Arabic Architecture

Al-Kindi is considered one of the most important Muslim scholars who made significant contributions to the field of musical composition. He was instrumental in developing musical notation and inventing various musical scales and notes. Al-Kindi discussed sounds, intervals, and melodies, proving that Arab art stands as an independent form[6].

Arabic music is characterized by harmonious tones and the continuous repetition of original melodies. This repetition is visually mirrored in the facades of Arab-style buildings, particularly through the repeated use of arches and decorative motifs. Furthermore, the changes in the character of Arab architecture from one region to another, and the varying forms of arches and domes, find a parallel in the evolution of contemporary music of the time [Figure 10].



Figure 10. The continuous repetition of contracts and decorations in clear proportions and the difference in the shape of the contracts between the two buildings - the first picture is the Alhambra Palace in Andalusia, and the second picture is the Al-Ghuri Agency in Egypt.

2.8. African folk Music

The music of primitive tribes, characterized by repetitive drumming and continuous rhythms, reflects in their

architectural style and primitive character. The structures consist of closely arranged, simple, and primitive huts, mirroring the straightforwardness of their musical traditions. Similarly, rural music in each country showcases simple melodies and monotonous rhythms derived from the surrounding natural environment, evident in their architecture, which is marked by simplicity and tranquility, utilizing locally sourced building materials [Figure 11].



Houses constructed from local materials in a Maasai village in Tanzania



General layout of a Maasai village in Tanzania

Figure 11. The continuous repetition of contracts and decorations in clear proportions and the difference in the shape of the contracts between the two buildings - the first picture is the Alhambra Palace in Andalusia, and the second picture is the Al-Ghuri Agency in Egypt.

3. RESULTS AND DISCUSSIONS

From the preceding discussion, it can be concluded that the relationship between architecture and music is one of the oldest and most profound connections among the arts throughout various eras, exhibiting mutual influences between the two forms. In the Pharaonic era, both music and architecture were skillfully crafted, reflecting the religious and social culture of the time. During the Romanesque period, religious music evolved alongside the construction of sturdy churches. The Gothic era witnessed the integration of various arts to enhance spirituality and religious expression. In the Renaissance, the arts experienced rational and humanistic developments, manifesting in rich visual and auditory experiences. The Baroque period was characterized by complexity and excessive ornamentation to evoke feelings of grandeur and awe. Subsequently, the arts returned to the aesthetic values of ancient Greek and Roman culture during the Neoclassical period, emphasizing simplicity, clarity, and balance.

In Arabic music and architecture, figures such as Al-Kindi and others contributed to the development of musical notation and harmonious melodies, which are reflected in the facades of Arab-style buildings. This artistic relationship persists even in popular music, which reflects a primitive character and simplicity in the design of huts and rural structures [Table 1].

Table 1. The most important features in architecture and music for each era

ERA	Architecture	Music
Ancient Civilizations	Straightforward geometric shapes, balance, clarity.	Simple solo melodies, clarity of notes
Middle Ages	The magnitude of the scale	choral appearance amplification of sound volume
Renaissance	Interesting proportions	Smoothness in sound structures
Baroque era	exaggeration, curved ornaments	The emergence of melody definitions in music

Neoclassical era	Logical mass balance in design simplicity	Delicate, balanced music, far from .extremism
Music and Arab Architecture	Arch, Domes, Decorations	Homogeneity, continuous repetition of original notes, clear rhythm
African folk Music	Simplicity, use of local building materials, compactness	Repetitive drum beats, continuous rhythm, simple melodies

CONCLUSIONS

It is evident from the preceding discussion that the relationship between architecture and music is profound, transcending mere aesthetic beauty to reach the essence of proportion, harmony, and balance, despite the differences in their expressive mediums. This relationship is grounded in similar philosophical and aesthetic foundations, rendering them a common language that embodies human emotions and thoughts.

By understanding this relationship, we can achieve architectural and musical designs that enhance well-being and promote positive behavior, creating unique human experiences while also serving as a documentation of the culture of each historical period. Thus, the primary objective of this research is fulfilled, demonstrating the existence of a strong and ancient connection between architecture and music, not only at the aesthetic level but also concerning the composition and foundations of both fields.

Key Findings

The study concludes several significant results, summarized as follows:

1. Architecture has a substantial impact on human behavior, depending on how well it meets human needs through artistic, creative, and environmental aspects, such as color, materials, and textures of buildings, in addition to temperature, light, and noise levels.

2. Music exerts a powerful influence on humans, functioning as a universal language that expresses human emotions and affects psychological and physiological states. This impact extends to the physiological interaction of organs with music, as well as its psychological effects, influencing mood and emotions based on intensity and tempo. Furthermore, the influence of music surpasses physiological and psychological aspects to encompass human behavior and social interaction, playing a vital role in enhancing communication and social integration, along with its crucial role in education, particularly during early developmental stages.

3. There exists an integrated relationship between music and architecture, manifested in various shared aspects such as harmony and balance, rhythm and symmetry, dynamics of scale and hierarchy, and the use of color, texture, and fabric. All these elements work together to create balanced and harmonious sensory and aesthetic experiences, contributing to interactive environments that enhance psychological well-being and sensory comfort for individuals while also stimulating creativity and expressing both inner and outer beauty in music and architecture.

4. A reciprocal relationship between architecture and music has evolved over time while maintaining core principles: harmony, rhythm, balance, and the expression of beauty. The ancient Greeks and Romans employed ideal mathematical proportions in their architectural and musical designs, such as the golden ratio that symbolizes ideal beauty. In the Renaissance and Baroque periods, developments in architecture and music reflected one another, where the complexities of musical compositions led to dynamic architectural designs. In modern times, architectural designs draw inspiration from musical rhythms to express dynamism and movement.

Based on these findings, a positive impact on individuals and society can be achieved through the integration of architecture and music. Education plays a vital role in understanding this profound relationship between the two fields. Schools and universities can promote these studies and support research that elucidates how architecture

and music influence human and cultural experiences across different historical periods. Education is the beginning of understanding and developing this relationship, fostering artistic aspects in students so that they become architects aware of aesthetic considerations. Such awareness can reflect in their professional practice, allowing them to design buildings and spaces that enhance human interaction and provide exceptional sensory experiences. Trained architects who comprehend the impact of music on architecture can create environments that stimulate creativity and psychological comfort, contributing to the improvement of public quality of life. Architects can develop spaces that meet human needs and respond to cultural and societal changes by integrating music into their designs.

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