The Role of Engineering Graphics and Design Sciences in the Study of the Analysis of Patterns in the Ancient Monuments of Uzbekistan

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Abstract

Overseas, design, formed during the nineteenth and twentieth centuries, penetrated rapidly in the wave of art, and later in science and technology, and into our lives, and became one of the most influential and widespread forms of design activity. It can be acknowledged that design is a field of science that has its own theory from a cultural, philosophical, psychological point of view, which studies its history and the relationship of man to the environment of the world of objects. The world's scientists in this field, summarizing the research of foreign and domestic researchers, use other humanities and natural sciences, technical achievements, pedagogical psychological methods and technologies.

Key words: integration, engineering graphics, design, monument, the world, the universe, nature, Physics, Metaphysics, patterns, Painter, our masters, knowledge and skills, the art of architecture, the art of carving, the Holy Quran.

The remains of Afrosiyob, Varakhsha, Bolaliktepa and other monuments demonstrate clear examples in this regard. During the initial stages of the Renaissance, people did not know much about the world, the universe, the nature. People were just observers of the processes that occurred around them. As time passed, they not only started to observe the process, but also began to collect and analyze a variety of data in detail. People’s perception of the world around them changed due to the general social needs, the need to improve the hunting methods, as well as the need to develop the labor tools into compact, convenient, high-quality ones. There appeared a need to discuss in different ways the accumulated data and knowledge, as well as the experiences, which evolved as a result of people’s attitudes to the various events around them. People were bothered with so many unanswered questions. This required experimentation, observation, and work, with which people started to deal with progressively. Aristotle’s works such as “Physics” and “Metaphysics” put some insight on the development of nature as a science over time (384-322 BC). The XII-XIV centuries were an era of groundwork for the revival of the manufacturing forces, trade, and science in Western Europe. The nature was studied and developed into a science. This was thanks to the significant contributions made by scholars such as Farabi (950), Abu Ali ibn Sina (980-1037), and Abu Rayhan Beruni (973-1048). In the XII century in Western Europe, works of thinkers such as Euclid, Heron, Ptolemy, Galen, Muhammad Musa al-Khwarizmi, Abu Ali ibn Sino (and others) on natural sciences have been translated and studied. The separation of technology during the Renaissance took place in the XIV-XVIII centuries, and many geometric shapes were discovered in the middle of the last century. At his time people began to polish the completed items. This took place due to the emergence of two specialties - engineering and painting. It is not difficult to imagine how these changed conditions have not lost their luster, beauty, and have left their mark on the world of artifacts found by our archaeologists.

These changed circumstances have not lost their beauty, attractiveness so far. And it’s not hard to imagine what kind of mark they have left in the world of artifacts found by our archaeologists. Since then, there has been an increase in the role, and later the role of drawings has increased significantly. As a result of the development of human consciousness, science and culture were formed over time. Manufacturing and architecture began to flourish. These, in turn, began to contribute the essence of drawings, which are the main type of graphics. The initial
drawings appeared during the construction of houses, castles and other structures. The first drawings involved only one image, which was called a plan. Normally, these plans were implemented directly on the surface of land, which was the actual size of construction site, on the area that the structures will be built. Therefore, the visual arts have been replaced by floral, geometric patterns. Colorful, plant-like, geometric patterns convey deep meaning in their interrelationships (Figure 1). Having formed abroad during the XIX and XX centuries, it penetrated art, then science and technology, and then our lives very rapidly, and became one of the most influential and widespread forms of design activity. It can be acknowledged that design is a field of science that has its own theory from a cultural, philosophical, psychological point of view, which studies its history and the relationship of man with the environment of the world of objects. The world's scientists in this field, summarizing the research of foreign and domestic researchers, have been using other humanities and natural sciences, technical achievements, pedagogical and psychological methods and technologies.

Figure 1

Symbolism prevails in the patterns that are tailored and depicted in the design. The ancient monuments were decorated by our ancestors with elegant patterns of drawings. They demonstrated their dreams, hopes and loves through the drawings through which they enjoyed. Our ancestors-painters studied the human psyche in detail and comprehensively. Thus, they enriched the houses with wonderful ornaments, with elegance and beauty. As an experience of
long period, our prudent forefathers learned that people live a long and peaceful life in tranquility due to a decorated house. According to expert masters, in ancient times the art of painting was so developed that painters could communicate with each other in a silent voice through the patterns they drew or painted. In order to learn the language of painting, one had to know the symbolic alphabet of each element and color of the pattern. This means that, even in those days, because of their deep command of engineering graphics and design sciences, they created unique works of art that integrated the features of both sciences.

The time tested the experience, knowledge and skills of folk masters through generations. The folk architecture reveals in itself the rich cultural heritage collected by the masters over the centuries such as the bright colors, the ornaments of delicate taste, the geometric patterns of a high cultural level. The range of geometric and floral patterns were mainly used in enriching the lines and colors, developing the possibilities of color images. The invaluable cultural heritage of our people embodies the experience of centuries, the fruits of the creative work of our ancestors. Thus, it is obvious that any bright “light” of the past can illuminate the darkness for several prospective centuries.

A remarkable amount of work is to be done by the people of art (who studies art) in relation to finding worthy monuments or memorabilia in the treasury of our cultural heritage, studying them in depth, as well as serving the development of modern culture. There has been a plenty of research into (the study of samples of) the art of architecture, which is a world in itself, and the art of painting (which is closely connected with architecture), in particular, painting, carving, plastering embroidery, engraving, etc. The works created by the grandeur of engraving art reflect the local originality. The masters from Samarkand created shallow reliefs and elegant patterns. The paintings of Bukhara were created in the form of flat reliefs. The works of Bukhara masters Usta Shokir (early XVIII century), Usta Baratboy and Shadi Muhammad (late XVIII - early XIX centuries) have been preserved. The blue, turquoise, green, and pink colors on the white background of the beautiful traditional dishes (tray, bowls, jugs, etc.) are filled with a sense of purity and coolness. Jewelers made crowns, women’s forehead ornaments, gold necklaces, rings, gold and silver jewelry with various stones (rubies, turquoise, azure, emeralds, nephrite, agate, etc.). Masters made beautifully decorated horse harnesses and weapons. Knives made of gold and silver were embroidered in elegant islimic method. Bone and jade were used to make the handles of knives. In addition, the handles were embroidered with embossed stones, or were decorated with turquoise stones.

Artistic handicrafts developed further during the reign of Amir Temur and the Temurids. Large architectural ensembles such as Registan, Shahi-Zinda, Oqsaroy (Figure 2 a), b)) were constructed. The buildings were decorated with colorful tiles and rivets, the interior was decorated with spotted patterns and paintings, from the second half of the XV century with a gold-embossed “kundal” pattern. The written sources reveal that the palaces built by Amir Temur were decorated with themed paintings and embroideries. At that time, although Islam
religion prohibited this, the walls of palaces and houses were decorated with colorful and meaningful works of art. According to Ibn Arabshah, the walls of the palace depict the way of life of the people of the palace, the battle scenes of Amir Temur and his sons, as well as celebration of wins.

Fascinating landscapes were found (1385) on the walls of the mausoleum of Shirin bek aka, which is the part of the Shahi Zinda mausoleum complex in Samarkand. According to the researchers, there are analysis of 16 landscape images placed inside the pattern on the walls of this mausoleum. These images contribute to a small part of the preserved images, which were probably painted on the inner walls of the mausoleum. Preserved only some parts of the landscape. The trees are depicted in blue, with water flowing from a ditch at the bottom. And magpie birds are clearly depicted on the tree branches. The artist was confident in painting the scene with his own hands. It is prominent that the directions of the brush traces in the image are written with free movement. The drawn image was done conditionally, without perspective cuts. The images are displayed layer by layer. It is clear that the artist attempted to demonstrate the movement of water, the roughness of the earth genuinely as it is in real life.

The trees are not similar with each other. The white background is painted in blue, light blue, and in some places reddish brown color was used.

In another mausoleum of Tuman aka (1406) in the mausoleum complex of Shahi Zinda, in addition to the preserved paintings, blue, yellow, red, brown, and gold were used in the landscapes. The landscape is conditionally described here, the trees are similar to each other, repeated periodically, and the real reality is not reflected, which shows that the work is drawn brightly. A new style of decoration was used with the Ishrakhana in Samarkand (1464), the White Palace (15th century), the Zayniddin Haji, and the Baland mosque (first half of the 16th century). Their walls, domed ceilings, and altars of were decorated with patterns. In order to create a bulge in the pattern, it is coated with a specially prepared mixture of red soil and the pattern is covered with a very thin layer of gold (inlaid). This method was called the kundal method.

By this time, the use of colors developed and become richer. Dark blue color became common to paint the floors. Using this color makes golden and orange-yellow colors look very attractive and beautiful. Or the floors of patterns painted in green and blue are painted in gold and red.

The floral patterns started to flourish by the end of the 15th century and the beginning of the 16th century. These are new complete intricate pattern compositions, not some techniques that are drawn into geometric patterns. One can come across islimic patterns, special patterns, bouquets, images of trees. During this period, epigraphic inscriptions were widely used in floral patterns.

![Figure 3](image-url)

New methods of drawing patterns have emerged due to the continued changes in working with walls designs. The patterns were painted with tempera dyes, mixing mineral dyes with plant glue on dry plaster. Thin sheets of paper were glued to the desired places with the help of honey. Because the 15th-16th century dwellings were not preserved, we can only see the miniatures and how the dwellings were decorated with the help of some books (Figure 3).
By the XVII century, the use of wall decorations declined. Only a few buildings are equivalent to examples of buildings built in the 15th and 16th centuries. One example could be the Abdulazizkhan Madrasah in Bukhara (1652). The madrasa is one of the brightest examples of the 17th century monuments, with very fine ornaments and patterns. The floor (background) is made in the style of gypsum plaster kundal. The landscape also decorated with delicate patterns.

By the 18th century, large-scale construction works had nearly stopped, but the decoration of the buildings still went on. In their works, masters enrich the traditional forms primarily through drawings, by searching of new, inexpensive, and high-quality raw materials.

Jeddah Mubarak Mosque is one of the most notable structures in the Andijan region. The mosque was built during 1992-1993, in the early days of our independence, and was built in harmony with ancient and modern architectural traditions. The courtyard of the mosque has a khanaqah with a porch on the west side, there is a two-storey library on the east side, and a fountain in the south. There is a range of terraces connected to the khanaqah, which links the western and southern sides of the mosque. Patterns on the roofs, altars and doors include texts containing surahs from the Qur'an and some prayers. All in all, when one studies the decorations and inscriptions of this beautiful building, one can conclude that the durability of the Uzbek national architecture and our skilled masters deserve their ancestors.

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