

Using Yewno Discovery to Develop a Knowledge Map as an Empathy Mapping Tool to Learn about Architecture

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ABSTRACT

There is a large number of people who are faced with the term “architecture” or have studied it at universities. However, not all of these people are informed about the connection between architecture and many aspects of human life.

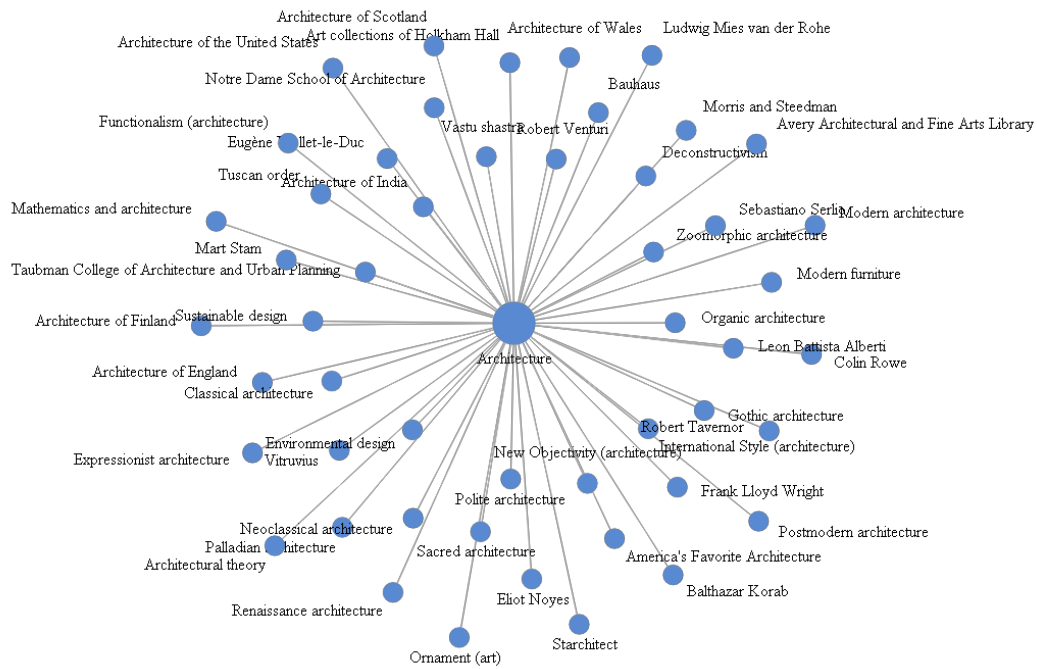
What do you know about architecture? What is it? These are the types of questions, I think, I will be asked in the future, because I am going to become a part of an architectural world.

The Yewno Research Platform is a great help for young scientists and students to expand their knowledge and outlook on the different topics which they are interested in. The platform provided me with a wide range of data about the architecture and its concepts which may be useful in my later professional life.

According to the Yewno Snippet Definition, architecture is both the process and the product of planning, designing and constructing buildings or any other structures. Architectural works, in the material form of buildings, are often perceived as cultural symbols and as works of art.

From my point of view, architecture is the construction of buildings, made in a certain style, to decorate cities and places. Each architect always brings something unique, a drop of his soul, to his work.

YEWNO KNOWLEDGE MAP: ARCHITECTURE



RELATED CONCEPTS:

1. Mathematics and Architecture
2. Sustainable design
3. Zoomorphic Architecture

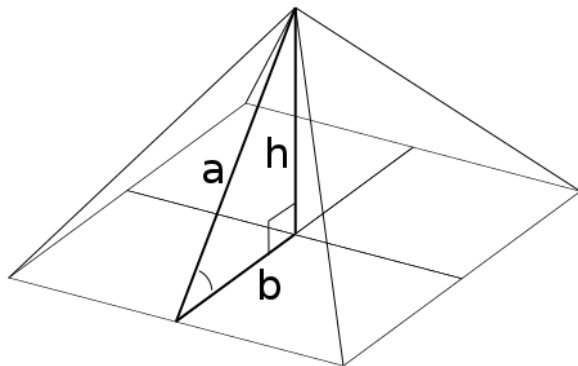
MATHEMATICS AND ARCHITECTURE

Since mathematics is the queen of sciences, it also finds its application in architecture. As with other arts, architects use mathematics for several reasons, for instance,

1. Architects use geometry to define the spatial form of a building. They lay out buildings and their surroundings according to mathematical principles.
2. The decoration of buildings can also be done with the help of mathematical objects, such as tessellations (tiling of a plane using one or more geometric shapes, called tiles, with no overlaps and no gaps).
3. Architects use mathematics to meet environmental goals, such as to minimize wind speeds around the bases of tall buildings.

By the way, pyramids, temples, mosques, palaces and mausoleums in ancient Egypt, ancient Greece, India and the Islamic world, have been designed with specific mathematical proportions.

The pyramids in ancient Egypt serve as an excellent example of the use of mathematics in architecture. We all acknowledge that the pyramids of ancient Egypt are tombs constructed with deliberately-chosen proportions. The pyramids' slopes were chosen from the 3-4-5 triangle (face angle $53^{\circ}8'$), known from the Rhind Mathematical Papyrus (c. 1650 – 1550 BC); or from the triangle with base to hypotenuse ratio $1:4/\pi$ (face angle $51^{\circ}50'$). The possible use of the 3-4-5 triangle to lay out right angles, such as for the ground plan of a pyramid, and the knowledge of the theorem of Pythagoras which would imply, has been much asserted. [1]

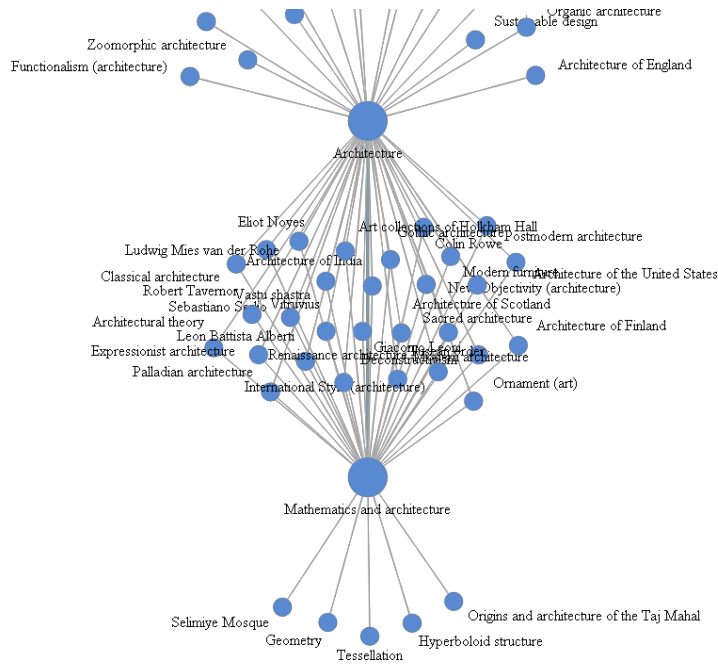


Connections:

Architecture to Mathematics

Architects lay out buildings and their surroundings according to mathematical principles.

YEWNO KNOWLEDGE MAP: ARCHITECTURE AND MATHEMATICS



SUSTAINABLE DESIGN

Sustainable design (or environmentally-conscious design) is the philosophy of designing physical objects, the built environment and services to comply with the principles of social, economic and ecological sustainability.

Nowadays, architects try to construct the majority of sustainable buildings, because great design is sustainable design. The intention of sustainable design is to "eliminate negative environmental impact completely through skillful, sensitive design". [2]

How can this be achieved? Creating the design and appearance of the building, architects should also think about its internal structure. This includes better user experience and comfort, doing more with less to enable the building to easily achieve peak performance, and maximizing the effectiveness of durable and quality materials.

Important to take into consideration is the fact that buildings should not harm the environment and, at the same time, must create a balance between the economy and society, which can lead to long-term relationships between user and object (service).

At the moment, there are numerous buildings focused on sustainable green design, eco-friendly materials, affordability, material reuse and humanitarian relief. For instance, people visit One Bryant Park every day in New York City, which is the first high-rise building to get LEED Platinum certification, the Bank of America Tower, in Manhattan, is one of the world's greenest skyscrapers. As well as having CO2 monitors, waterless urinals and LED lighting, the building also has its own generation



plant that produces 4.6 megawatts

of clean, sustainable, energy. [3]

One Bryant Park

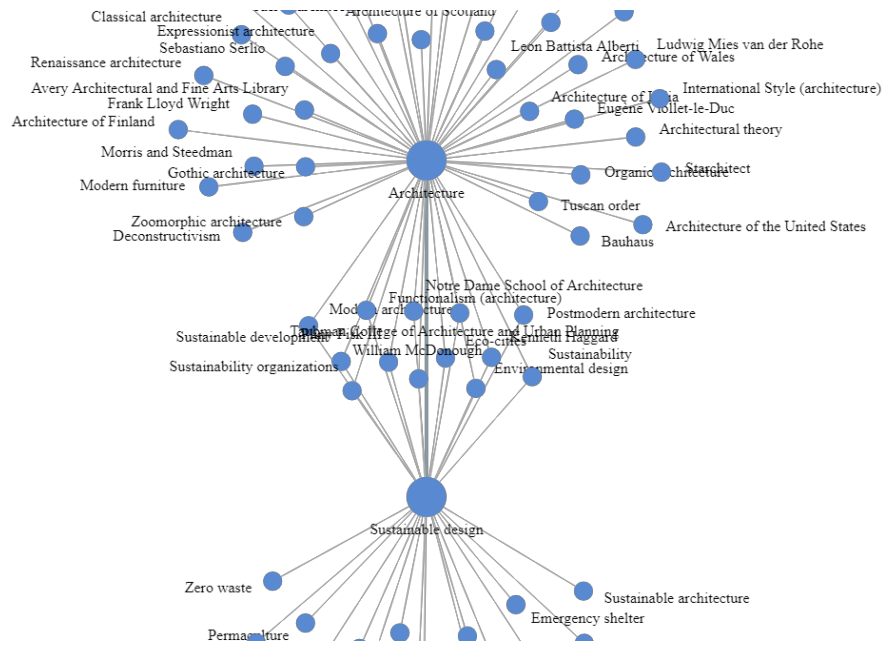
Sustainable design is increasingly used in architecture as the basic design of the building. The limits of sustainable design are reducing, and whole earth impacts are beginning to be considered nowadays. According to Hazel Clark and David Brody of Parsons The New School for Design in New York, “emotionally-durable design is a call for professionals and students alike to prioritize the relationships between design and its users, as a way of developing more sustainable attitudes to, and in, design things.”

Connections:

Architecture to Sustainable Design

Sustainable design is increasingly used in architecture as the basic design of the building.

YEWNO KNOWLEDGE MAP: ARCHITECTURE AND SUSTAINABLE DESIGN



ZOOMORPHIC ARCHITECTURE

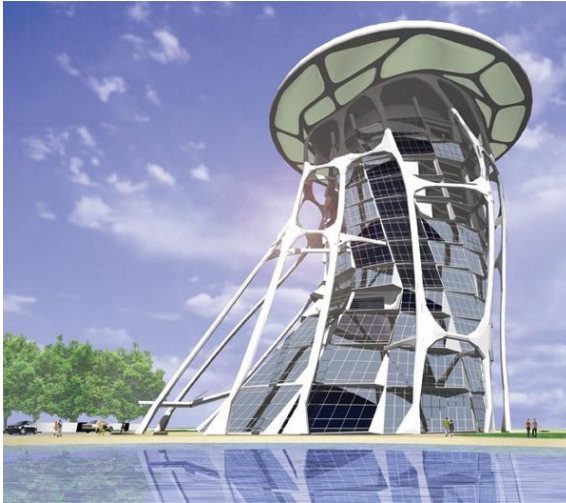
Architects have to come up with an approximate shape, location and design of a new building before constructing it. For many architects animal shapes often become their inspiration for creating a new unique structure. This is what is called zoomorphic architecture - the practice of using animal forms as the inspirational basis and blueprint for architectural design. "While animal forms have always played a role adding some of the deepest layers of meaning in architecture, it is now becoming evident that a new strand of biomorphism is emerging where the meaning derives not from any specific representation but from a more general allusion to biological processes." [4]

In the real world there are many buildings created on the basis of animal forms, since the number of species of animals and plants is very large. Some well-known examples of zoomorphic architecture can be found in the TWA Flight Center building in New York City, by Eero Saarinen, or the Milwaukee Art Museum by Santiago Calatrava, both inspired by the form of a bird's wings.



Oriental Milwaukee Art Museum

Here are some famous examples of zoomorphic architecture:



Jellyfish Hotel, Tianjin, China



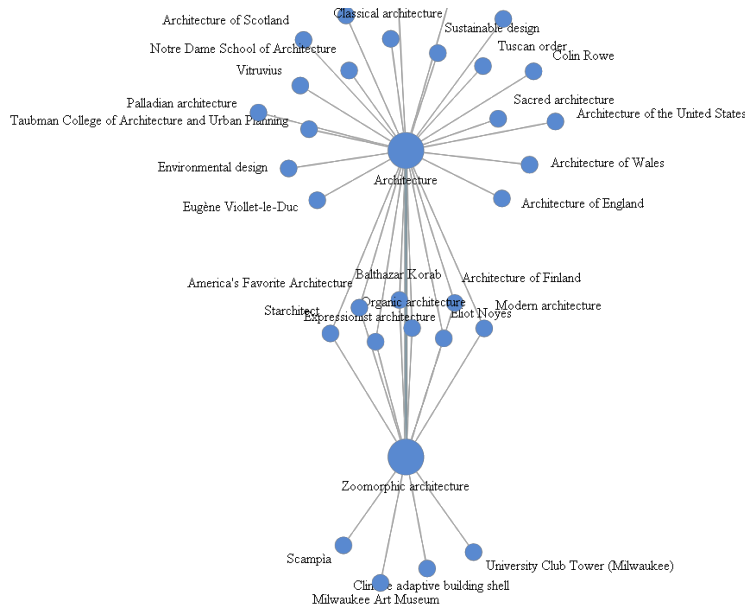
Kindergarten school by Tomi Ungerer

Connections:

Architecture to Zoomorphic Architecture

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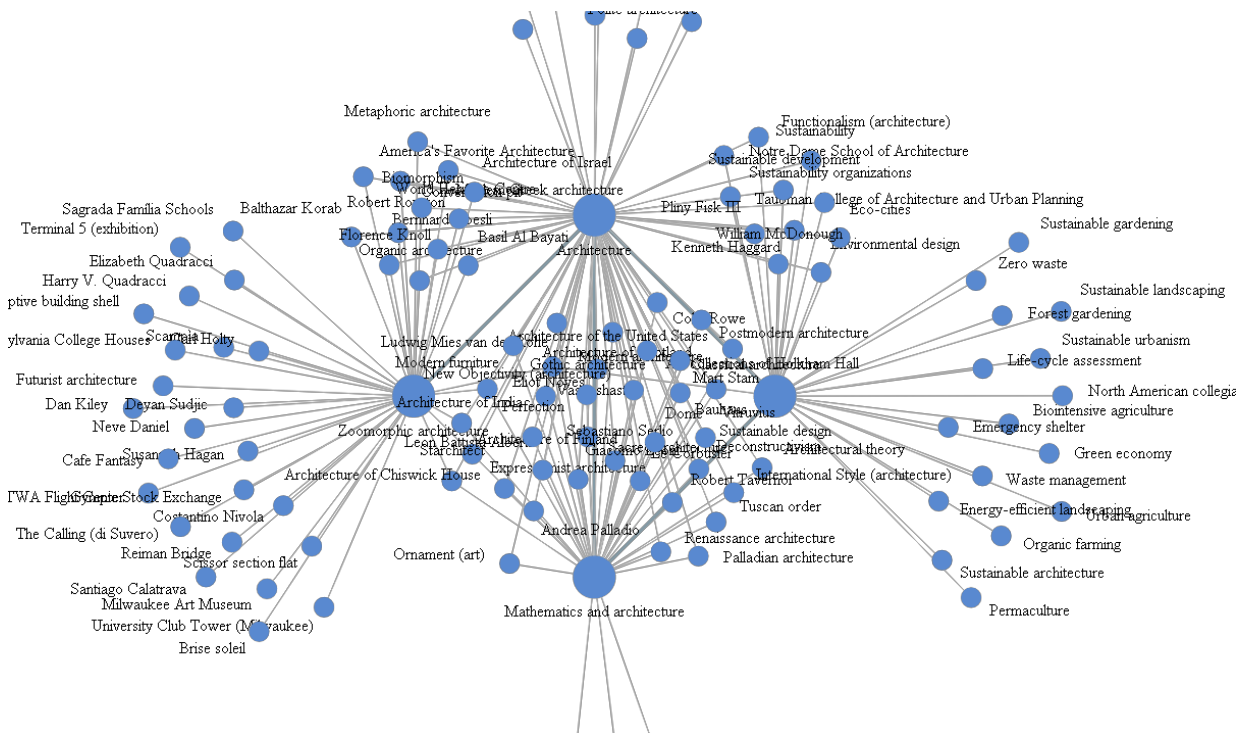
YEWNO KNOWLEDGE MAP: ARCHITECTURE AND ZOOMORPHIC ARCHITECTURE



CONCLUSION

I am delighted to have the opportunity to participate in the Yewno High School Research Competition and to work with its research platform for students, because now I can easily find much-needed information and can establish a link between different concepts. Exactly in this way, I expanded my knowledge of architecture and realized that it concerns almost all spheres of human life. I used Yewno to connect the concept “architecture” and “sustainable design”, and “mathematics” and “architecture”. The concept that I liked most is zoomorphic architecture, because it gave me inspiration and new ideas for constructing my own buildings. Since Yewno did not provide all the information, I had to browse several links to understand the concepts which served as a big experience for me as I am planning to become a designer-architect in the future.

YEWNO KNOWLEDGE MAP: ALL THE CONCEPTS TOGETHER



REFERENCE

1. Aldersey-Williams, Hugh (2003). "Introduction". *Zoomorphic: New Animal Architecture*. London: Laurence King. p. 19. ISBN 1-85669-340-6.
2. McLennan, J. F. (2004), *The Philosophy of Sustainable Design*
3. <https://www.cnbc.com/2014/08/11/ten-of-the-worlds-most-sustainable-buildings.html?slide=4>
4. https://en.wikipedia.org/wiki/Mathematics_and_architecture#Ancient_Egypt