CENTRAL OHIO ART CENTER

Perception of space and motion

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Ball State University
College of Architecture and Planning
Department of Architecture

CENTRAL OHIO ART CENTER:
Perception of space and motion

Bachelor of Architecture Degree Program
Thesis Design

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INTRODUCTION

The Central Ohio Art Center developed from the surrounding committees need for social interaction as well as a retreat. The facility will provide a learning experience for the residents of central Ohio. A permanent display will exhibit the achievements to the art and design world of local residents. In effect, this will help unify the city of Columbus which has become the largest city in the state of Ohio. A permanent art display will broaden peoples views on how an idea can be realized with success. The art center will illustrate how such ideas involve creativity, entrepreneurship, and determination. The facility will also generate a sense of belonging and proundness towards their city and community. Therefore, it is essential to incorporate these feelings of creativity and excitement within the architecture.

The goal of the art complex is to create an exciting building environment. Today, architecture is designed according to program studies as well as amount of funds available. As a result, few buildings have innovative concepts or designs. The museum will express architecture in economic terms in which spaces can be altered for different economic times and proper gallery viewing. This thesis project was one based upon research and design process. The Final design relates the process involved and the goals stated herein.
I would like to thank the following individuals for their continued support and guidance.

*Dr. Daniel Doz-architectural studio design professor
*Harlan Roepke-Geologist in the study of crystals
*Dave Mackey-architectural thesis critic
*John H. Fisk,A.I.A.- site analysis with Burgess & Niple
*S. Patrick Mills-site information with Burgess & Niple
THESIS DESIGN PROGRAMME

The Central Ohio Art Center will serve residents of Columbus as well as attract visitors from neighboring states. The facility will be a monument towards our past and current generations. Furthermore, the building will visually attract drivers from the outer belt. To accomplish this, the building must be noticeable from a distance. The art center will also attract neighboring communities to interact and support school arts.

The building will react to changing economical and program conditions. The facility will be able to adjust by changing interior configuration. Spaces within the student exhibit area will be flexible to support changing demands. The facility, in that respect, will mirror the current social attitudes and art of the time.

The building design will have the highest regard for context in which it is placed. It is the architects role to design according to the environment. The building must give back or serve its surroundings with proper programming. Two social design issues that come into play involve architecture built horizontally and vertically. Traditionally, architecture built vertically involved hi-tech or innovative solutions. Respectively, architecture built horizontally incorporates organic or earth bound elements; i.e., F. L. W. architecture. This project utilizes both elements to achieve a structure that is anchored with the site while posing new design solutions.
Circulation surrounding the exterior must be clearly visible. Access to the site from the outer belt must be transitional. There are ample parking spaces along with a drop off location for the needy. A walkway leading to the structure is covered. Circulation inside provides views outside so as to not lose orientation within the museum and environment. The theme of movement will be expressed within the architecture creating circulation spaces. Fire exits are located at each end of the hallway. For handicap purposes there are two elegant elevators that will assist the needy. Yet, the two ramps leading to either one of the hallways are the main circulation route. With emphasis on connection of spaces, wooden ramps link all gallery spaces from each other.

Security within the facility will be of major concern due to the value of the exhibits. A design solution is to have transparent hallways visible from the outside. A security work staff for inside and outside use will guarantee public safety. The entry/atrium space will act as a gathering place for community interaction.

The loading bay will serve both the restaurant on the lower floor and the gallery. Service to this area will be wide enough for truck interchangeability. The service road is separate from the main entrance, walkway, and public view. The service load goes underground to enhance the buildings image.

The art center will incorporate different light fixtures than what is existing at the adjacent shopping center. The light fixtures will be...
designed according to my concept. All public spaces will be continuously well lit.

The South edge of the site contains a row of mature trees. These trees will be maintained and be intergrated with daytime shading. The trees will also serve as an excellent outdoor retreat and picnic area.

Due to the fact that many surrounding buildings use brick, the art center will use brick only on paths or walkways. I, personally, like to walk on brick because you become more conscious of your footing; therefore, your sense of orientation or direction becomes enriched. Exterior materials will consist of glass, scored concrete, stucco, and plastic ceramic tiles. White tiles will provide a unique sense of texture stating that the building is of an elite foreign classification in a standardized culture. It will appear obvious that the building is not of the same architectural class as the shopping center or the buildings a mile away.

Access to the site appears to be of symmetrical front facade with six forms that accent the entrance. The forms seem to be the same but are all different in dimension. Classical architecture proved this idea as did F.L.W. in playing with symmetrical forms and asymmetrical reverse images. However, most of my inspiration came from Robert Venturi with his intelligent use of dimensioning.
DESIGN INTENTION

The idea for the design of the art museum is one based upon spatial organization. I wanted to present unique and different forms for the gallery rooms and linkage by a common element(s). The purpose for the manipulation of spaces is to provide research for my goals:

1) MOTION - perception of forms in motion by user
2) STRUCTURE - organization and post/beam connection
3) LIGHT - how to attract, highlight, and express rhythm

These are three goals in which I used to help propel my creativity in the design process. The use of these ideas gave justification for my spatial definition. However, I felt there was something missing from the essence of the project. That is when I stumbled upon relating atoms to architecture. Molecular architecture added the much needed layer of definition to my source of structure and connections. This whole process eventually led me to use crystals as an analogy to my already stated goals.

The Thesis question, how are spaces and motion perceived using structural organization, was one which I relied upon transformation of forms and rhythm or patterns of structure. The museum complex explored how forms can be of different sizes and height while being unified. As in molecules, I believe in parts using the same vocabulary while relating to a whole. Furthermore I wanted the structural
organization to express an artistic quality; thereby, producing a truly
designed architectural space. The floor plan, is fragmented solely
because fragmentation, to me, means that it was once of a whole. As a
result, this concept implies motion (more specifically shearing of crystal
planes) which is more organic in design over what could be a rigid
design. I wanted to steer away from traditional forms, namely the
square and rectangle, which are rigid and poor design excuse and
concentrate on forms originating from other forms. The forms for the
gallery rooms may seem to drift away from the core or nucleus of the
museum, in a systematic way, to carry the notion of motion.
The overall massing of the museum complex uses the idea of molecular architecture. The complex is divided into three basic parts separated by strong path, as a result, it breaks and shifts the main axis or hallway. The three parts to each half are different from each other; yet, similar in architecture vocabulary. This idea can be compared to continents being once a whole and separated by a powerful force. Furthermore, each continent later becomes an island in its identity and form. I created different pieces within three major divisions; yet, linked together by sequence, mechanical structure the main hallway, and people.

Structurally, there are three different column types other than the hallway spaces. First and most important are the mechanical columns. This column type dictates the direction of grid format. The direction of the columns is important as to direct the users' vision out towards the environment. Secondly, is actual structural support for which the floor is attached to. Like the Domino house by Le Corb., the live and dead load is spread among these columns. Lastly, there is a non-structural column applied to continue rhythm or pattern established by the overlapping and interacting grid systems. Non-structural columns provide a duality of rigid format versus a flexibility in which spaces can interchange. Spaces are able to expand or contract, pending the users' need.

The museum complex is one built to reflect the people using it.
Movement of people is gracefully mirrored above them by the horizontal and tilted roof forms. The main axis with a large canopy expresses motion as it appears to sway in the wind. It is located about 35 feet high and poses as a lightweight element supported by massive columns. The columns express delicacy as they relate to the connection between molecules. This roof visually and in function becomes the unifying element throughout all the fragmented gallery spaces. Furthermore, like a crystal’s composition, there is an invisible connection between the roof and people driving miles around. Such a connection resembles the magnetic force that attracts and repels molecules from each other. The columns were designed with the same intention and holds the same interest as the roof forms. The secondary axis where you first walk in has columns that resemble tree roots. I wanted to show that the column already supported weight on the top like trees with branches and the base should express roots. This idea is to educate people of spread footing and load distribution. Again a potentially rigid structure becomes organic in function.

In my view, architecture needs to reflect on the principles of the arts and crafts movement. An architecturally designed building is not complete until all aspects of the building are accounted for. I believe that the gallery rooms in this project, should be designed and crafted to display an exhibit to its fullest potential. The rooms should be a servant to the paints or sculptural designs. The rooms should be focused by
direction and other to take notice of the display. Traditional museums today consist of a space with four walls with a variety of floor and ceiling combinations. I am proposing the walls, floor, and ceiling to be shaped and molded to incorporate the art displays. Furthermore, most historical painters draw upon the vantage point and perspectives to correctly proportion their paintings. In a sense, I am manipulating spaces that exaggerate a perspective which is not based upon a painting by the user or visitor. The visitor becomes a part of the display once he enters each uniquely designed space. Architecture's role is to facilitate thought and for the visitor to visually interpret or recognize abstract forms. When a visitor walks out, he/she will be able to remember certain spaces pertaining to different exhibits. The visitor has created mental images of how he/she perceived that space.
Separation between structure and enclosure.

Bringing light from above.

Flexible/open plan.

Order has been too rigidly applied.

[Diagram sketches and annotations]
1) Geo-Forum Quarte - series
2) Rhythm/Patanoia - series

Next 2 weeks

FUNCTIONIC FORM
STRUCTURAL ORGANIZATIONAL
"ONE SUPPORT THE OTHER"
"SMALL NEEDS WHOLE"

SHOW DEPTH - POS/NEG
PLANT/SECTION

TETRAHEDRAL

FEB 9, '92

1) STREET GRIP
2) OVERLAY UNREALIZED PART
3) ROTATE + STYLE
CONTEXT: PHYSICAL AND CULTURAL

The physical context involves a shopping center across the street from the site. The site is located next to a highway interchange (I-270) in Columbus, Ohio. As of a year ago (1991), the whole site once was a corn field and is currently being developed. The shopping center and movie theater were the only structures that were realized. Within the complex, no one building faces each other and is connected only by a side walk and partition walls. The height of the shopping center is roughly 35-40 feet high. The museum complex is at its highest point of 45 feet high.

I related to the physical site by orienting the building inside out to six (6) major perspectives of view points. From the inside anyone can focus upon one of six different areas relating to the outside environment. The building also relates to the environment by the night/day duality. At night the entrance hallway is exposed to the outside by lights; thereby, creating an axis in the night sky. During the day, the axis shifts as people read the elegant roof form marking the main hallway. The building has a very strong connection with the visitors by different viewing angles and exterior axis locations. Again, this tie with the people relates to the analogy of molecules being held in place by magnetic forces of attraction.

The social and cultural context is very similar to most Mid West towns. Columbus, as a society, expresses architecture through an...
economical context - the amount of funds determines materials and construction. Architecture, as a result, has been stripped of ornamentation in order to gain elsewhere, for example more square footage. Furthermore, zoning laws and permits hamper architecture as a design process/product. My thesis explores architecture as a futuristic design based upon economical and social conditions. My goal is to express architecture on a different level of actualization other than already existing buildings. I do not believe the architecture of this shopping center and of this region is the answer to current needs of construction and design. I believe the answer lies within modular units where parts belong to a whole, micro to macro scale. This does not mean necessarily modular architecture where whole units are interchanged. I have used this concept, of fragmented units, throughout my thesis design. I am also making an architectural statement by designing materially out-of-context to express architecture as an exploratory and innovative process to educate the public of the possibilities to be found.
DESIGN OBJECTIVES

The design objectives of my thesis project are to provide structural elements that produce heterogeneous spaces by which every person will perceive differently. I am dealing with different spatial organizations; one which has positive and negative spaces in plan and elevation. Like crystals, I am working with the X, Y, and Z axis. Structural columns are also designed vertically with horizontal connections.

My thesis design became interesting when I started to deal with the issue of flexibility of space or interior organs and the exterior skin. It has been demonstrated by famous architects that a large shell or shield like structure can house many different interior functions. However, my major concern was to keep direct sunlight into interior gallery spaces. The dilemma was do I create a very large shell and have forms penetrate the skin only on the sides or do I have gallery spaces punch through the roof to fully express its identity horizontally and vertically. I had to be consistent with my ideology and have different roof forms interacting with sunlight.
The wall section model was one of the first models that incorporated my ideas of structure and their connections. I was also concerned with circulation. This was inspired by the Wexner Center in which all gallery spaces were off from the main ramp or hallway. In section I have a ramp supported by a series of columns which is in turn supported by a larger structure. By looking at atoms and alignment, I began to study grids and their interaction. The idea of having sun light filtered with baffles was introduced here. Lastly, the notion of a shell covering other grid systems was explored. Different column types and connections became an issue from this model.
This study model was originally an exercise in elevation study. I was curious about pulling away different layers of skin and exposing different parts of the interior. I am working with the idea of motion and patterns needed to establish a rhythm. In elevation, the walls would be battered or sloped outward. The design of the museum should not be traditional with four walls and a flat roof. I believe that in this case the architecture should have artistic qualities even if it is simple in design. This model began to expose how light can be shielded while using a structural support system.

Once the model was completed Dr. Daniel Doz proposed that it become a column. His help gave me ideas of fragmented columns as well as wall sections. The integration of light within structural detail became a concern in the design process.
To study columns, I feel, you must see all the dimensions. This model originated from a simple sketch. I was curious to see what happen if the beam rested on an intermediate piece on the column. The intermediate form would express depth as the columns drew a thick line through space. The study ended up giving way to a different study - that of artificial lighting. In the space where the intermediate object would be placed artificial lighting could be substituted. Lighting would then shine upon the column to eccentric it and produce floor patterns. Placing many columns in a row would produce depth.
This is really a gun...not. This was a study of a column and beam connection. I was interested in how different geometries can be integrated as one unit. The actual column is round and meets the capital which is rigid with rectangular shapes. The capital acts as a cap to support the beam connection. I thought it would be interesting to visually separate the connection just as the connection between atoms is physically separate. The beam in this case would be connected in some fashion to the cap but not necessarily at the very end of the beam as in traditional methods.
The internal composition of the crystal support the X, Y, Z axis. Crystals in most cases are very symmetrical and grow systematically. This model shows how different elements can surround an axis. These elements all vary at different lengths from the core. This study, however, does not involve the pure elements of geometry that crystal contains. The element extending from the nucleus are figurative in nature or abstract notions of form.
Working with crystals, I decided to create what a tretrahedral looks like within a square. A tretrahedral is unusual because it only has three sides, which is also symbolic. Yet, the idea of triangulation within a world made out of squares and 90 degree angles was a challenge. I later made numerous sketches of how this combination can work within an architectural environment. These sketches later became the leading force behind my column types along the corridor spaces.
How do column grids interact? That was the question I was concerned with here. The easy solution was to have columns at different heights intersect other patterns. This orginally came about from the problems that the center of my project would have as roof forms would inter-mesh. As a result, this gave to have independent roof forms interact with mechanical systems. The solution was to have the unique grid of each gallery space higher than the mechanical grid system.

Grids interest me because I like to trace the pattern back to the source; thereby, checking out the structural connections. I also like to see what type of patterns, due to repetition, structures create, if any. Like perspectives, your eye can not help but to pick up patterns or sense of direction.
To express motion, I created a model that has a floor that moves and actually becomes the display case for a sculptural piece. I took the form of the square and rotated it to express forms in motion. I can visualize people/kids walking up and interacting with the pieces as to provide a three dimensional image of the square not 2D. Furthermore, when you first walk in you become a part of the exhibit. The walls seem to point down to and focus upon the exhibits and your eye follows this. This model was done after a sketch. By using a one point perspective, I was able to see how wall forms can be incorporated in sculptural architecture, similar to the arts and craft movement. The walls also show how columns can be exposed without hiding them in the wall. The wall at the end is separated to express its own identity and to bring direct sunlight. The roof structure has its own identity as different grids interlock holding the mechanical systems. However, the room, unlike on one point perspective, the walls flow out not in. This notion is to show that the exhibit has importance draws or directs people into the space.
This was a concept inspired by a project of F. Gehry. The most important part of this exercise was that I began for the first time to reach out to the site and develop my six perspective views. There are 6 areas for which a visitor can be directed to interact with the building. Instead of the environment framing architecture, architecture is framing the environment from within. This was fun because I was working with small scraps which led me to play with unusual massing forms. This personal exercise pushed the design as far as possible at that time. Indirectly, I had established my main axis and secondary axis. Because the model is abstract, it has more richness in design than my final product. The roof forms are all individual yet hold similar architectural language. Lastly, this project expresses crystal growth by expanding from a core or nucleus. The ends of the building represent the separation of forms from what was once was the original to express motion. Motion in asymmetrical form can be read by visitors driving by; thereby, holding attention as no one part of the building is alike.
To continue the idea of interior sculptural gallery spaces, I took the notion of the one point perspective to an extreme. The model represents a space in which all forms focus upon one location. Once inside the space the visitor feels enclosed and drawn to penetrate the interior realms. Like a molecule, there is an invisible line drawn from the visitor to another sculptural object on display. Architecture, here, is not subtracting from the gallery exhibits but merely enhancing one's perception of the space. The visitor feels a force and becomes a part of the room/architecture. Along the walls may be some niches where painting and objects are on display. By studying crystals, one's perception of space is not limited horizontally but vertically as well. The floor immediately becomes transparent as you can see the depth below. This gives a person a perception that structural forces isolate you from the pit below.
As a further study of all the different models, I produced a very simple solution that places emphasis on motion. The model came from a small sketch of a section and is realized in 3D form. The actual structure is just repeated. Like an earlier model, the gallery spaces exist off to the side of the ramp. The ramp is slanted to give the museum diagnostics. Furthermore, this incorporates the crystal in the use of shear planes and the tretrahedral. The idea of shear planes further supported the notion of fragmentated architecture to show motion. Lastly, light played a niche in the design by being able to be funnelled into the interior spaces of the first floor. The structural system also casted a shadow creating a feeling of passage for the visitor traveling through.
The first study model was to capture the essence of the major and minor axis and the six viewing areas. This model represented the concept of breaking the main axis by the passage of people. Here, the people create the strong axis and shift the major axis as if an earthquake sheared the corridor space. The issue of roof structure is unresolved. However, the gallery spaces with the grid system begins to have its own identity. The model illustrates that a large sheid or shell roofing system would subtract from the richness of the structural details. Internally the gallery spaces would lack any sunlight. A system of voids penetrates the second floor for people to interact with the entire exhibit.
Due to the scale of the complex, a model was necessary to visualize the entire spatial system. The actual floor plan is designed on two halves consisting of three divisions, unified by architectural language. Each half is designed around the main hallway. In some places the gallery spaces intersect directly with the hallway other spaces are not connected. One half is longer and more developed than the other to provide visual debate and interpretation. The roof form is of a pattern to organically relate to the motion of the visitors walking. The building is extending out to the landscape and becomes a part of it in many ways. Finally, the roof forms vary depending upon floor height.
CONCLUSION

My thesis project was a design process by which I learned what issues really interested the most. These issues include the use of motion, structure, and light in architecture. What has also inspired me was the ability to abstract such a powerful analogy of the crystal. I believe these concepts that I just tapped into will help guide me in the design field. I feel there are many questions that are unanswered for me to explore. I do not think I would have such a strong presentation if I was without my study models. I believe that ideas need to transported from the pen to model forms to actually see the workings of the design. Many of my models are quick and easy but from them I was able to get feedback from my professors and classmates.

The museum complex was design only for that site and I was true to my convictions of being honest to the environment. This is truly a building that will never lose interest to the visitor as it can be perceived from many different angles.

I am also pleased to see that all the different array of ideas that I had in the beginning came together effortlessly at the end. Lastly, the amount of concentration on structures proved to be a challenging and enjoyable task. I feel the design and connections of structures has just begun.

Again, Thank You Dr. Daniel Daz for your time and understanding.
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