I, Ryan McNally, hereby submit this work as part of the requirements for the degree of:

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Building the Natatorium: the University of Cincinnati Could Have, and Should Have Built

This work and its defense approved by:

Chair: Barry Stedman (First Chair)

Gordon Simmons
Experiential Architecture

Building the Natatorium the University of Cincinnati Could Have, and Should Have Built

A thesis submitted to the Division of Research and Advanced Studies of the University of Cincinnati in partial fulfillment of the requirements for the degree of

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Ryan McNally

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Committee:

First Chair – Barry Stedman
Second Chair – Gordon Simmons
ABSTRACT

In many building designs merely designing for the functional needs of the users is not enough; more effort must be put into certain buildings so that when the users interact with the building, their experience will be enhanced. Natatorium facilities fit into this category. The recent trend of using the same layout time after time and temporary facilities for major meets results in dull sporting venues hosting major competitions.

Since 1982 every major natatorium facility has followed the precedent set by the IUPUI (Indiana University-Purdue University Indianapolis) natatorium. It solved the problem of how to lay out a swimming and diving facility to be as functional as possible, but stopped before discovering how to take advantage of the space. Facilities that followed have not discovered the full potential either. They fail to realize that when the users’ senses are fully stimulated, they leave a lasting impression.

Designers can use sensation and perception to study how humans interact with their environment. Through design, they can manipulate the senses and alter the users’ sense of reality for a lasting and memorable effect.

The goal of this thesis project is to popularize an unpopular sport using architectural design to influence the senses and create a superior interior experience, while adding a new monumental building to the campus and surrounding environment.
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Chapter 1: INTRODUCTION

At the age of six I joined my first swim team. From then through my fourth year in college I never stopped swimming. I swam competitively in club, high school and college programs, and had the chance to travel all over the country. In my 16 years of competing in the sport, I was fortunate enough to experience many facilities, some that functioned perfectly, and some that were nothing more than a hole in the ground, filled with water.

When I entered the University of Cincinnati, its swimming program was small, but growing at a fast rate. Cincinnati was not in one of the large conferences and didn’t have the recruiting power to attract top high school swimmers, but we still had the talent and ability to compete with some of the schools that did. Through my four years of swimming for the University our team started to make a name for itself.

The facility we trained in during this time was very small and located in the basement of Lawrence Hall. The pool was of minimal size; six-lanes wide, 25 yards long with an attached diving well. The spectator seating held 600 people. The pool was so small that our coach held two practices every afternoon, thereby splitting the team in two. When the entire team was
asked to fit into the pool at the same time, it was very cramped and hard to train.

One year after my final season, the University planned a new natatorium as part of the Main Street and Varsity Village campus renovations. The location for the new pool was to be directly over the existing pool. This meant that the old pool had to be demolished to make room for the new. This plan caused the team to be without a pool from January of 2003 until completion was expected in September 2005. The team found pool space at a local high school to continue training during these years. This move hurt recruiting tremendously. Who would want to swim for a team that didn’t have a pool? Over two full seasons the team went without a pool and the quality of the program fell dramatically.

To make the situation worse, when the final designs for the new facility were unveiled, they were inadequate (see appendix A for plans). The new pool design, while larger than the original (it is an eight-lane, fifty meter pool), has less seating. The diving well is contained at one end of the pool. The deck space around the pool is a mere six feet on three of the four sides. If the pool area was a little larger it would have been much more useful. The funds and space needed for a more adequate facility were used on unnecessary additions
such as a lazy river (a river-shaped pool where people can float in inner tubes along with a current). Had there been more investigation into the pool’s potential, the University would have been able to make money from the facility by hosting meets, at the club, high school and college level. The facility that was designed is useful only as a training facility. The functional lessons of IUPUI were not realized at the University of Cincinnati.

The question of “why” arises. There are several possible explanations, not the least being the University’s attitude toward sports other than basketball and football. The fact is swimming does not have the same audience or donors with deep pockets.

In addition, the design of the swimming facility was of secondary importance to the overall design of the complex. The complex was designed and the swimming facility was “fit in” where there was room. Studying the floor plans through the eye of someone who has been around swimming pools his entire life, there simply is not enough room.

In most natatorium designs, the facility is primarily programmatic. The facility serves its essential functions. Nothing more is added to the design to heighten the user’s experience of the sport or the space. There is no drama, no feeling of competition. Swimming is a sport that, unlike football
or baseball, has cyclical popularity. Every four years, coinciding with the summer Olympics, swimming takes center stage and experiences a growth in popularity.

Thousands of people crowd into the stands, and hundreds of millions around the world watch their heroes compete. They are drawn to the drama, the excitement and the competition among some of the fittest athletes in the world. The athletes are there to compete for gold medals, glory and the pride of their nation.

For the most part, team sports draw the largest crowds. Most of the time, the reason why people attend a swim meet is because a family member is competing. Altering the design approach may change that. Like basketball, people might come for the excitement of a close relay, screaming at the top of their lungs to encourage their teams to victory. Such is the lure in the Olympics.

This thesis will explore the design of a swimming facility to increase the experience of both the competitors and the spectators. The “right” facility could increase the popularity of the sport, probably not to the level of football or baseball, but to a level where more people would follow the sport. To create the necessary experiential environment, the retail environments offer a useful precedent. Retail facilities use experiential
environments to stimulate buying behaviors and draw customers into, and back to, the facility. Further, analysis of sensation, perception and human behavior will be studied to determine “principles” that make for memorable experiences.

Research in the field of experience in the retail industry has generated concepts that can be used and adapted to fit all areas of architecture and design. Ideally, such research includes the human senses, visual perception, and memories, since they are inherent to how spaces are experienced.

A simple example demonstrates how viewing the sport can be changed. Over the past few years there have been many facilities built across the country, almost all using the same layout. Viewers and participants are separated by height and distance! The experience of a basketball game, the immediacy of the action on the court, the sounds and smells of the game, are denied to swimming.

Spectators can watch swimming in several different ways. Currently, a spectator can watch on television, in the stands close to the pool or in the stands at a distance from the pool, but always in a viewing angle of figure 7A. This has never been challenged! Spectators could view the competition from below the water level, at the water level or from above. So much happens under the water that the novice fan does not
understand. Figure 7 shows how a natatorium could offer
different viewing angles to the spectators. Exposing this side of
the sport to all spectators could improve the viewing experience.
And this is only the beginning. The same approach can be
applied throughout the natatorium.
Chapter 2: EXPERIENTIAL ARCHITECTURE

Introduction

All too often architecture is designed from a myopic point of view. Designers become so obsessed with the appearance of the building, functional requirements, economic limitations, and client satisfaction that they fail to grasp the fundamental importance of the user’s experience.

Experiential architecture focuses on how people experience, interact, respond to, and remember their environment. While functionality is essential, experience is the highest priority.

Functionality

“A building, no matter how well it may be designed, cannot be successful without people, and particularly people who are enjoying themselves”¹ This is at the heart of making architecture that satisfies our needs. At one level, needs are functional in nature. Functionality is self-evident. A house must house people without inconvenience, structural collapse, or rain entry. But functionality is more than this: the building must serve the people who use it. Architects would become better designers by studying people and the way they act.²

² Deasy and Lasswell, 1985.
People are multidimensional, complex beings; yet they can be studied on two levels: the physical and psychological. For architectural design, the physical level concerns the study of human size, proportions and ergonomics, providing for relationships of sizes, scale and “fit.” Ergonomics began with military hardware being designed for soldiers’ bodies.\(^3\) Since then, it has evolved into the design of furniture and spaces to fit the human body. Designing around the proportions and dimensions of the human body can alleviate much of the stress and frustration that goes along with being uncomfortable. Eliminating uncomfortable and stressful situations promotes performance and efficiency\(^4\), yet is this all the living being requires? What of sunshine, nature, interaction with people and other human needs?

On a psychological level, architects can improve buildings by studying human behavior and people’s responses to spaces. What people do and do not like about certain spaces is an example of how architects can learn from building users.\(^5\) If designers watched a specific area, such as a food court in a mall, they would discern patterns of behavior that are common among people. People choose some seats and avoid others, or

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\(^4\) Bennett 14.

\(^5\) Deasy and Lasswell 5.
take one travel path instead of another. ‘Why?’ is a question of behavioral psychology. Through research, designers can discover such tendencies and be able to predict which table a person will take, or what restaurant other people will eat at. Human behavior and how people interact with their environment is intimately linked to human needs and how they are satisfied, such as personal space, territoriality, communication, etc. Our needs have important implications for designing areas where people will frequent.\textsuperscript{6} That is, human needs, in conjunction with tastes and preferences, determine behavior.

One way to effectively design specific spaces is to solicit opinions from future users. Their input, while often limited to a restricted range of previous experiences, can assist the designer in properly laying out the space. An architect cannot know the best way to lay out every space, but taking advice from people who are experienced with similar spaces might prove to be beneficial.\textsuperscript{7} This strategy can be informative but often the user will not know what spatial requirements are best for them. Instead, they will tell you what they want, or what they have seen before.

\textsuperscript{6} Bennett, 1977.  
\textsuperscript{7} Deasy and Lasswell 16.
Experiences

In the past few years, experiential architecture has become a hot topic of discussion. Spaces that evoke emotions in the people inhabiting them are of concern to architects, psychologists, managers, etc., but the most popular area of experiential design writing is the retail industry simply because of the need to sell a food or product, and the influence of the environment on a buyer’s state of mind. In The Experience Economy, B. Joseph Pine II and James Gilmore explore the possibilities of experiential spaces and describe the need for moving experiences in a very competitive industry. Similarly in Experiential Marketing and Customer Experience Management, Bernd Schmitt supports the case for experiential environments. “Taking the customer seriously – finally” has become crucial to a firm’s success. Why is one place of business more successful than another if they both offer the same products? The answer to that is the nature of the experience a person has inside the store.

In the past, the retail industry has been outcome based. The immediate satisfaction of the customer was all that mattered. Now the industry is becoming more experience

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oriented, which implies a long term preference since experiences build memories. “The experiential platform includes a dynamic multisensory, multidimensional depiction of the desired experience.”

This deals with all activities, sensations, and events throughout the process. If these sensations are positive, the customer will be satisfied.

This shift in thinking, from outcome based to experiential based, surrounds the prediction that if you can get the customer into your store, you have a better chance of selling them something. Shopping malls are perfect for research in this area. Many stores in the mall sell very similar products, women’s clothing for example. What makes one store more successful than the rest? The answer may be the label (Guess, Gap, Express, etc.) and what is fashionable at the moment. The experience shoppers have has a lot to do with whether they want to come in, and definitely if they revisit the store.

“The key to company growth and profitability can be summarized in a simple formula: analyze the customer experience, then develop an experience-focused strategy, and add value through integrated implementations that focus on the customer experience.”

The previous concept, though developed for a commercial market, can be adapted for any type of design.

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10 Schmitt 2003, 27.
12 Schmitt 2003, 23.
Following the step by step process, the first requirement is to “analyze the customer experience.” In natatorium design, the focus is on the spectators, swimmers and coaches. For some design aspects of the building, only one group is focused on, or is the primary focus (the spectators for the spectator seating). For others, all three groups are considered (the entrance concourse). Once the user group is established, the designer needs to analyze how the experiences are most successful in natatoriums today.

The next step is to “develop an experience-focused strategy.” The designer needs to invent new ways for the user group to interact with the space. Each portion of the building can be designed in many different ways, from the most functional to the most experiential, keeping in mind the desired experience for the user group.

The designer can then “add value through integrated implementations that focus on the customer experience.” To do this, the designer must chose the best experience-focused design from step two, or combine aspects from multiple ideas, and implement this into the overall design.

This process should be done for every space in the building. A natatorium has many specific spaces that need to be designed independently, each to maximize the user’s

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experience, and molded together into a seamless design with specific experiences.

**Actionable Principles**

**Senses, Perception and Memory**

An important aspect of experiential design is how we sense and perceive the space we are in. Space is sensed primarily by the eyes, although the other senses may have a role. The way we perceive space determines whether or not it is experiential. Perception is very individualized, but research into how humans perceive spaces can be used to design spaces that guide users to not only perceive what the designer wants but experience it the way it was meant to be.

People need stimulation. The body is sensitive to many different stimuli and looks for them, yet we cannot handle too much stimulation. A person who is overly stimulated becomes unbalanced and frustrated, which is the same result as a lack of stimulation. The right amount of stimulation heightens all the senses and yields a memorable experience.

Involved in the study of sensations and perception is psychophysics, the study of how physical stimuli relate to the sensations experienced. Finding out how sensation stimuli

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affect humans and then how humans perceive these stimuli is the cornerstone of experiential design.

One major key to keep in mind when dealing with perception is that past experiences become memories which can affect future perceptions. A good example of this is if we see a building that is in the shape of a house, we perceive it to be a house. We do this because we know houses took this shape in the past. We infer that it is a house without having any further stimuli.¹⁶

Perception of a building’s use from its form involves archetypes and their qualities. Architects often use archetypes as symbols for buildings. Two examples used throughout history are the temple and triumphal arch. The Greek temple is grand, monumental and durable. This archetype was used for important civic and empirical buildings from Rome to present day. It is common in banks today. The second example is a triumphal arch which is ceremonial and symbolizes triumph, as well as entry into a region or city. This archetype has been used in many cathedrals. It gives a tripartite deviation – the trinity of Christianity to symbolize the entry to God.

Architecture is primarily focused on the sense of sight, leaving the other senses to do other things. This may be in response to our culture. Whereas some cultures (mostly

¹⁶ Coren, Lawrence and Enns.
western) rely on touch or reinforcement for learning, Americans rely mostly on visual cues to understand their environments. Failing to involve the other senses and perceptual sensibilities such as sound, olfactory qualities and movement through space has removed the human spatial experiences. Most architects are so preoccupied with the visual aspects of the building, especially exterior shape and form, that the designer seldom considers how people understand space. Most of the precedents architects use in design are of life-less exterior photography and elevation drawings. These techniques tend to be object-oriented rather than experience-oriented.17 “On the whole, art should not be explained; it must be experienced.”18

Designing spaces with these sensibilities in mind allows people to generate experiential memories. Donlyn Lyndon and Charles Moore observed this in Chambers for a Memory Palace. They address the sensibilities, beyond visual, generated by moving through spaces. Work, movement and intimate contact with spaces can enhance the experience beyond what can be derived visually.19

Haptic perception is the psychology of understanding a three-dimensional space completely. This goes far beyond seeing the entire space; it involves using as many senses as possible. These senses can be touch, smell, sound, etc., or they can be positional awareness, balance, movement or memory. If designers were to incorporate this type of thinking into their work, just imagine the types of experiences they would create. This is the difference between seeing pictures and drawings of buildings and spaces and actually experiencing them. A photograph shows the space flattened to 2-dimensions, lights a patterns of shadows and variation of lighting, how materials come together, etc. When you walk through a space and experience it, you are able to feel the materials and the natural light. You can smell the different materials or the freshness in the air. In addition, you are never mistaken about the size and scale of the space when you experience it.

Somasthesis is the sensibility of the body to itself. This is most realized when a person is doing physical work. Combined with haptic perception, somathesis can allow us to know places more intimately and create richer memories than we could just by seeing. The people who will inhabit the space will

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20 O’Neill, 4.

21 O’Neill, 4.
undoubtedly be working in the space. The designer should attempt to experience and know similar spaces to understand how to properly design such a space.

Memorable architecture combines the building’s physical nature with prior experiences and so affects the mind that it is stored and reflected upon. To truly know a building, a person must not only see it in person, they must experience with sufficient time to take in its intricate and complex characteristics. Thus, one does not know Chartes Cathedral after a five minute visit. It might take several visits, or several months, to truly appreciate its qualities; something new is discovered each time. The typical tours people take of famous buildings do not allow a person to feel what it is like to live, work or play in the space; it simply shows you the shape, size and ornamentation.\textsuperscript{22}

People gain the greatest environmental knowledge from physical experiences such as moving through and touching the space. These, combined with the visual aspects we acquire, give us a broad and complete understanding of the built environment.\textsuperscript{23}

\textsuperscript{22} Campbell, Robert. 2005. Far from the madding crowd: architecture, memory, and place. \textit{Architectural Record} 193, no. 7:51-52.
\textsuperscript{23} O’Neill, 4.
Once you have experienced a memorable space, you can’t separate that memory from place. “Memory and place are one. Neither really exists without the other.”

**Gestalt Psychology**

Gestalt psychology developed near the end of the 19th Century. “Gestalt” means “unified whole.” That is, things are “seen” holistically, not in the pieces that are shown to the observer. These theories are used in many design fields to understand how viewers perceive forms and shapes, and predict reactions to new forms and shapes. Gestalt is the psychology of perception; that is, there are principles that affect how most people see the world. It is used to explain how and why people group elements, making them “unified wholes,” by certain principles that are applied. These principles are the laws of gestalt:

**Law of Proximity** – Objects that are closer will appear to be one, coherent object. As shown by the figures to the right, the first image appears to be individual squares scattered about, but with varying depth. In the second image, the squares are much

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24 Campbell, 53.
26 Coren, Lawrence and Enns.
closer and unity occurs. Even though the squares are still separate objects, they are perceived as being one group.

**Law of Similarity** – Objects that appear similar will appear to be part of the same group. The first image to the right shows similarity in the triangles surrounding the central image. Even though the triangles at the bottom are part of the eagle’s head, they are still perceived as similar to the rest of the triangles, and therefore part of the group. In the second image, the object on the far right stands out as being different. This is known as an anomaly. This technique can be used to highlight something important because people will be drawn to this object first.

**Law of Good Continuation** – People tend to perceive continuation when a pattern is established in an implied direction. If the implied line has to move through another object, people will still see the line, even if it isn’t there. The first illustration shows, the line moving through the images and out the other side. This theory also shows our preference to see continuity. In the next image, we will tend to see two lines intersecting instead of four lines meeting in the middle.
**Law of Closure** – People will ignore gaps in order to complete a perimeter and enclose space. The images to the right demonstrate this point. Even though neither image is complete at the perimeter, we still follow a perceived border to complete the shape we expect to see.

**Law of Figure and Ground** – We differentiate an object (figure) from the surrounding area (ground) by separating the two. This can make an image more clear by balancing the two, or it could add surprise by using an unexpected combination of the two. The first image is rather simple, showing leaves separated from a tree trunk separated from a stream. The second image appears to be a simple shade, separating the shade form from the surrounding white space. There is also the form of a face within the shade to add complexity.

**Law of Pragnanz (simple form)** – We will always break up complex forms into multiple, simple forms. As you can see, there is a rather complex form in the image. To perceive this form more easily, the human eye will break this down into a triangle and a square.
The gestalt principles explain how humans tend to organize visual sensations (perceptions), and are helpful to explain how people perceive the built environment. Architects can use these principles to create further heightened experiences. By using these ideas in designing spaces, people would visualize more than just what is there. People would see the hidden meaning intended by the designer.

These techniques would either create memories, or draw on memories to make the space more successful. If a designer understood how a person perceived space, he would also know what the person expected to see. From the moment a person sees the building, the brain is working trying to figure everything out. The designer knows this, and knows what the individual is expecting. If something other than the expected occurs, it is hypothesized that the space becomes more memorable. This is the goal of an experiential space.²⁷

An example of this could be the shape of the building. In a natatorium, people know they will be entering into a space filled with water. The building could be designed with a curved, or wavy, façade using glass. This would make the exterior of the building appear as if it were water. This technique is being used for the 2008 Olympic swimming facility. The façade material is Teflon known as ETFE. The skin is designed to

²⁷ Gilmore and Pine, 96.
react to light specifically to appear as a cube of bubbling water.\textsuperscript{28}

**Expectations and Sense of Reality**

Companies that are in the business of staging experiences know that, in order to keep customers, they must continue to refresh the experience. People are bored by the same experience again and again. They need something surprising and unexpected to create new and memorable experiences.\textsuperscript{29}

In most cases, people have normative expectations of an environment (a natatorium is like other natatoriums they have seen). Instead of meeting these expectations, designers who intentionally transcend expectations will leave people surprised. This is termed “staging the unexpected.”\textsuperscript{30}

\[
\text{Customer Surprise} = \text{What Customer Perceives} - \text{What Customer Expects}\quad 31
\]

People expect certain buildings and spaces to look, or be designed, a certain way. For example, a hospital has long corridors, easy to clean surfaces and a signage system to find departments. Typically expectations are “driven by function,” not experiences. If they are not, this starts altering people’s

\begin{footnotesize}
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\item \textsuperscript{28} \url{http://www.sportsvenue-technology.com/projects/swimming_centre/index.html#swimming_centre7}
\item \textsuperscript{29} Gilmore and Pine, 96
\item \textsuperscript{30} Gilmore and Pine, 96.
\item \textsuperscript{31} Gilmore and Pine, 96.
\end{itemize}
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sense of reality. For example, people expect water to be some shade of blue or green. Red water would be unexpected. Any unexpected event, such as this, affects a person’s sense of reality, and becomes memorable. It may be positive or negative, but it is remembered. This surprise quality is a key ingredient in making the building or space experiential and memorable.

Surprise is used by businesses to ensure repeat customers. Giving customers something unexpected, or more than expected, allows them to perceive added value. Companies can turn everyday transactions into memorable and unique events simply by incorporating change the customers find enjoyable. This is why shopping at grocery stores that give away free samples is more fun.
Chapter 3: BACKGROUND

Recent History in Natatorium Design

One major issue in natatorium design is whether they should be built with the intention of hosting large competition events in addition to everyday training. Until recent years, every major competition was held in a permanent natatorium. There were a few larger facilities located around the country that had the seating capacity to host important meets.

During the 2000 Olympic Trials, every session was completely sold out. In addition to the 4,700 spectators in the stands, there were at least 1,500 athletes on the pool deck watching and cheering for every race. This amount of people created an unbelievable environment, not only for the athletes, but everyone in the building.

Due to the spectator turnout at the 2000 Olympic Trials and other such meets, there has been a growing need for larger facilities. The problem is that these large facilities are only used at capacity once, maybe twice, a year. This is not economically viable. In two such instances last year, where additional seating was required, the temporary facilities were built for larger crowds. The first was the 2004 Olympic Trials held in a temporary facility in Long Beach, California. As the demand was so high for the trials in 2000, United States Swimming
decided to build a temporary outdoor facility that would host more than 10,000 people. The second meet was the 2004 Fina World Championships. This meet was held at the Conseco Fieldhouse, home of the Indiana Pacers basketball team. For this meet, a temporary pool was constructed over the floor of the field house. The stadium typically holds 18,500 spectators but due to the height of the pool it was limited to 12,500.

This trend shows the need for venues with large seating capacities but also shows the ability for existing large stadiums to simply add a temporary pool to hold the competition. This can be viewed in three ways.

1. **Most popular view** - Why build swimming facilities with large capacities if a temporary pool can be constructed in existing structures and achieve functionality?

2. **Better way** – Design natatoriums such that the experiential cost lost in hosting events in a multi-use facility would be far greater than the cost of losing some spectators in a smaller, more experience oriented facility.

3. **Combination** - A smaller, experience focused natatorium can be designed to incorporate additional, temporary seating when a large crowd is expected. This could be rationalized by having some permanent seating close to
the pool. Above this seating could be an indoor track with room for temporary seating on the track.

The most significant swimming landmark in this country is the Indiana University-Purdue University Indianapolis (IUPUI) natatorium. Since its completion in 1982, it has been the location of more national and international meets than any other American facility. The main reason for its popularity is its size. It can hold 4,700 spectators in the stands alone. This facility is a functional work of art but leaves much to be desired on the aesthetic and experiential side.

In recent natatorium design, there is little real design work. New recreational centers are being built on college campuses across the country following the precedent set by IUPUI. The layout functions well for the intended purpose of swimming, practicing and hosting a meet, but the experience of entering an emotionally, intellectually or spiritually moving space is never considered. The competition occurs on one level and the spectators are on another level. A connection between the two never happens. They remain separated.

Natatorium Precedents

IUPUI Natatorium

Arguably the best natatorium in the United States is the IUPUI Natatorium in Indianapolis. Even though it was built in
1982, it was the first natatorium to be built using the layout that is still the prototype today. Functionally, the building works very well. Swimming and diving can take place at the same time, the deck space is ample, the spectator seating sufficient, and all the offices and restrooms are located in easily accessible locations. Many of the most important meets are held here, such as nationals and Olympic Trials. One of the best aspects of this facility is the spectator seating. Not only is there ample seating for most meets, much of it is only eight feet off the pool deck. This makes for a close relationship between the spectators and the athletes and the action in the pool.

Functionality

There are no complaints about the functional aspect of the building design. The only problem is that the building is entirely functional in design. The pools are situated where they are in order to optimize space and viewing opportunities. The same reasoning applies to the seats, locker rooms, entrances, stairs, and auxiliary spaces. The only impressive aesthetic feature of the building is the immense size of the natatorium area, which again is rooted in functionality. It is a full three-storey space with clerestory lighting running down the center. There is one breathtaking vantage point of this but it is located outside the pool space on the concourse.
The athlete entrance is poorly designed. To enter the pool area, the athlete walks, from the concourse area on the second floor, down a stairwell. Upon emerging from the stairs, the athlete walks along two corridors before finally entering the pool. The entrance to the pool area is from the corner of the space, under the stands. This choice is unfortunate. As it is, the swimmer walks along a corridor, having a view of a corner of one pool and portions of seating. A centralized entrance would be more impressive.

Circulation could be enhanced throughout the entire building. For example, the entrance to the building could welcome people into the swimming experience with drama and excitement. It should be more than a mere hallway that leads from the street or parking garage to spectator seating or the pool deck. At IUPUI, a flight of stairs leads onto a concourse that separates the natatorium from the gymnasion. The only feature of the concourse that lets you know you are in a swimming facility is the view overlooking the pool through floor to ceiling windows. In addition, there is a curtain that at times is drawn to block views from the concourse into the pool. Why hide the best view in the building?

Along with the circulation the lighting could be improved. Skylights along the ceiling allow indirect natural light into the
space. There is also general illumination lighting. This lighting is fine for visibility, but no more than that. Specially designed lighting, especially in and around the pool, could create dramatic effects with the play of light reflecting off the water.

**Experience**

The IUPUI Natatorium holds a special place in many people’s hearts, most of these people being swimmers who have competed in the pool and still recall their most memorable moments; whether it be a best time, a national win, or a team title. Poor experiences are even remembered by the athlete.

No matter how old athletes get, upon walking into this building, it will be with a rush of adrenaline and emotions. They will have flashbacks when they pass by the window overlooking the pool. More memories will return as soon as they can smell the chlorine. These things will never change for anyone who has ever experienced significant moments in this space. This is the same for spectators as well. They will remember the incredible races they have witnessed when their senses react to the space.

The following are important design issues that, if addressed differently, would heighten the experiential perception of the building for all users, not just the athletes who have competed here.
Building Exterior

Experiential architecture involves both the interior and exterior. The exterior can hint or symbolize the building’s use or purpose or at least get visitors excited about coming events. Seeing the building could arouse emotions and create interest even before the building is entered. This would be a type of advertising for the sport. When crossing the bridge into Cincinnati, one of the first things to come into view is the football stadium advertising for the Cincinnati Bengals. The sport of swimming needs to build anticipation, drama and power on the exterior. The more people are exposed to it, the greater the chance that they will be interested and possibly attend an event to witness the excitement of the sport.

For a person who is unfamiliar with the building, the design is purely a functional characteristic. “If the building design communicates that it is a certain type of building then it has done its job. For many businesses, this is key. If they can get the customer inside the store, they can try to sell them their merchandise. If they can’t get them in the store, then they will never even have the chance.”32

IUPUI is located in the heart of downtown Indianapolis. Thousands of people drive by the building every day and most of them probably have no idea what the building really is.

32 Deasy and Lasswell.
Proper building signage can be the solution to this problem but the building design should resemble a swimming pool, or at least water, for people to grasp the concept.

**Building Entrance**

As mentioned before, the building entrances of IUPUI leave much to be desired for experience. Both entrances, from the street and the parking garage, open onto a concourse that runs the width of the natatorium. That concourse should be more than a hallway; it should create excitement about, and celebrate the upcoming events.

From both entrances, you can use stairs to arrive on the concourse. Stairs are the perfect feature to start the excitement. The process of climbing the stairs can build the anticipation until you culminate at the top. The view from this point of the concourse should not be wasted. There are so many possibilities that could work tremendously at this point. Because it is a swimming pool facility, the incorporation of water features (such as a water wall or a running fountain) would work perfectly.

Since this is a location through which everyone must pass, a swimming hall-of-fame would be a great addition at this point in the building. The problem with most halls-of-fame is that they usually consist of plaques on a wall. This is nice but
people usually aren’t interested in this. People need something that is more interactive. People need an environment that explores multiple senses to create the desired experience. There is currently a portion of the concourse that is dedicated to plaques celebrating swimmers of the past but it is dull and attracts very little attention. Spectators would be more interested in interactive displays concerning current swimming hot topics and sport icons.  

The concourse is currently the only place where people socialize. During meets, this is also where concessions, tickets, and merchandise are sold. These spaces should be programmatically separated from an experiential concourse. Gathering, concessions, and merchandise are needed functions of the building, but can also limit the functionality and circulation of the space. Architectural spaces should be designed appropriately depending on the function the space will have. Proximities are vital for the spaces functioning correctly.

Seating

The amount of seating is probably the best feature of this facility. There is room for 4,700 spectators to sit and watch. That ability to accommodate large numbers of people is imperative to an exciting swimming experience. Swim meet

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34 Fitch and Bobenhausen.
excitement thrives on fast swimming and close races. These are what get the spectators cheering and the athletes swimming faster.

Though there is a large amount of seating here, there is still a small amount of prime seating. There are only a few rows close to the deck. The rest can be far away from the action. Another drawback to the seating is that there are only a small number that are located at the start/finish end of the pool. This is where the excitement occurs, where races are won and lost.

Circulation

The circulation through the space is purely functional. Though there is a large amount of seating here, there is still a small amount of prime seating. There are only a few rows close to the deck. The rest can be far away from the action. Another drawback to the seating is that there are only a small number that are located at the start/finish end of the pool. This is where the excitement occurs, where races are won and lost.

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walking to their seat, it would feel more like it was part of the facility and less like a hallway.

Maybe the most disappointing aspect of the entire building is the descent to the pool deck for the athlete. The event should celebrate the athlete. Why hide the journey to the pool instead of celebrating it as a promenade? A centralized entrance could take place at the concourse end of the pool. With this being the case, the spectators would be able to spot the athletes as they enter the pool. This would also allow the athlete to have the best view of the facility as he first enters. He would be able to sense the entire atmosphere and get a feel for the space as a whole. The pool entrance for the most important occupant of this facility should reflect that importance. As he enters, he should be engulfed with the grandeur of the space.

**Lighting**

The most important meet I ever participated in at this pool was the 2000 Olympic Trials. For this singular meet, special lighting was installed to enhance certain events between races. At certain points during the meet, when athletes were marching out for the finals of a race or when awards were being handed out, the general lighting would dim and spot lighting accented the athletes. Unfortunately, after the meet was finished, the lighting was taken down. This type of lighting
should not only be used for the highest profile meets. Any meet would benefit from this addition.

Other Building Precedents

Conseco Fieldhouse

One example of experiential athletic design is that of Conseco Fieldhouse in Indianapolis. This facility opened in 1999 with a very nostalgic look. This is the experience they wanted their patrons to have. To quote Donnie Walsh of the Indiana Pacers, “In Indiana, basketball is religion. Conseco Fieldhouse is the cathedral.” The goal was to design the building to make people think of basketball stadiums from years before in a very modern and technological way. Having personally attended both a basketball game and the swimming world championship in this facility, I feel that the design enhanced my experience of the basketball game but was disappointed with the atmosphere during the swim meet. The designed experience was for a basketball game, not for swimming.

From the time you walk into the building you are immersed in an environment that is a throw-back to the way things used to be. Inside the entry pavilion you find the old-fashioned ticket and box offices. As you pick up your tickets you can hear in the background shouts of “Programs, get your

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35 Conseco Fieldhouse <http://www.consecocfieldhouse.com/history.asp>
programs!" This is a program hawk selling the way vendors used to. From there, you turn around and ascend a magnificent grand staircase. As you climb you read a quote ahead of you, "Basketball really had its beginning in Indiana, which remains today the center of the sport" — James Naismith (the inventor of the sport), 1936. Once up the staircase, you walk around the arena only to notice that there are enlarged newspapers hanging along the concourse. These are also throw-backs, enlarged replicas of important dates in Indiana Pacers’ history. Also on this level you find the concession stands that also appear to be from a different time.

Once you finally head to your seat you realize that the enormous space, holding 18,500 seats, seems to be quite small. Even from the top row, from which I have personally watched a game from, you never feel as though you are that far away. The seats rise so fast that it keeps you from getting too far away from the court. Another fitting feature is that the scoreboard is not your typical high-tech jumbo TV. It is actually a hand operated board. The shape of the building also brings back memories of older days. The roof over the main court is a barrel vault. Features such as these are what make this space appear to be the home of a high school team, not a professional basketball team. As you exit, the last image you are left with
when you leave the game is an old-fashioned banner that tells you who the Pacers are playing next.

An editorial in the *USA Today*, 13 April 2005 quoted former Pacers’ Coach Larry Bird as saying “It’s nice for the fans. You don’t build arenas for players; you build them for the fans. I think it’s the nicest one in the league and I think our fans enjoy it and it’s something we are proud of.”

**Newport Aquarium**

From the moment you walk in the door at the Newport Aquarium you are immersed in aquatic life. From details as simple as painting the walls a watery blue color to having statues of whales in their lobby, the entire focus of the building is to make you believe that you are somewhere you aren’t. This altered reality is one of the best ways to give the users (customers in this case) the experience they are looking for.

Upon entering the front door to purchase a ticket, patrons immediately find themselves standing next to a twenty-five foot whale statue that appears to be flying out of the water only to splash water all over them. This is only a taste of what to expect during the rest of the journey. Upon entering the exhibit, patrons are lead down an escalator. Riding down the escalator becomes very symbolic as descending below the surface. This is the first time the sounds heard that will accompany them the
rest of the trip. Currently, the sounds are of water, possibly along a beach or crashing against a rocky cove. They are however, unmistakably water. This is just getting you ready to view all the creatures that live in and around this element. At the bottom of the escalator there is a quote on the wall that reads, “If there is magic on this planet, it is contained in water… Its substance reaches everywhere; it touches the past and prepares the future.” – Loren Eiseley. This quote is meaningful in this location because every creature in the building lives in it one way or another.

There are a few successful ways the aquarium displays the animals. The first way that you are shown is by setting up scenes behind a viewing window. Each of the scenes contains a few different species of animal. These are hand picked by experts to see that they need the same environment and react well with each other. The scenes are more than just the right amount and temperature of water. They are all miniature versions of the species’ natural habitat. The aquarium needs only to put the life essential ingredients in the scene to make sure the animals live but this wouldn’t allow the customers to enjoy their experience nearly as much.

The next way the aquarium displays the animals is by setting up scenes in the middle of a room. These scenes are
usually adorned with plant life (always artificial) and rocks from the region native to the fish. Again these are used to set the scene that you would see if you were indeed seeing the fish or reptile in its natural environment.

The final, and most spectacular way the animals are displayed are in tanks. This does not sound very spectacular, but it is when you are walking through tunnels lined with clear, seamless acrylic. When you are walking through these tunnels you are literally surrounded by fish. They are swimming beside you and even over you. This is especially moving when you are in the shark tanks. Seeing a fifteen foot shark swimming right at you and then turn slightly upward to swim over your head is a little scary even though you know it can’t get to you.

As mentioned above, there is music playing throughout the entire trip. This music actually adds to the excitement of the experience. When you first enter the exhibit, you hear the sounds of water telling you what lies ahead. Some of the first scenes are of beautiful but harmless fish. The music at this point has changed a little but is still fairly light-hearted. When you finally enter into the dangerous and deadly tunnels or the shark tunnels, you notice that you are a little jumpy. You know that you are protected from the dangerous animals by glass and walls but you are still a little scared. Part of this is because the
music has changed. The speakers are pumping in music that is perceived to be danger music. The effect works fabulously.

The lighting in the entire aquarium has been design to master the same effect as the music. The lighting in the rooms with fun and friendly fish is bright and warm colored. When you enter into the dangerous areas of the exhibit the lights are either dimmed or they are turned off completely. This adds to the excitement.

A very important design feature that may be overlook many times is the sequence the users experience your building. It is clear that in this building the designers had a clear idea of what exhibits they wanted people to see first and what exhibits should be saved for the end. The first exhibits were nice and they definitely get the users comfortable with the surrounding but the scenes become more impressive along the way until you culminate with the shark tanks. These are the most impressive displays and the ones that should be kept at the end so people leave really looking forward to coming back again. This forced promenade is most evident at one point in the building where a new addition has just been opened. At that point, there is a partition screen along with some plant life temporarily blocking the users from continuing in a certain direction. If the did, they would completely miss the new exhibits.
One effect that is noticeable only if you look for it is the way paint is used to create a false ceiling. There is no ceiling thought most of the tour. The walls are painted sea blue from the ground up to a point on the wall. This is the same height where the lights are hung. With this effect you don’t realize that there are speakers above you, mechanical units, and other auxiliary equipment that would take away from the experience. A similar effect is used to hide other mandatory building program elements such as emergency exits. They are just painted over so they tend to disappear.

Along the tour there were many places to stop and learn more about the animals on display. For every creature involved in the scenes there is a plaque by its tank giving you a name, description and other facts that help you learn more about it. In addition to that, there are several places to stop and learn and many of them are interactive. This is quite a better way to learn than simply reading a plaque on the wall, plus it is more enjoyable. Most of these stops are geared towards younger users which makes the tour fun for the whole family. While adults read about the animals, the kids are playing games that teach them the basics.

The main reason for choosing this building as a precedent was the way it dealt with the problem of seeing what
happens under water. This is a dilemma that I will have to deal with in natatorium design. The tunnels that are set up along the bottoms of the tanks work spectacularly in this situation. On your way out of the building, you are brought back up the escalator and shown the view of the shark tanks from above. There really is no comparing the view from above and below the water’s surface.

Enhanced Experience: Themed Retail

Today’s internet environment has made it simple for people to do much of their shopping without ever leaving home. Though this provides an advantage for retailers in that they may not have to worry about building stores in the future if all shopping is done online, these companies are not ready to give up the in-store shopping experience. “Is there any doubt that retail survival entails offering a higher-visibility and more involving purchasing experience?”36 One way these companies have succeeded in keeping shoppers in the stores is by using themed design.

This design combines the selling environment with an entertainment environment using themed and fantasy experiences. This encourages people to not only go there to shop, but to go for leisure. This ensures more people will be

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visiting the store. Once inside the store, the company uses the design to imprint the company’s brand up on the customer, leaving a strong impression on the customer’s mind.  

Some naysayers will claim that this type of architecture will be its downfall claiming that it is fake and inauthentic. True, many of the design details may be fake to give a certain impression, but the end result is a space where people believe they are someplace else.

Recreational Equipment Inc. (REI)

This Seattle, Washington based recreational equipment retailer began the design of its flagship store with the vision on interaction and entertainment for its customers. It no longer wanted to be a “store,” it wanted to become a destination experience.

REI is in the business of outdoor gear, rock-climbing, backpacking, etc. They insisted that this store be a place where certain equipment could be tried before purchase. This meant building a 65 foot climbing wall, 470 foot outdoor trail, and a glass enclosed room that mimics rain.

REI wanted their customers to believe they were not in a store, but outdoors using this equipment. Their first step was to use a path of travel to separate the customers from the

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everyday world. From the parking area to the retail space, the customers travel through a garden with waterfalls. This serves as a buffer to make people feel that they are somewhere they aren’t. Unexpected details also heighten the experience such as clothing hangers in the shape of ice axes in the changing rooms.  

Since the renovation there have been some complaints that the store has removed itself from its roots of providing quality equipment to outdoor enthusiasts. Sales, on the other hand, are close to double what they were before the store opened. The store has become something of a tourist attraction and has enabled them to reach a broader customer base and compete with niche retailers. Nike Town

Nike uses themed design differently than REI. REI used it to broaden their customer base. Nike uses architecture in an “all-encompassing brand-reinforcing experience.” Gordon Thompson, Nike vice president of research, design and development, says “We’re using architecture as a communication device for a brand.”

Nike already has a huge customer base. The athletic gear company wanted to build a new store near Fifth Avenue,

New York, that emphasized nostalgia and high-tech retail. The exterior of the building was modeled on an old-fashioned gymnasium. This motif continued inside the building with wooden floors, exposed brick exterior walls, gym-mat covered interior columns, and arched windows. The building also houses some very high-tech, futuristic displays. These are used to feature some of the newest products.42

The interior has a strong gymnasium/stadium feel to it with its five-story center atrium. Within the rest of the retail area, only half of the 66,520 square feet are used for product displays. The rest is dedicated to enforce the idea that Nike partners with champions. There are displays for current and past Nike-sponsored athletes, exhibits showing Nike technology, pieces of Nike shoes, etc.

Nike Town customers are attracted to the entertainment value and stay to shop. There is always activity taking place and sports broadcasts airing on the numerous televisions. There is so much activity and sport related content, you feel as if you are involved in a sporting event. The only difference is you might come home with the pair of running shoes you need.

**Exaggerated Experience: Visionary Architecture**

Buildings are designed and built every day. There are two sides to the built environment we know: the side that we see

being designed and built today and the side of unbuilt proposals. The designers working on the spaces we see continue working in that direction until it is clear that change needs to be made. We then turn to those experimenting in the imagined environments to look for possible answers.  

We are always on the verge of a new architecture emerging. “It has been said that much of yesterday’s fiction is now reality, and that much of today’s fiction may be the reality of the future.” This is due to the human imagination and progressing technologies.

We can find examples of this type of architectural thinking back to the days of Etienne-Louis Boullee, with his Cenotaph for Isaac Newton, and even earlier. Lebbeus Woods is a leader in experimental architecture today. Experimental architecture is rooted in the same qualities as visionary architecture, but Woods claims a difference. He believes visionary to be a practice of dreamers creating the impractical. His experimental architecture is grounded in solving, or at least provoking thought to, problematic situations. Both visionary and experimental architecture challenge our expectations.

45 Myers, Woods, and Harries, 5.
Woods claims his work, and others like him, to be “open-ended and exploratory” and is made “with the purpose of gaining experience for its own sake.” The goal of experimental architecture is to not worry about rationale or buildability, but to explore what could be done and push the field to the exceptional.

Visionary architecture draws from many different fields. Woods started most if his experimental work after becoming interested in science, philosophy, art, society and politics. John Johansen, another visionary, has devoted much of his work to nanoarchitecture: molecular nanotechnology. He uses advancements in this field to further develop his ideas of future architecture. “The task of architects today is to seize hold of new technologies, judiciously apply them to building, delight in the symbolic potential, and endow them with poetic expression.”

Woods has said he is interested in creating forms he has never seen before. This unpredictability frees people from knowing what to expect. They are allowed to encounter a space or building and experience it with a desirable freshness, which will undoubtedly leave a lasting memory with them.

46 Myers, Woods, and Harries, 5.
47 Myers, Woods, and Harries, 7.
48 Johansen, 20.
Using this type of design thinking allows architects to progress architecture forward, but more importantly, alters the users’ sense of reality. When people encounter a building or space that is outside the realm of normal design, they don’t know what to expect from the building. This lasting effect will create a timeless quality that people will always remember.

Literature Precedents

The Experience Economy

Spaces can be designed to increase the value perceived by the users. The retail industry created and proved this theory. This is seen clearly by examining the range of economic offering and the prices associated with each. These principles can be used in other areas of architecture to create spaces that are more valuable to the uses.

There are four different types of economic offerings in the retail world: commodities, goods, services and experiences. For example the way coffee is sold in these different offerings: people will spend very little money to purchase harvested coffee beans (commodity), those coffee beans can be made into coffee grounds or they can buy the already ground coffee at the store (good), someone can make it for you (service) or the consumer can be served the coffee in an environment that makes sipping
coffee enjoyable (experience). Each level of offering adds value to the previous and will cost more.\textsuperscript{49}

We have been living in a service economy for the past twenty years or so and were living in an industrial economy prior to that. Today, Pine and Gilmore observe that we are on the verge of moving from the current service economy into the new experience economy. Businesses that realize this early will be better off and will prosper during the coming years. “Decoupling experiences from services in accounting for what businesses create opens up possibilities for extraordinary economic expansion – just as recognizing services as a distinct and legitimate offering led to a vibrant economic foundation in the face of a declining industrial base.”\textsuperscript{50}

Gilmore and Pine analyze four different types of environments and explain them in detail. It is the designer’s job to figure out what type of environment is appropriate before designing and using these as guides.

The key to enriching experiences is analyzing the audience and determining the proper realm in which to engage them on. Guests’ experience can vary depending upon the level and type of participation. This, paired with guests’ varying connection or environmental relationship, can bring about four

\textsuperscript{49} Gilmore and Pine 1-2.
\textsuperscript{50} Gilmore and Pine ix-x.
main experience realms (environments): entertainment, educational, escapist and esthetic.\textsuperscript{51} These environments can be manipulated by changing the amount of participation by the users and by forcing them to absorb their surroundings or be immersed in them. Understanding these realms and how to manipulate environments to enhance the desired experience can truly make the environment successful. Through the design process, the designer would benefit by asking, “What would it mean for a natatorium to be designed like each of these environments?”

In entertainment environments, people passively absorb the environment through their senses. Participation in these environments is very minimal and the guest is merely taking in the surroundings. Examples of this type of experience is watching a sporting event on television or from a distant seat, watching a movie at home or listening to a lecture.\textsuperscript{52} Most of the spectator seating in a natatorium falls under this category. These spectators are just watching the events and are too far away to participate.

Educational environments call for their guests to absorb their surroundings just as entertainment environments. The difference between the two is that educational environments call

\textsuperscript{51} Gilmore and Pine 30-31.
\textsuperscript{52} Gilmore and Pine 31
for people to actively participate in the events unfolding. “To truly inform a person and increase his knowledge and/or skills, educational events must actively engage the mind (for intellectual education) and/or the body (for physical training).”

Good examples of educational environments are museums that allow people to participate in learning activities, petting zoos for children, and certain science fairs where people get to be involved. Educational experiences are most successful when you combine learning with playing. The closest spectator seating and the athlete seating can be described as educational environments. These spectators are watching but are close enough to get involved a little by cheering.

Escapist environments are completely the opposite of entertainment, they require people to be actively involved and immersed in the surroundings. Examples of escapist environments are theme parks, casinos, chat rooms or paintball game locations. “Rather than playing the passive role of couch potato, watching others act, the individual becomes an actor, able to affect the actual performance.” The pool falls into this environment. The athletes are in the environment competing against one another.

53 Gilmore and Pine 32.
54 Gilmore and Pine 32.
55 Gilmore and Pine 33.
56 Gilmore and Pine 33.
The final experiential realm is the esthetic. In these types of experiences, people are immersed, instead of just absorbing, but are passively participating. People partaking in these experiences immerse themselves in the event but leave everything untouched as it were before they arrived. Examples of these experiences are seeing the Grand Canyon, museums, and certain sporting/musical events.\textsuperscript{57} The pool deck falls into the environmental realm. The coaches and athletes standing on the deck are mostly watching but are immersed in the action taking place in the pool.

These four experiential realms can become confusing. One way to keep them straight is to say that “the guest partaking of an educational experience may want to learn, of an escapist experience to do, of an entertainment experience want to sense and of an esthetic experience just want to be there.”\textsuperscript{58}

Every space within a building should be designed separately. The key to using these realms in designing is deciding what exactly you want out of your environment for each space because each one is different. In some cases is may be obvious what experience may be best suited for your guests but some may be a combination of a few. In all cases, however, using a combination of all four realms will produce the riches

\textsuperscript{57} Gilmore and Pine 35-36.
\textsuperscript{58} Gilmore and Pine 35.
experiences. The key is finding the right variation of each of the realms and planning your environment around them.

**Sensation and Perception**

When it comes to the way people experience spaces, sensations and perceptions are an important aspect. In 1651, Thomas Hobbes wrote “There is no conception in man’s mind which hath not at first, totally or by parts, been begotten upon the organs of sense.”\(^{59}\) We sense the world around us, filling in information by touch, taste, sight, sound and smell, processing it (perception) and acting accordingly. The key issue is the difference between sensation and perception. Sensation is the way our body reacts after receiving a stimulus (light, sound, etc.). Perception is the way each person perceives such stimulus.\(^{60}\) Although there are some similarities, there are also some important differences such as color preferences, different memories, etc.

The text also discusses the study of Psychophysics. Psychophysics studies how physical stimuli relate to the sensations we experience.\(^{61}\) An important contribution was made by Gustav Teodor Fechner.

“In order to describe the relationship between our physical bodies and our mental experiences, Fechner had to solve three problems. First, he

\(^{59}\) Coren, Enns and Ward 1-2.  
\(^{60}\) Coren, Enns and Ward 9.  
\(^{61}\) Coren, Enns and Ward 15.
had to find a way to measure the minimum intensity of a stimulus that we can perceive, which is the problem of detection. Second, he had to devise a way to measure how different stimuli must be before they no longer appear to be the same, which is the problem of discrimination. Finally, Fechner attempted to describe the relationship between the intensity of the stimulus and the intensity of our sensation, and in doing so addressed the problem of scaling.”

The perception of space explains how people perceive the space around them, in particular depth perception and the way our brains perceive a three-dimensional world from the two-dimensional planar view our eyes sense. “The accomplishment involved in seeing objects in depth is quite amazing considering that the basic information available to the nervous system is just a flat image on our retinas.”

The visual field is the environment that stimulates your eyes at any given point. There are four aspects that determine this field. The first is the light source. This is the direction and intensity of anything producing light in your current environment. The second aspect is reflectance which deals with how much the surfaces in your field reflect or absorb the light. The third is surface orientation. Different angles of surface orientation, to the light source, create different reflectivity. The final aspect is viewing position. Even though the light source does not change, if you move you will change all of the above in relation to

62 Coren, Enns and Ward 15.
63 Coren, Enns and Ward 251-283.
to each other. The major problem of perceiving form is that many scenes can produce the same 2-D image. Without more information about the scene, the human cannot know exactly what he/she is looking at, which brings the theories of Gestalt to the fore.\textsuperscript{64}

History, experience and knowledge also affect our perception. “Your prior experience with this stimulus has changed your perceptual abilities in some manner, and now you can see what was formerly invisible.”\textsuperscript{65} In a study of sensory motor learning there are two different types of stimulation, exafference and reafference. Exafference is learning what occurs as a passive observer. Reafference is learning what occurs as a result of an individual’s own movements. In these studies, the objects who are subjected to reafference learn more quickly and behave normally after the tests unlike those who are subjected to exafference. As mentioned earlier, there are many shapes and sizes that could give off the same 2-D image if placed and oriented in the correct position. It is our experience and knowledge that keep us from perceiving the shapes as something other than what they are. We use all the information given to us as the present time, as well as experiences we have from our past before make an assumption as to what the object

\textsuperscript{64} Coren, Enns and Ward 284-321.
\textsuperscript{65} Coren, Enns and Ward 500.
is. The older we get and more experiences we have, the more often we are correct.\textsuperscript{66}

\textsuperscript{66} Coren, Enns and Ward 499-531.
Chapter 4: ACTIONABLE PRINCIPLES

Introduction

The need for experiential design has dominated this thesis thus far. Though the need for these principles is essential, the design of a natatorium is so specific that a different route is needed to discover how experiential design can be used effectively in a natatorium. The program of a natatorium is such that there are certain elements that a functional building needs.

The question of what makes a space experiential was raised in chapter 1. It is the opinion of the author that an experiential building can enhance design by:

- Challenging expectations
- Challenging sense of reality
- Invoking memories, nostalgia
- Utilizing Gestalt psychology principles

The way natatorium design needs to be approached follows. Each of the important programmatic elements are to be analyzed in four steps listed above. In every case, the elements can be better designed, but some of the designs produced by this method may not be logical for a natatorium. After all of the elements are designed, they can be analyzed to pick the
combination to best enhance the user’s experience of the entire building.

The following are the programmatic elements that have been designated for design. The precedent used for this analysis is IUPUI natatorium described in chapter 3.

**Building Exterior**

Natatorium buildings are mostly very simple forms. The form is a response to the shape of the pool. The auxiliary spaces are located around the pool with the spectator seating above that. Most buildings are rectangular volumes. They rarely have any relief either such as windows because too much natural light hinders the competition.

**Memories**

The building could be shaped like a famous sporting facility to evoke memories. If it were shaped like the Roman Coliseum, people may hold the sport in higher regard due to the magnificence of the original. Likewise, if it mimicked the Parthenon, it would be seen as a temple to the sport. Building forms such as these could be used to make people look at the sport differently.

**Gestalt**

Using the water as inspiration, the building façade could be curved, or even wavy. Water is a very fluid element so why
shouldn’t the building form. This form might allow people to see “water” in the building. If so, it would act as a billboard for the facility and sport. When the building is a rectangular box, people can’t be expected to know what is inside. This way, they might.

**Expectations**

People expect buildings to exist a certain way. They are supposed to sit on the ground, be solid, stand up, etc. How would people react if the building were underground? This would work with a swimming facility because much of the facility functions better without natural light. What if the building were floating? People see a large building and would know that it is too heavy to float. What if the building appeared to be floating on water? A trench could be dug around the building and filled with water. If people couldn’t see the walls go to the bottom, it would look as if the building were floating on top of the water. What if the building had a retractable roof? Many baseball stadiums do this to give the option for indoor or outdoor. This would work great in a swimming facility because the summer season is usually outdoor and the winter indoor. People expect buildings to look a certain way, especially natatoriums, but they don’t have to.

**Sense of Reality**
Swimming is a very powerful sport and it is easily seen if you capture a still shot of a swimmer in action. You can see the muscles flexed and the water spraying everywhere as the swimmer propels through the water. This is such a powerful image that the building could use this form.

Take, for instance, a photograph of an athlete swimming butterfly. The water in the pool could represent the base of the building. The head and arms spread out could be the next level. The spectator seating then could be represented by the water spraying in all directions. If each level were represented by a different material, with appropriate colors, this symbolic design could act as a statue.

**Entry/Circulation Concourse**

The entrance into the building and path towards the pool area in most natatoriums is nothing more than a corridor. In the best cases, it is an interior plaza or a food court with windows looking into the pool. This journey, from the exterior to the pool should be celebrated. It should be treated as a design opportunity to excite people about the action that is about to occur, not just as circulation.

**Memories**

One of the best ways to get people excited about the upcoming action is to remind them of all the great athletes and
performances that came before them. A hall of fame dedicated to the best swimmers of a school, country or era shows people the greatness that has happened in the facility, or any facility, and gives the athletes a benchmark to aim toward. The hall of fame has to be more than just names or statistics on a wall. People are drawn to interaction. Photographs or video clips of a shining performance will draw people’s attention. Even better, interactive stations that let people discover the past as they chose will leave a more lasting impression.

**Gestalt**

The problem with the corridors that lead you to spaces, such as a pool, is they shut off views of what is really important. In a swimming facility, a designer should keep the number of spaces where people can’t see the pool to an absolute minimum. This concourse should be lined with windows. To make the windows more interesting, and to keep the idea of a hall of fame, Gestalt principles could be used on the windows. Using frosted patterns that allow people to not only see through, to the pool, but see information would serve a double purpose. The frosted patterns could be of swimmers competing or images of hall of fame inductees.

**Expectations**
People expect circulation spaces to be corridors because that is what they are used to. Corridors are usually tunnels that lead you to the intended space. What if the corridor led you through the intended space to a more specific location? The spectators need to get to their seats and the most common way of doing this is leading them behind, or under, the stands to their section. The spectators could get to their section by walking through the space instead of behind the stands. A walkway could be built in the pool area, over the pool for people to complete their journey. This would allow them to get to their seat without having to miss any action and give them a spectacular view of the entire space.

Sense of Reality

Upon entering the facility, people need to get to their expected locations. Spectators need to get to their seats and athletes need to be down on deck. The process of walking through these concourses is bringing themselves to the pool. One way of challenging people’s sense of reality is to bring the pool to them. Instead of walking through normal corridors, they could enter below the pool through tunnels underwater. If the building doesn’t allow this, they could walk through tunnels with water flowing over top of them. People are there to see action in the water but the action shouldn’t be confined to the pool.
Pool/Athlete Entrance

Current natatorium facilities use very functional entrance methods. Most use stair wells to travel from the concourse down to the pool level. These stair wells lead you to locker room facilities where the athletes can change and then proceed to the pool area. Some of the better pool entrances have you enter the pool area from the concourse level and proceed down stairs to the deck. This is better because upon entering the space, you are able to see more than you would if entering from the deck level. This entrance should be dramatized. People attend these meets to see the swimmers. This shouldn’t be confined to the pool; the athletes should be celebrated upon entering the space.

Memory

Fans stand outside arenas, waiting for the arrival of their favorite players, just to get a glimpse of them. At many formal events, people are put on display upon entering the space. The rest of the guests want to see people arrive. In interior spaces, a good way to do this is use a grad stair. As people arrive from the upper levels, they walk onto a platform.

This technique can be used to celebrate the athletes as they arrive. The entrance should be a display for spectators to see the athletes and prepare them for the excitement that is
about to occur. The platform they walk out on would work as a display for the pool area. The athletes would be able to see the entire space from this point and take it all in.

Gestalt

Using the Gestalt design principles and pulling heavily on the presence of water in the space, the stair could become a symbolic waterfall moving water and athletes into the space. Water could flow through channels over the steps create the waterfall experience. The shape of the stairs could taper towards the bottom as well, strengthening this point. The power and beauty of a waterfall could be inspiring to all who use the staircase.

Expectations

As mentioned earlier, most of the circulation in swimming facilities is through corridors and stairwells. This natatorium should attempt to keep people in the pool space as long as possible. Circulating people within the pool space instead of separate corridors would allow them to watch the action while traveling to their destination.

A walkway could be designed to run over the pool with stairs down to the deck on either end of the pool. View to the pool would have be kept in consideration to ensure that this walkway did not block anyone from watching the competition.
When the athletes walked along this path, it would help bring them closer to the level of the spectators. This would keep the spectators and athletes less separated.

**Sense of Reality**

A 50 meter pool is used for most international competition but much of American swimming takes place in a 25 yard pool. When the pool is set up for a 25 yard (short course) race, a 50 meter pool is split in half with two bulkheads. This leaves some space in between the two bulkheads, allowing for the meter-to-yard conversion. This would create a spectacular entrance to the facility if the locker rooms were connected to these stairwells. Swimmers could emerge from the stairwell in the middle of the two pools. This would be a very dramatic entrance to the space.

**Spectator Seating**

The best natatoriums today have spectator seating on both long sides of the pool. The amount of seating will vary depending on the intended use of the natatorium. The design of the seating does not vary much. Due to the rectangular form of the buildings, the seating has typically followed. This rectangular form causes very few of the seats, the ones focused on the start/finish end of the pool, to be desired. The rest are not angled where the action is.
One of the explanations why swimming is not much of a spectator sport is the separation between the athletes and the spectators. In the best facilities, the closest spectators are still 10 feet above the pool. Compare this to the stands at a basketball game. The best seats are on the court.

In swimming races, most of the action occurs under water. The swimmers start by diving into the water. They are under the water there and after each turn. Most of the stroke and kicking happens there as well. Although the water is clear, it is still hard for the spectators to see what is going on and understand what the athletes are doing.

**Memories**

If you were to ask someone which was better sporting facility, a natatorium or a basketball arena, they most likely say basketball. Why? The seats are closer to the action, all the seats are focused on the action and there is usually not a bad seat in the house. Why shouldn’t natatoriums be designed more like this?

**Expectations**

When watching a swim meet, you expect certain things from the stands. Most of all, you expect to be sitting above the pool looking down on the action. If the spectators were sitting below the water line and the wall of the pool was glass, they
would be able see the action they wouldn’t have been able to from above. They would be able to see all the stroke technique, the kicking off each wall and the explosive power generated in the dive.

**Sense of Reality**

At swim meets, the swimmers are supposed to be the ones in the water and the fans are supposed to stay out and watch the action in the pool. If the spectators were brought inside the pool, this would challenge the spectator’s sense of reality. The design would get the fans more involved in the action allowing them to view the athletes from an angle never before seen. It would make them feel as though they are in the race themselves.

**Athlete Seating**

The seating for athletes at most natatoriums is rarely thought of. Metal bleachers are brought into the pool area and arranged on the deck around the pool. These bleachers are cold, uncomfortable and do not promote a team atmosphere. Just like the typical spectator seating, they are rectangular in form and do not allow teammates to easily converse with each other. It almost goes as far as separating the individuals on the team. Once the competition is over, the bleachers are usually folded up and sometimes taken out of the pool area.
Swimming, though very individualized, is a team sport, and it is important to foster that feeling. Athletes feed off of each other’s energy and the more they feel like a team, the more excited they get for one another.

Memory

One way the seating could be improved is creating a dugout-like atmosphere. In baseball, each team is given a separate area to sit when they aren’t participating. The team sits and cheers together. When multiple teams are competition, these dugouts could be partitioned off to give each team separate/private space. The sitting areas could be lowered a few steps below the deck as well. This would help to enclose the athletes better and bring the spectators closer to the action as in baseball.

Expectations

To help enforce the team atmosphere concept, each team’s area could be curved. This would bring the attention of the team to a focal point and allow the members to interact more easily. This would hinder flexibility to adapt to a smaller or larger team since they are each given the same amount of area. This could be fixed by designing bleachers that integrated with the wall. Larger teams could pull three or four rows of bleachers
out of the wall if needed whereas the smaller teams would only need one or two.

**Gestalt**

Using the same idea as above and encouraging a team atmosphere, the same form could be used to enforce a wave-like pattern. The Gestalt principles tell us that people could perceive the constant, fluid curves as a wave. Being in a swimming facility with plenty of water would enforce this perception.

**Pool/Gutter**

The pool of a competitive swimming facility is a standard. There are just a few variations to its size and shape. The length of the pool is most important. In most cases, a small pool will be 25 yards. Any facility that plans to host larger meets will need to be 50 meters (the size of international and major national meets). Smaller pools will have either six or eight lanes. The larger pools will typically have eight, but sometimes will have ten. The final variation is the addition of a diving well. Adding a separate pool for diving will allow both swimming and diving to occur at the same time and will allow for more room for the swimming to warm up and down.
These are usually the only design parameters for the pool. This is decided and the rest of the building is filled in around it.

**Expectations**

The pool in a natatorium is expected to rectangular in form in one of the sizes mentioned before. This does not have to be. Two of the edges, the short ends where the swimmers start from and swim toward, have to be perpendicular to each other. There is no reason the other two sides need to be orthogonal. In some cases, the pool is 50 meters by 25 yards and swimming is held in both directions depending on the needs of the event. This can be solved by having easily movable bulkheads to make the pool any desired length.

The only requirement for the pool is that the swimming area be a certain size. The pool could extend beyond this footprint. Not only would this shape be something people would not expect, it would benefit the swimmers in the outermost lanes. During a race, each swimmer creates waves that move the adjacent lanes. These waves culminate at the outermost lanes when they hit the wall and bounce back.

**Sense of Reality**

Everyone knows that the color of the water in the pool will be blue. What if it weren’t? What if the water was red? People
would remember that. Red water would possibly be a
distraction to the swimmers and the spectators so permanently
dying the water color would detract from the experience. A
better way to achieve this effect would be using lights in the
gutters and on the floor of the pool. The lights could be used to
tint the water any color in between races, when there is no
action, and the water could be normal for the start of the race.
Why stop at just turning the water one color when lasers could
be used to create crowd-pleasing effects to keep the spectators
in their seats in between action?

Gestalt

Using the principles of Gestalt psychology, lights and
lasers could be used to create patterns in the pool. Though it
may be hard to use these to create pictures, the Gestalt
principles teach us that human brain will interpret certain
patterns as pictures. For example, lasers could be used at each
of the short ends of the pool to create seven red lines. White
lasers could be shot from the bottom of the pool to create 50
white dots in one corner of the pool. This would create enough
of a pattern of the American flag that the spectators would
perceive it as such. Then, instead of saluting the flag during the
national anthem, people could salute the pool.
**Water Features**

Due to the presence of water in a natatorium facility, it only makes sense to design features around this. Water can be a very beautiful and powerful design tool. Very few facilities are using this tool to their benefit when it could greatly increase the experience had by the spectators and athletes.

**Memory**

There are many opportunities to draw upon people’s memory of water. The most powerful may be creating waterfalls at various locations. A water-wall can created in any space within the facility, such as the concourse. A more powerful option may be to create a waterfall from the diving platforms. The highest platform is 10 meters above the water. Water could be pumped to the top of this platform to create a running waterfall when diving competition is not occurring.

**Gestalt**

A very strong symbol for swimming is the Olympic Rings. This is the most important meet for swimming and the event that gives the sport most of its attention. It is such a powerful symbol that many swimmers, even those who have never made the meet, get a tattoo of the rings to remind them of what goals they are shooting for.
Using Gestalt psychology, bubbles could be released from the bottom of the pool to create any shape. Creating the Olympic Rings would be an inspiration at the beginning of important meets, especially the Olympic Trials.

Expectations

There are a few meaningful “lines” in swimming. These lines are symbolic, each for their own reason. For instance, five yards from each wall is where the flags are hung. These are used so backstrokers know where the wall is going to occur. It is mandatory that the swimmers not be under water more than 15 meters off each wall. A final symbolic “line” is the mid-pool line.

During national meets, the backstroke flags are taken down for any race without backstroke. Many times, the 15 meter line is marked by either a colored marker on the lane lines, or by an orange cone sitting on the deck. These “lines” mean something to the sport and it should be expressed in the facility design.

Intentional gaps could be created in the stands and trenches in the pool deck at each of these marks. The lines could be continued through the pool by coloring the walls and the bottom of the pool. This would help reinforce the design and
maybe even force some less educated spectators to notice certain rules.

**Sense of Reality**

During a swim meet, people know that being on the deck will keep them dry. The water is supposed to stay in the pool. Designing the pool to quickly raise the water line and flood the deck would force people to start questioning this. This could be done in between races to keep people attentive. It would almost appear is if the pool was attacking the people on the deck. Drains could be located five feet from the pool to make sure the water doesn’t get personal items on the floor wet and the water could be lowered to a specified height when the action returned.
Chapter 5: DESIGN PROGRAM AND SITE

Program

The final product of my research and design will be a natatorium facility for the University of Cincinnati. The facility will feature an Olympic size swimming pool and separate diving well. The facility will also incorporate an indoor track, miscellaneous studios and offices, a café and any other programming needs for these functions. The facility will be located too close to other University facilities to include programmatic elements already existing such as weight room, basketball courts, aerobic rooms, etc.

The author realizes the University built a pool that will opened in January of 2006. Due to the inadequacy of this pool, this is a proposal of what should have been built instead. The author, for the sake of this argument, is assuming that space allocated for the new natatorium is being used for a different purpose.

The goal of this project is to push natatorium design to a higher level so, in the following years, all new similar facilities will use this as the benchmark for design. An additional goal is for this building to be capable of hosting the biggest and most important meets of United States Swimming. This will bring more popularity to the sport in this particular region.
Cincinnati is one of the best swimming cities in the nation. High school swimmers from Cincinnati attend colleges all over the country, swimming at the collegiate level. This would be an ideal location for a facility such as this to be built. The first reason is the need for a premier facility to host important, high caliber meets. The closest facility that can handle a larger meet is Miami University. Though this is a fine facility, there are many deficiencies that limit the quality of experience. There are many meets every year, at the club, high school and college level that would benefit from being hosted in this facility.

A second reason this facility would benefit the University is recruiting. The team has always had trouble recruiting the top talent out of Cincinnati. There are plenty of high school swimmers that don’t consider swimming in Cincinnati. The main reason for this is the lack of a quality swimming facility. If this facility existed on the University’s campus, more talent would stay here and greatly improve the quality of the swimming program.

A final benefit for this facility is the University could make money from it. Colleges look at swimming as a sport that does not make any money for the University, such as basketball and football. There are no television contracts and attendance is
much lower. There are other ways to make money from a swimming facility. Hosting meets high school and club invitationals would make the University some money. These teams all have to pay to swim in the meet, plus food, merchandise and parking. This is small money compared to what could be made if a national meet could be held here. This is money that would pay for the cost increase between an inadequate and a premier facility.

**Site**

It is the author’s intention that this facility be located on the main campus of the University of Cincinnati. This is to be a natatorium for the University, and specifically the varsity swim team. The most important reason for locating this project on the campus is to give the University of Cincinnati the swimming facility it so desperately needs. For years, the pool the swim team used was inadequate and the designs for the new pool do not even meet the functional needs of the university. It is my goal to design the facility that the university should have two years ago.

The southeast corner of campus appears to be the best location. There is currently a parking lot and maintenance facility across from Edwards Hall that is one site possibility. A second location could be the area of Sander Dining Hall.
The first possibility (the parking lot and maintenance facility) is proposed to be turned into a green space named Jefferson Quad. Due to the University’s severe lack of green space, this is a major negative. The positives to this location are the size, elevation change, access from Jefferson Street and parking. The size would be more than adequate to build this proposed facility. It is a large plot, over 300 feet in each direction. The elevation change would be ideal for a natatorium. This would allow the public to enter from the south, on the second (spectator) level, and that athletes could walk down to the deck instead of everyone walking up to the second level and the athletes walking back down to the first. This location is also adjacent to Jefferson Street, one of streets that surround campus, so access to the facility would be easy. The final positive would be the parking that is located in Edwards Hall, located across the street on campus.

The second location would also work well for this facility. The most important positive would be to allow the green space to be built on Jefferson Quad. According to the 2001 Master Plan for the University, all of buildings, except Daniels Hall, are expected to be demolished. This leaves a plot of land that, though not as large as Jefferson Quad, could work. The site is also directly across from the 5/3 Center which houses the

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Image 119 - Area of possible natatorium built on Jefferson Quad

Image 120 - Jefferson Quad - University of Cincinnati

Image 121 - Area of possible natatorium built on current Sander Dining Hall
varsity weight room and training room facilities. These are both necessary daily for the team. This is also the location that, in the 2001 Master Plan, a natatorium was supposed to be built. This location would also have good access to Jefferson Street but would be farther from parking.

A final location proposal would be a combination of the two lots. Currently there is a drive (Charlton Street) that enters from Jefferson Street and splits the two. As a part of this building, this entrance would be updated to match the rest of the campus entrances. The building could be mostly underground, going under Charlton, being located on each side. The pool, which needs little to no natural lighting, would rest directly under the street. The spectator seating would start underground and extend above ground on each side. This proposal would take up much less ground area and still allow for Jefferson Quad to be built.

All three of these proposals would be adequate for this facility but the third may be the most appropriate. It will allow for the natatorium to be built and would impact the campus the least. The final decision will be made at a later date.
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Appendix A – New natatorium documents

Image A – Overall site plan. You can see here the addition of a lazy river. This lazy river uses room that would be better dedicated to the competition pool. If this were not incorporated in the plan, there would be more room for functional additions to the natatorium, such as a separate diving well. You can also see the limited deck space on three of the four sides of the pool.

(University of Cincinnati, Main Street Documents. KZF Design and Morphosis Architects)
Image B – Competition pool layout. Here you can see more clearly that the diving boards are to be included in the competition pool. The starting end of the pool is the top. During a meet, diving and swimming will not be able to take place at the same time, like in other facilities. During practice times, the team will swim from left to right. This distance is 25 yards and gives them more lanes, but diving practice will take some of lanes away.

(University of Cincinnati, Main Street Documents. KZF Design and Morphosis Architects)
Image C – Competition pool section. You see in this image the lack of deck space on each side of the pool. It is seven feet wide. This is smaller than Lawrence Hall, and this is supposed to be an upgrade. You can also see the spectator seating on the right. There are only three benches that will hold 250 people. Lawrence Hall held 600. Why should the University be upgrading the pool in size and downgrading the amount of seating.

(University of Cincinnati, Main Street Documents. KZF Design and Morphosis Architects)