Change is a constant in our society and in our daily lives. Modifications are made daily that are influenced by desired levels of privacy, lighting, and sound; weather, and other interactions. How can a building be designed to easily respond to create levels of change and adaptation for the human interactions occurring within? How can elements be used to allow pedestrians to see the building reacting to these influences occurring in its environment? Does a building’s design have to end when the construction crew rolls out? Can it be an always-changing element in our society that reacts to its surroundings?

This project allowed for an exploration into these questions to discover how a building can respond to these needs. A variety of interactions and individual adaptations were developed that were driven by these ideas of change and alteration. The project that was explored transformed the idea of traditional urban living into a building that changed and transformed by the very hands of the people that lived within these walls. The result was a design that tested the theories and methods of change that could be applied specifically to a building’s façade.
As I explore this idea of the changing of life and growth in buildings, I am reminded of how this process is inherently leading me into my own changes in life. Throughout the past 5 years of exploring and studying architecture, I have learned and grown thanks to the strong web of people helping push me along the way. The long road of CAP is now coming to an end, and there are so many thanks to give. Thanks to all the faculty and professors at CAP who devote their lives to helping us develop our dreams. Thanks to my family for always having faith in me and what I want to achieve. Thanks to my amazing group of friends who have stuck with me as we held each other up through struggles and successes. Special thanks to Tom who has always let me express my individuality and encouraged me every step of the way. It’s been a great ride with lots of amazing people.

*A man’s growth is seen in the successive choirs of his friends.*

Ralph Waldo Emerson

Acknowledgements

Studio Professor

Bob Fisher

Thesis Advisor

Brian Hollars

Thesis Consultant

Jeff Culp
How are ya Dede?

Not so good, I just moved into a new apartment that is dull as can be. There is nowhere for me to enjoy the beautiful weather...not to mention how I can't change anything having to do with the outside. I wish there was a way for me to personalize my own unit for what I need.

You can! Just flip through this book and you can see how good design can give people a choice of how to change their surroundings!

Wow! Thanks so much! Maybe I can be so lucky to live in a cool building like that someday!

what are you looking at?

Go look at the book.
[the aggregate of qualities and characteristics that distinguish one person or thing from others]
[an individual or distinguishing feature]

[individuality]

[change]
[to undergo a modification of]
[to become different]
[to pass from one phase to another]
[to make different in some particular]

[choice]
[the act of choosing; selection]
[the power, right, or liberty to choose; option]
[a number or variety from which to choose; a wide choice of styles and colors]
[the best or most preferable part]
[an alternative]

[alteration]
[an event that occurs when something passes from one state or phase to another]
[the act of making something different]
[the act of revising or altering]
this is about change... this is about choice... this is about people...

Human activities are very complex. They require constant adaptability to surroundings and a great deal of change occurs on a daily basis. People change to adapt to their surroundings, to adapt to temperature, to adapt to other people, to adapt to change. **Change is a constant.** It is always occurring. Everything moves from one phase to another. People in their lives, plants in their seasons, and buildings... **how do buildings reflect change?**

People often change their image to fit their lifestyle. Their clothes reflect their personal styles, and their personal styles adapt with seasons due to comfort levels. They change into different outfits for different activities. They change as the years go by to adapt to different fads and fashions. Can these ideas be meshed into how a building responds to activities and seasons?

Buildings are built to contain all of this active living and working within its walls. **How do buildings change to reflect these activities and processes?** How can the inhabitants of the spaces created adapt to the environment? **How does the environment adapt to the inhabitants?** Buildings can often be mysteries, hiding what is occurring behind motionless and static walls. In our busy lives of change, do these buildings fall into the background? Once we’ve seen it, we’ve seen it...right?

**How do we take a static and inert building and make it compatible with the ideals of change and adaptability of humans?** Humans can change their appearance to reflect a number of things that are occurring. How can buildings change their appearance to reflect activities? **Buildings contain active people,** and should respond to the users of the spaces.

(How will change affect the building?)
Can it then become an ever-changing façade, allowing users to adjust it for various reasons? Can it show different phases due to the users, seasons, and lighting? Can it transform from a static appearance to one that changes and moves on a daily, seasonal, and yearly basis?

(How will change affect the inhabitants?)
Can they change the boundary between inside and out? Can they choose the levels of separation they prefer and adjust the building accordingly? Can they become interactive with their surroundings and adapt them to their own needs? Can personal styles influence the building's appearance?

(How will change affect pedestrians?)
Can people see a building that reflects the change that occurs in the lives of the inhabitants as well as in their own environment? Can they see change occurring due to the affects of daytime, seasons, and the users? On a daily basis, can they see a building changing and adapting to the life around it?
Windows should be adjustable to allow natural ventilation to flow throughout their spaces. This allows fresh air to pass through the space, providing a healthier living space. Users will also appreciate the added benefit of lower energy costs.

[ventilation]

People need different lighting levels depending on what activities they are doing. The skin of the building can provide opportunities for people to adjust the amount of natural daylight that penetrates into each space.

[light]

During different seasons, temperatures rise and fall, which affects when people want to be inside or out. Flex spaces can be created that allow for a space to transform from an outdoor balcony in the summer to a sun room in the winter.

[seasons/temperatures]
[sound]

Listening to the hustle and bustle of urban life can often be enjoyable for people residing in cities. However, certain activities are better enjoyed if this outside noise can be adjusted to the user's wants.

[privacy]

Even though open living spaces are great for lighting and space qualities, people may not always want to feel like they are being watched by their neighbors. Certain rooms, such as restrooms, require times when total privacy may be needed.

[growth]

New residents may require more or less space than the users before. As families grow on the inside, new spaces might be required to contain the whole gang. As plants grow on the outside, how can they be utilized to benefit the building and its inhabitants.
Shades in a building can greatly alter not only the indoor living atmosphere, but are very apparent to the pedestrians passing by. They are easily manipulated and adjusted by the inhabitants for daily activities. When windows are closed, shades can help control privacy and lighting, and when open, block wind and weather as well. In many residences today, shades are an afterthought. When people move in, they go to the store and pick out a mini blind or curtain that is tucked up in front of windows. What would a building be like when personal shading is a driving design factor?

Openings in buildings provide a high degree of alteration that can take place on the building's facade. Windows and doors have been developed so that a wall can essentially disappear. Users can bring the outdoors in with a fold or slide of a wall, tucking it out of site. Openings allow places for residents to interact and enjoy the activities happening at street level. The boundaries of interior and exterior space blend and invite passersbys to enjoy the space that spills out into the streets. By layering materials over the openings, variations begin to happen, altering the levels of privacy, lighting, sound, wind, etc. that occur. Different degrees of openness occur and are reflected, changing the street atmosphere that occurs below.

In a combination of what influences change, and what elements can change, movements and change can occur that begin to give life to the building. The building is then allowed to respond to the factors of change and reflects the environment that it is immersed within. The thesis exploration showed how a building could be, in theory, a constantly changing element in our environment. The factors that drive change were explored and solutions were derived based on these factors. The end result shows how a building can continue to change on an hourly, daily, seasonally, and yearly basis to create continuous adaptation to the users needs.
This time when looking at lighting, the focus is on artificial lighting rather than the previously discussed issue of natural daylighting. Artificial light spilling out from within the building can be a material in itself at nighttime. Certain spaces that are lit shine through the windows, creating a pattern of light and showing the life within. By providing opportunities on the facade with openings and material, light can be altered and extended beyond the limits of interior space. This also reflects a change that occurs on a daily cycle, changing as the sun rises and sets.
Vegetation growth is driven by seasonal changes in certain climates. Vegetation can change the overall appearance of a building when used as a design element. Vegetation screens allow levels of privacy and lighting to be altered within, not to mention the fragrant smell certain plants release when blooming. The change can occur rapidly or slowly depending on the plant type used. Vines, for example, can spread quickly up a wall, and just as quickly...be cut back. Trees grow much slower, extending change over years. It requires little interaction from users for change to occur; just a little watering and pruning here and there when needed.

Different materials can be used in design to show differentiation between spaces. The facade of the building can also be given character when combinations of materials are used together. For residential, materials on the outside can add individuality and ownership to their own unit. Residents can be given the choice of what materials they would like to have to suit their personal tastes and styles. Materials also can affect how much light and sound can enter into an interior space. When residents are allowed to modify exterior materials, this changes the overall composition, adding variety and movement to the building.
Due to influences like growth, spacial issues become a major part of why a change needs to occur. What comes to mind right away is when a family grows, needing more room for kids, dogs and the loads of stuff that accumulate. This issue can be addressed by creating opportunities to transform one space to another, or to add or subtract spaces to the whole. Maybe an overlooked issue that, being a college student I wanted to look into, was how spaces can be transformed for temporary size increases, such as a social gathering. This can be done by creating spaces that can be added together to create larger areas, or subtracted back down to allow for more personal areas. Looking even deeper into this, creating spaces that can be utilized for either outdoor activity, or added back into the interior square footage when space is required. This “flex space” allows rooms to flip flop between indoor and outdoor environments.

This element is quite possibly the most recognizable form of change. Color is easily identifiable by pedestrians, and stands out as a trademark on a building. When thinking of color in terms of alteration and change, it can be placed on objects that move, emphasizing these moving elements. Individuals can have preferences in color, and can be given a choice of what color a wall or shade can be. This choice can then be reflected in the overall appearance of the facade. Acceptable colors can also change over time, becoming dated to a certain time era. Long term changes in color can therefore become desirable.
You mean other people have done this before?
The beginning of my exploration started with looking into the most basic of alterations. In this housing project for senior citizens, the challenge was how to create a sense of individuality while keeping costs low and without altering floor plans. The answer lay in the balcony design. Across the facade, balconies create a magnificent pattern of textures, shapes and colors. By changing colors and balcony sizing, life and character are given to the basic square building. In order to meet the unit quota, the architects created a unique solution along the North facade. In the Netherlands, apartments are not allowed to only have openings to the North. In order to provide more units with East and West openings, the architects suspended units outside the main structure of the building. This allows for an opportunity to introduce the colorful balconies once again on the opposite facade.

A connecting balcony provides a great opportunity for office workers to meet and enjoy the outdoors while avoiding the surrounding industrial site. The balcony is covered with vegetation that wraps the complex with a lively screen of foliage.
The facade of this apartment building has found a new way to define the relationship of the inside and outside spaces. On the south side, balconies protrude from the facade to create private indoor/outdoor spaces. The top and sides of the balcony are entirely glazed, with the south wall being sliding glass. The balcony space can then be used as an outdoor area or a conservatory when the glazed wall is closed. This provides a great opportunity for residents to adjust the boundaries of their living spaces. A steel construction allows the walls to slide across the facade, creating a constantly changing view.

illa fleming
barcelona, spain
jaume bach

The design themes for this residential project are alteration, change and movement. The architect chose to enclose the building on three sides with a balcony layer. The exterior of the balconies consist of shading devices that run across the facade. The shades are constructed of an aluminum frame with fixed horizontal louvers. The residents are then given the choice of moving these shades depending on individual needs. The building then takes on a horizontal emphasis, with the shades sliding across the horizontal bands. The facade then begins to shift and change due to the residents within.
This infill project almost appears as if it could be two precedent studies put into one. The outer infill buildings contain a metal shutter system that runs floor to ceiling height. The shutters fold to the side, providing a second skin to the building’s facade. This skin appears as if it would rarely have the same appearance as the day before. The interior courtyard garden apartments provide another shutter system that has been altered to provide a more natural material. The wooden slatted shades roll up and down in front of the balconies, providing privacy to the residents within.

In a peaceful neighborhood setting, this building does anything but blend in. The odd look of the building becomes even more unique when the gable side of the building suddenly slides out to create an outdoor bedroom. The electric motored “drawer” slides out over the heads of the pedestrians at street level. This creates a room that, when opened, becomes a combination of a bedroom and balcony combined. The residents then get the chance to enjoy the sky above while still maintaining their privacy.
The first project I explored was a mixed use building located just south of Ball State’s campus. The objective was to provide housing that could serve the annual change of students living within this interactive building. As the project transformed, I began to focus more and more on the objective of creating change mainly on the facade of the building. This drove my thesis to focus more on the ideas of change affecting the boundaries of indoor and outdoor space, and how this change affected the buildings appearance. It became obvious to me that the best place for this change to occur was to create a balcony zone that fulfilled this idea of flexible change. The flexible box was then created. An alteration of this is seen in my final thesis project. The flexible box is the balcony space that hangs from the south facade structure. It consists of layers of shading devices that move behind floor to ceiling glass sliding walls, allowing residents to create areas with mixed amounts of privacy. A sun space was then placed into this balcony box that could serve as either indoor or outdoor living space dependent on the seasons and users wants.
The site chosen is located on the corner of Meridian Street and Jackson Plaza, just south of Monument Circle in Indianapolis, Indiana. The site was picked because of its urban atmosphere. I wanted a location that was surrounded by activity and movement. Just blocks in between the RCA Dome and Conseco Field House, this seemed like the perfect place for a building that is focused around these two ideas. The neighboring buildings are medium rise buildings, ranging from three stories to twelve.
Hey! Let’s go eat at the Spaghetti Factory!

Great! Right next to the cool new building where the screens and walls change!
In my thesis inquiries, I began to focus on how people adapt to their surrounding living spaces. Let me re-phrase that...how people’s living spaces can adapt to them. The project that was designed was therefore a mixed use “condominium” building. I use the word “condominium” cautiously, however, due to the majority of this housing type being “mono housing”, with residents having little choice in how their unit’s exterior can look. Not to mention the stereotype of condos being a place where people go after the age of 70. This is far from the case of what I am pursuing in my explorations. So from now on I will use the word living units, where activities and change is encouraged to occur along these exterior boundaries. Old people, of course, are still welcome to live here. The mixed use part comes in play so that a hub of activities begins to occur at street level, which then would run up and through the entire building envelope.
The main thing trying to get accomplished here is designing a building that can be adapted to the people that live and work within. Opportunities are given wherever possible for the residents to slide, fold, change, shift, open, close (you get the point) their living boundaries. As you will see soon enough, I did this with sliding screens, changeable wall systems, nana (bifolding) glazing systems, and balconies. Colors, Materials, and openings can be altered by the residents themselves, allowing personalization of their own units. This lets them adjust lighting, privacy, styles, ventilation, openness, and sound levels to suit how they would like it for the hour, day, month, or year. If you feel like being a hermit for a week, you can close off the outside with a little sliding and folding. Likewise, if you want to open your entire unit up to the outdoors, slide and shift screens and walls back open to make the division disappear. The choice lies with each individual that lives within the building's walls. When they decide to change their living envelope, the entire building envelope is altered as well. Local city goers can see this building change over by day, by season, and by year.

This section shows the south side facade. The two layers of glazing walls open the space from being an enclosed sun space into being completely open to the outside. Shading devices slide to the side of the spaces, letting users have even more choice and personalization.

I think you get it, let’s take a look at the design.
The building is zoned into different sections, each addressing a different level of alteration. The level of alteration is determined by how public or private a space is. By identifying zones by the activities and alteration levels that will occur, the facade can begin to speak about the functions occurring within. It becomes easily identifiable as to what happens where when passing by. This allows for pedestrians to feel welcomed by the building and comfortable interacting with the activities occurring in the public zones. The building doesn't mask or hide what lies behind its walls; it allows the functions to become an active part in the design. When looking at more public areas, facade layers are used that require little interaction by the residents and users themselves. An example of this is vegetation walls. When the spaces become more private, this is where most of the personalization can occur. These spaces are then allowed to become personalized for the users who have ownership.
These trees are grey to show that this space is a zone where all activities meet. Atrium spaces that flex between indoor and outdoor serve as activity hubs for retail and residents to blend. The space can then be used year round allowing interactions between public and private to remain.

**How does this affect the floor plans?**

let me show you.
The first floor plan consists of retail spaces and public gathering spaces. An outdoor corridor running east to west cuts the building into two zones. This brings the public into the building, allowing retail and activities to occur within. Two atriums split the building even further, allowing a gathering place for people to gather, shop, and enjoy their surroundings. The atrium spaces open up to the outdoors, allowing the activities to spill out onto the street. The entire floor is sunken three feet, bringing the residents above closer to street level, and also allowing people to flow down into the plazas below. Pedestrians walking by get a good look down at what’s happening just within.
The upper floors introduce the residential zone of the building. On the north side, retail turns into residential parking above. The parking is accessed by carvators that move up and down along the east and west facades. After parking, residents pass through the light well that divides the building's zones. These walkways lead into the atrium space, that can either be an outdoor space or an indoor space dependent on the weather. This space promotes activities within the building that then travel up through the space, allowing residents above to enjoy the node of activity that occurs. Balconies are located off of this space, extending resident's spaces into the atrium. The units themselves consist of a combination of single and loft apartments. The units are zoned to allow for bathrooms and kitchens to be located in the center of the plan, while the bedrooms, dining and family rooms are located on towards the exterior. This allows for these spaces to have opportunities to open and extend outside.
The third level is laid out in the same way as the second. Differences occur where a second level of a living unit is in place of the first level. Where this happens, outdoor open balconies are located above the flex balcony spaces on the south. Bedrooms are located here and allow these private spaces to have balconies.
The only change that occurs on this floor is the private balcony terrace that is offered for the occupants that reside on either side of the space. This allows for these residents to have a larger outdoor gathering space instead of looking out into the atrium space below. This is to allow a variation of layouts, giving buyers a choice in units.
On this level, only one unit remains, while the rooftops open up to communal spaces for residents to enjoy gardening, hosting a party, or the view of the city streets below. The community rooftop garden allows for residents to grow plants in a more quiet setting away from busy Meridian. The rooftop terrace located on the east gives all residents a chance to enjoy the city activities on the streets.
The elevation of the south facade is the most dynamic since all apartments open up to the outside along this axis. The balcony "flex boxes" have been located off of this side, providing sun spaces that can be opened or closed dependent on the user. This facade has a series of layers, allowing change to occur at any given time by the residents. Materials can be changed in and out, allowing users to personalize the levels of light, privacy, sound, style, and so on. Since the balcony lends itself to being a space that is highly adjustable, the idea of sliding and shifting of materials and openings occur at this location.
completely open

This section shows the south side facade and how with. The two layers of glazing walls open the space from being an enclosed sun space into being completely open to the outside. Shading devices slide to the side of the spaces, letting users have even more choice and personalization.

completely closed

In these elevation studies, you can begin to see how the building can take on different looks. The shift of materials and growth of vegetation can be seen as it affects the entire appearance.
The east elevation faces out towards busy Meridian Street below. Located just north of the site is an old mixed-use building that has the Spaghetti Factory located at ground level. The parking structure would be located right up to this building, with a 3' ventilation shaft separating the two. The parking garage can barely be seen through the car tower structure that runs up the side of the facade. The car lifts can be seen traveling up and down the building, carrying vehicles up to their destination floors. The stair towers are also located along this facade, however, a communal terrace runs across the front. These terraces allow for all floors to have access to viewing Meridian Street activity. A trellised steel structure runs up the side and across the top of the building, connecting up to the west facade trellace, essentially wrapping the parking garage with vegetation. Each terrace has planter boxes serving as the railing, allowing plant life to grow from every floor. On the sixth floor, a larger terrace allows for gatherings to take place that overlook the busy street life. The residential units are defined by a 12' x 12' structural grid. For long-term adjustment, these walls can be changed in and out, being set into the structure. This allows residents to change their exterior boundary whenever wanted. These panels would consist of a pre-made wall system that would alter in a variety of materials. This allows residents to be able to personalize their units, as well as changing their boundaries from opaque, to translucent, to transparent. Storage for walls would be located in the basement level of the building, and would be ordered and changed out by maintenance staff. These wall panels can be placed almost anywhere on this structural grid, allowing residents the ability to completely customize their surroundings. On the south, the panels would fit into the outer wall of the balcony, allowing residents to expand their living spaces within.
Here's a fun little graphic showing the basics of the carvator. Even though many people may doubt the practicality, it is very useful when a large amount of parking is needed, and no space to provide it. By eliminating the ramp, the parking structure size is greatly reduced.

Above are some examples of the variations that can occur along the east facade. The bright red carvator lifts move up and down the facade, while the vegetation grows from season to season. On the outside of the units, the walls can change in and out, creating a longer term change along the building.
Both sections show the interior space of the two atriums. The wall panels are carried inside this space to allow for these walls to be treated like all other exterior walls. Each unit has a private balcony entrance that allows them to enjoy the space below. Flex balconies also offer some units to open to the atrium space with a nana wall.
**[nana walls]**
allows balcony space to be converted to exterior or interior space

**[exchangeable wall panels]**
allow alteration of style material/transparency/openness; placed into structure to allow change to occur across entire building

**[sliding balcony panels]**
steel framed panels slide along tracks to alter privacy/lighting/enclosure; interchangeable louvered/fabric/vegetation screens

**[balcony box]**
flexible outdoor/indoor space; altered by changing wall panels and sliding panels
{}

["...this book features locations, where you feel good staying outdoors for a few hours or only a brief moment, whether it is at a barbeque on the terrace, a cigarette break on the balcony, or sunbathing on the roof terrace. In short: here, it is about the transition between building and the outdoors."]


[Riley talks of the strong presence of the middle-class private house and the history of how it evolved in the western world. He talks of the connection of privacy with the change in the public world, in family life, in work, and in domesticity. Twenty-six works are featured of projects that have tested the limits of privacy and blurred the boundaries of interior and exterior space.]


[This book discusses intelligent building skins and their responsive performance that can be in relation to the environmental performance of the building as a whole, its relation to the biological intelligence and response systems of the human body, and its relation to the science of artificial intelligence. It features case studies that discuss the building skins performance in different areas of study.]

[This book features projects that show "the relationship between public and private spaces that depend on architectural features that define one and surround the other". It shows projects that answer the question of how are separations and private spaces created when designing a minimal house.]


[This book first takes a look at the design issues that are associated with warm climates and responsive climate design. It then looks at a series of building design strategies that attempt to create a building that can respond to the contextual climate.]


[This book discusses five main topics: Behavioral constraints on building design, Spatial organization and Social Interaction, Environmental influences on health and well being, The social meaning of architecture, and The application of behavioral science to design. It shows the connection between how humans interact and their behaviors and how buildings can respond to these human behaviors that take place.]
I suppose the big question that should be asked is did my thesis work. Yes. To me, anyways, the answer is yes. While flexible living might not be every person’s oasis, for me I loved the idea of having a choice in my own environment. Maybe this thesis was driven by the fact that I am now in my 6th year of rental homes. This thesis isn’t about just being able to open a door or window, it’s about truly being able to tweak your environment so that it suits you for that very moment. What you like now could very well change tomorrow. Everything is in a constant cycle of growth and change. Somehow our buildings got left out of that equation. Instead of our building’s walls sheltering us from the outside, they should allow unique connections to be made to shift and mold our spaces to fit our lifestyles. The goal in the end is to create a place that every person could live in that adjusts to suit their own needs. So, looking back, I guess the real question would have to be…do YOU think my thesis worked?

aw, come on guys, can’t I at least get one thumbs up?