VIRTUALSPACE

creating a digital sense of place

572 DESIGN THESIS BOOKLET

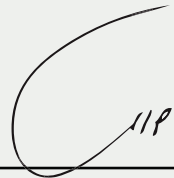May 2013 | North Dakota State University | Jake Williams

VIRTUAL SPACE | CREATING A DIGITAL SENSE OF PLACE

A Design Thesis Submitted to the
Department of Architecture and Landscape Architecture
of North Dakota State University

By

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In Partial Fulfillment of the Requirements
for the Degree of
Bachelor of Landscape Architecture

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Primary Thesis Advisor

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THESIS DOCUMENT

[SENSE OF PLACE]

'Spirit of Place and Sense of Place in Virtual Realities'

'The depth of the meaning that places have for us are informed by the qualities of their settings, which I will refer to as spirit of place and by our sense of place, or ability to appreciate those qualities. In everyday experience spirit and sense of place are inextricably intertwined, but its helpful to distinguish them so that their relevance for virtual places can be made clear."

-Edward Relph

THESIS ABSTRACT

The recent advancements in computer technology in the 21st century have changed the way many designers work in offices today. New computer software has allowed us to actualize works of landscape architecture that could have never been designed in the past using traditional drawing methods. Designers of the built environment have embraced new ideas and forms of virtual representations to present work which has evolved the landscape architecture profession in many ways. The drawing ability of designers is no longer a limit in expressing their imaginations due to new forms of digital art. As one of the most important aspects of design, the ability to successfully convey ideas to clients is now easier than ever. The concept of pure creation is now placed at the finger tips of skilled computer artists who can make any idea come to life. Although the computer is a great tool for designers to use, it should be seen as merely that; a tool. We are now able to imagine endless possibilities for our built world, but now there is a risk of over-saturating the industry with similar works and disrupting the design process. Photo-realistic computer renderings have changed the way designers communicate their ideas, but by presenting works in such a literal form it leaves no room for further growth or imagination. A question that must be answered is: how do we perceive and experience architectural spaces? In order to help our audience truly experience a sense of place for the projects we design there must be a shift to more interactive and dynamic virtual representations. By utilizing new forms of media and technology we can create a virtual sense of place to better communicate and present our designed urban environments. Examining current methods of graphic representation will help us begin to understand how effective our presentations are and where improvements can be made. Existing case studies will be discussed and evaluated on different levels of quality of representation to further refine the ideal form of visualization. Introducing new methods of augmented reality and interactivity will intellectually engage recipients, allowing for a more effective experience of the concepts being presented. The profession of landscape architecture has the opportunity to progress in many ways by questioning current drawing methods and adapting new ones. Furthermore, the exploration of new forms of representation and interaction can then be embraced and applied to create more interactive physical environments within our cities.

PROBLEM
STATEMENT

Current methods of visual representation of built environment design lack user interactivity and engagment.

Previously in the field of landscape architecture it has been either too time consuming or too difficult to create convincing visual representations of large scale urban designs. While new forms of hybrid drawing methods have been created to show landscape design traits, they're integration with the overall big picture is often disconnected. This research attempts to bridge the gap between previous methods of representation in the field, and new forms of media to more effectively present our work.

Technology advancements have allowed for various types of new software to be adapted for use in other fields; by embracing this idea it would allow a wider range of recipients the ability to experience new proposals. The result will be beneficial to the field of landscape architecture by using new media methods to promote and raise public awareness for large scale urban projects. Informative visuals could also be helpful to publicly display projects which deal with environmental issues. Future research could identify more ways to use and promote landscape design through new media, and as technology continues to advance more efficient methods of representation could be found.

RESEARCH
QUESTIONS

How can designers of the built environment use new software and immersive technology together to create a dynamic virtual sense of place?

> CREATING A VIRTUAL SENSE OF PLACE FOR THE BUILT ENVIRONMENT

Additionally, how can landscape architects effectively use design traits to engage and interact with an audience?

> ENGAGING THE AUDIENCE IN A TRANSACTIVE EXPERIENCE

DESIGN
HYPOTHESIS

By embracing new hybrid forms of representation designers of the built environment will have the ability to create more widely used and visually engaging visualizations.

Through the use of new media technology, design concepts and traits can be shown through a transactive method allowing for greater audience comprehension, resulting in more successful design proposals. Finding new creative solutions for design visualization will allow for additional ways of interaction between designers and clients.

PROJECT INTRODUCTION

Our perception of the world is through a hybridized form of 3d, but with time as an additional 4th dimension. When presenting works of landscape architecture on paper, the representations are often in 2d, but on paper it is also possible to create the illusion of 3d. This is due to the methods of perspective drawing. With the introduction of the computer and 3d programs, creating correct perspective images has become much easier. When working in artificial computer space, it is easy to create something in scale. But it is not always obvious for the audience how to comprehend the correct scale of the model in a virtual environment when using it as a medium to present ideas. In order to create a sense of scale for a space one must apply entourage and contextual imagery, which will depict the size of the virtual space. (Anderson, 238) The context can be objects that we commonly know the size of, like people, trees, and cars.

It is often that we see objects as a representation, before we see the actual product itself. Some might experience a city on Google Streetview before actually going there. Before people go on vacations, most people often look in the hotel brochure to see the place, the rooms, and the pool and furthermore to get a feeling of the atmosphere. One might say that a photograph is not a representation, because it depicts the actual thing that exists in the real world. On the contrary to a computer model, which exists inside the computer and is a copy of something real or something which one imagines to be real. But one could argue that the picture is a representation in many cases. Because most pictures are distorted by the lenses, by photo-shopping, and different kinds of filters to make it look like the graphic designer or the advertising agent wants it to look like. In that sense it is a representation of whatever the designer wants us to believe it is. Because so many things that we see are representations, they are quite important to how we perceive the world.

From the previous, we can understand the importance of representations. It is what we as designers of the built environment must use to market and sell our products. A project cannot be built until it is agreed upon and sold. To do this a guided vision must be set in place to convince our audience. Designers need to sell their project to the recipients by making them understand representations (the physical object) and presentations (the conceptual, the idea). For this thesis we will primarily look at digital tools to do so, and how we can discover new ways to convey ideas. By examining the different types of traditional drawing methods, narrative storytelling, interactivity, and integration of 3d modeling into our environment, we can answer the following questions; How can the tools we currently use in the design field be improved and what new tools and technology from other fields can be adapted to present our projects to the public, and how can designers create a better way to interact with their clients through graphic presentations. By achieving these goals we will have the ability to more clearly convey our conceptual ideas to a wider audience which in turn will create more interest in imagined works. The communication between a designer and a client is crucial to how well a project will be received. This relationship can be strengthened by creating new ways for clients to be involved in the design process and in turn will have a greater appreciation for the finished result.

THESIS
PROPOSAL

NARRATIVE

The exploration of new graphic representations for designers will benefit the overall design profession as well as our society. With the current shift to more personal interactive media, everyday users will benifit from the opportunity to engage and interact with new design proposals.

USER/ CLIENT DESCRIPTION

To strengthen the relationship between a designer and their client, new forms of presenting ideas will be developed. New interactive media will allow designers to more clearly show their ideas, and also offer their clientele an easier graphic presentation to comprehend.

MAJOR PROJECT ELEMENTS

To develop the most efficient method of presenting complex ideas,
various key elements will need to be explored..

Software Types

Graphic Style / Approach

Visual Information

Audience Comprehension

Video Quality / Speed

User Interfaces

SITE INFORMATION

The site chosen in Fargo, ND for future design will provide a sufficient space for a new urban proposal. The downtown Fargo area is currently going through an urban renewal process and promoting the building of mixed use developments. The design of a new public space on the site will allow for the opportunity to create a new virtual representation in which to showcase the future design. Through the use new types of media the promotion of the project will be able to inform the public of what is to come for downtown Fargo.

PROJECT EMPHASIS

With the main focus solely on developing a final graphical presentation, a visual comparison will be able to be seen through the exploration of multiple site design options. The use of a final precedent study will allow for a thourough development of a new type of visual presentation.

LITERATURE REVIEW

To begin to understand how we perceive the built environment and representations of it as a form we must understand the functions of traditional architectural drawing methods and their role in the design process. Unlike other forms of art, landscape architects create their works solely through drawings and representations of a to-be-built object. The interaction between the architect and the medium of architecture is developed through a series of different types of representations and tools to imagine a built project. Recently the most common tool used by architects has been computer aided design (CAD) systems. 'Working on drawings, I want to argue, can be as much an architectural activity as their translation into built artifacts." (Bafna, 2008, How Architectural Drawings Work – and What That Implies For the Role of Representation in Architecture) The article discusses what defines the different types of drawing methods used today in two categories. 'The most direct use of architectural drawings is to specify their subject matter," (Bafna, 2008) states. These types of drawings can be regarded as notational. For example, construction documents main purpose is to show specific elements and details of significance through the use of annotations, symbols, and diagrams. Plan, section, and elevation drawing methods merely specify a building without visually describing it. These are the most commonly used drawings throughout the entire design process; they are defined as notational. Their use acts as a significant role in the process of designing and approving a work, and are often used to present ideas to clients as well. They are great tools for developing ideas and diagrammatically showing details of architecture, although they should not be intended to represent architecture in its entirety. Being as these types of drawings are orthographic in form they are often misleading or difficult to understand without a previous understanding of the space being presented. Their literal representation of space is very static and un-engaging to one's mind. Complex forms seen in today's modern architecture cannot be represented clearly through these types of drawings without additional forms of representations. These types

of drawings also lack in a quality of aesthetic, which makes them less intriguing for a general public audience.

The second category defined by (Bafna, 2008) is the method of imaginative drawing. This will be the main subject of research for this thesis. Looking forward we must identify and understand how this type of drawing mode is perceived and read by its observers. An early case study of the work of Lebbeus Woods can be used as a starting point for discussion. In an article by A. Kanekar (2010), the often controversial drawings of architect Lebbeus Woods are examined and further defined as works of imaginative art. (Kanekar, 2010, Between Drawing and Building) To begin Kanekar states that in recent years, a shift in the profession has led us to more commonly use imaginative drawing methods for the representation of the built environment. In the field today 3d computer renderings are created to market and sell clients a vision of their proposed project; but are the drawings themselves becoming more sought after? 'Being less concerned with their [drawings] relation to what they represent than with their own constitution." (Kranekar, 2010) The point stated is that although these types of drawings can be used to represent architecture, they can also be considered architectural artifacts in their own right. The work of Woods is often described as 'paper architecture' for most of it was experimental and never intended to be constructed, rather to raise discussions. Through examining how Woods uses the abstraction of the traditional drawing methods to convey an intended narrative and a sense of place in his works, we can begin to understand how imaginative drawings are read. By using the technique of perspective drawing, the illusion of 3d space is created on a 2d piece of paper which allows for a much greater ability for one to imagine the space being represented. The expressive language used by Woods does not depict the architecture in its entirety as a literal representation, but instead it is visualized in a more ambiguous manner in which to leave open for further interpretation. The works are meant to be questioned and critiqued, in turn mak-

ing them more engaging and interactive to an audience. Observers become more interested in the work when questions arise and one's mind begins to fill the imagined space with their own subconscious thoughts.
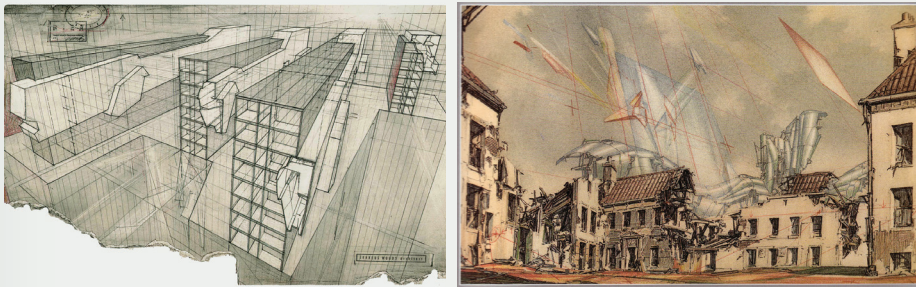

Drawings by Lebbeus Woods

    It is through the use of more untraditional drawing methods that we can create a better interaction between a designer's vision and a client's expected result of the project. With new advancements in computers and 3d modeling techniques we have been able to begin to imagine endless virtual worlds, but in what ways do we interact with them? Due to the increasing processing power and development of new software programs it is now relatively easy to achieve the effect of photo-realistic renderings without much effort. Although there is a common misconception that the computer does all of the work, which can be true in some cases, but it should be understood that in order to create high quality renderings a large amount of time and artistic ability is needed. 'The question 'What is art?" must not be confused with the question 'What is good art?" for most works of art are bad. Nor does being a work of art depend upon the maker's or anyone else's intentions but rather upon how the object in question functions." (Goodman, p. 643, 1985, How Buildings Mean)

    The increasing speed of the production of these images has caused the rate of consumption to also be increased. Through exposure on the internet and social media sites, photo-realistic render-

ings have grown tremendously in popularity and now have become commonly expected by clients. In order to stay competitive and up to date on technology many architecture firms have created internal 3d visualization studios, or either outsource their work to freelance 3d artists or professional rendering firms to present their work through photo-realistic imagery. (Morton, 2006) In 2010, freelance artist Alex Roman created a film entitled The Third & The Seventh which won an award for the Best Architectural Film of the year. (cgarchitect.com, 2010) His work has created a buzz throughout the architectural visualization field and the film was considered as arguably the most photo-realistic computer generated film ever made. Although the film was a tremendous work of art in itself, many people have failed to realize its marking the end of what has quickly become a trend within the architectural visualization field. Computers have allowed us to reach the goal of creating visual renderings so realistic one cannot depict the difference between a photograph and a computer generated image. This trend has begun to over-saturate the industry with many mediocre designs passed off by large amounts of stunning visual imagery.
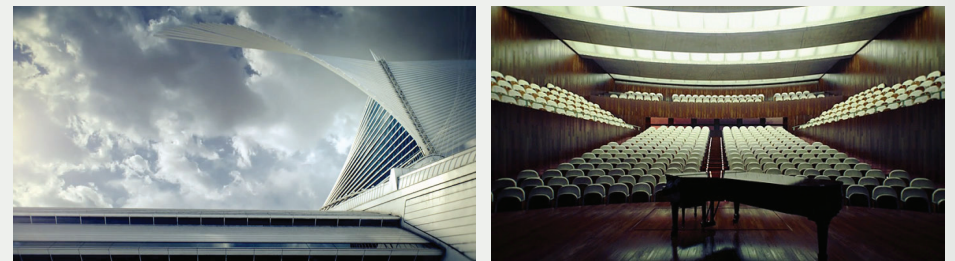
Still Images from 'The Third & The Seventh

Now that we are at the end of the photo-realistic peak, a problem has resulted within the industry. A recent interview with two leading visualization firms was published in the architectural journal CLOG. The discussion started by introducing the companies Luxigon and MIR and covered a brief history of their work in the industry and their thoughts on how it will grow in the future. Eric de Broche de Combes of Luxigon posed an interesting point by stating, 'There are too many photo-realistic renderings. It would be better with one or two images every time." (May, Hout, Reidel, Wu, Franklin, Coates, 2012, p. 127, 'Rendering" CLOG) Combes goes on to describe that his company focuses not solely on creating photo-realistic images but rather on conveying the spirit of the project. Stated previously, the job of a designer is to create a vision for a client to follow and imagine, but with such literal representation seen in renderings today little is left to one's imagination which makes these visuals less engaging. Roman's film was lacking in key aspects like interactivity and narrative. While it was visually intriguing, it fails to create a sense of place for its observers to experience. The film is comprised of static slow panning shots which limit ones virtual exploration, and the narrative of human interaction with the spaces being represented is completely absent. Each scene shown is empty and unoccupied which makes it difficult to grasp a level of reality in the space. Animation is a great tool to represent the built environment, but it must be further explored and expanded to better engage an audience. Hybridization is one method to be explored; different forms of animation and interactive programs can be integrated to create a new kinds of hybrid representations. 'The hybrid or the meeting of two media is a moment of truth and revelation from which new form is born [...] a moment of freedom and release from the ordinary trance and numbness imposed by them on our senses." (May, Hout, Reidel, Wu, Franklin, Coates, 2012, p. 74, 'Rendering" CLOG) This chapter discusses the idea of balancing and intertwining the strengths of different forms of representation to achieve a greater result. If the level of realism is too great in a representation it limits one's imagination and suppresses curiosity, but if there is not enough information one cannot understand the space

being depicted. Photo-realistic images have begun to be a dime a dozen, but by finding new ways to dynamically interact with these visuals more compelling representations will be created.

To begin to understand the ability to recreate a sense of place within a virtual representation, different methods of cinematography and interactivity will be examined. A 'sense of space' can be created by various perspective drawing methods previously identified and a level of detail is needed to achieve the result. While a sense of place does not solely rely on details, but instead the goal is creating a feeling of being within a physical space being represented. To immerse oneself into a virtual space the first subconscious thought is to have the desire and the ability to move freely about that space. Having the ability to take control of a virtual camera and use it to operate commands such as zooming and panning in real time within a scene creates emotional attachment in the users. (Porter, 2010, Experiencing contemporary 'nature': virtual and physical designed landscapes of the Blue Mountains, Australia) Porter discusses the use of an interactive web cam to allow people to experience the Blue Mountains themselves from a first person perspective from anywhere in the world via the internet. 'the appearance of consumer 'control' is given; however, the limits of this control are determined in advance." (Porter, p. 220, 2010) Although the users believe they are in full control, they are actually following predetermined paths that allow them to interact with a virtual environment to a certain extent by rotating and panning views, which still creates a feeling of personal exploration. This method has been known as 'indeterminacy within limits' (Porter, 2010) states. In the article Patterning Reconfigurable Narrative: interactive cincema as architectural elevation within 3d interactive digital environments by (J. Sussner, 2006) the idea of a 3d virtual narrative is discussed and how audiences interact with such an experience. Sussner uses the theory of Kevin Lynch's categorization of nodes, pathways, districts, edges, and landmarks to help define our understanding of a 3d interface. 'The situation of the body in space is a composition in flux, shifting and transforming the narrative experience, creating a participative performance of narrativity, just as the person of a human inhabitant

moving though their built environment." (Sussner, p. 245) The point to be understood is that to have a truly engaging virtual environment it must feel like one is discovering it for themselves. Almost as if it is creating itself before the observer. 'The concept of cinematic space joined with architectural thinking and the spatial organization of the narrative itself, both provides the blueprint for frameworks to reconfigure the fictive space coherently, and establishes an interactive environment in which to experience the stories." (Sussner, p. 250) To create a virtual sense of place for an audience new forms of representation will explore how one moves through a digital model. By filling this virtual place with a narrative that is interactive the observers will be actively engaged and more interested in the concepts being identified.

The ability to move through a virtual built environment helps one to experience it on a personal level, although an additional aspect of creating a sense of place is having the ability to change the environment in different ways as one sees fit. A great benefit of having 3d virtual environments is the fact that they are not real, and any detail can be changed in a matter of seconds. This is an idea which is rarely used in landscape design representations. Engaging an audience by using tools and modifiers that are directly responsive is a way of establishing a trans-active experience. Within a virtual recreation of an urban environment the changing of materials, objects, and lighting allows for a greater sense of place by allowing users to create their own narratives. An article by N. Brown, T. Barker, and D. Favero titled Performing Digital Aesthetics: The Framework for a Theory of Formation of Interactive Narratives, discusses the framework and process of the becoming of interactive narrative. Through their research they identified three types of interactive modalities, polychronic, the transcriptive, and the co-evolutionary. By having multiple events in a sequence for users to experience, allowing the freedom of rearranging the order in which one encounters these experiences is known as polychronic. Ones ability to experience a virtual environment cannot be hindered by a rigid order of events, but instead free of limitations to where the feeling of exploration is created. The transcriptive mode is described

as an experience where the user can manipulate the information of the work's database, essentially creating their own personal narrative by the ability to adapt different settings to their liking. In a profession where multiple concepts and ideas are often developed, integrating the opportunity for an audience to select different material options, plant and furniture types, and lighting methods will create an experience that will benefit both the clients and the designers themselves. Lastly the article identifies the co-evolutionary narrative, which is seen to evolve and adapt to a user with methods of augmented reality and artificial intelligence. By posing questions or options for one to assess, the narrative is then created by interpreting the users response and further adapting the experience to their preference. This creates a personal sense of place in a virtual environment by allowing them the choice of the type of experience they would like to have. The designers of the urban environment are often creating public spaces for multiple uses, which are shown through multiple renderings. While one person may want to experience solitude while visiting a park or an urban plaza, another may be looking for recreation or perhaps a place to be social and experience the night life. By creating visuals for co-evolutionary interaction, designers can showcase the urban environment's nature to allow multiple uses and adapt through time. The option to allow one to choose how they would like to experience a design will create a better sense of place and also further engage users by their ability to immerse themselves on a more personal level.

Although the idea of virtually exploring a new landscape may intrigue and please many, we must expand the idea of visualizations to also serve as more functional forms of representation as well. To truly take advantage of the new media technology and the computer software used to create these visual experiences, there are many additional opportunities to consider for their use. The final pages of CLOG expand on the idea of augmented reality and the option of multiple uses for the visuals we create. Renderings offer a great aesthetic value and vision for proposed projects, but once construction has started they are otherwise useless. "When a project has been approved and the design is finalized, it comes time for the mortar to hit the brick, and the renderings are obsolete." (May, Hout, Reidel, Wu, Franklin, Coates, 2012, p. 140, "Rendering" CLOG) By overlaying methods of augmented reality and informative graphics on the same visuals that are used in the design process, they can also be used to help construct it, as well as help guide visitors through the site once completed. Having the ability to measure an object in question or inquire how a structure is detailed should simply be a click away.

CLOG - Hybrid Visualization Concept

METHODOLOGY

To begin structuring the research design three key factors were required, data as visual imagery, a strategy to collect and organize data, and lastly a method to assess and compare the quality of the representations found. The data set necessary to provide a qualitative comparison is made up of examples of successful visual representations that achieved a sense of place within a virtual urban environment. These examples are divided into two categories. The first, visuals that were created in the design field and based upon spacial design, while the second category is examples of imagery from different fields that succeeded in creating interactive virtual urban environments. The collection the examples was carried out by methods of archival records, and once collected the two types of data were then analyzed through methods of descriptive analysis. Additionally, one case of observation will be used to understand how new media technology can help us interact with virtual environments.

The design of research began with the broad context of the built environment and how to most effectively interact with virtual representations of it. The ability to experience a sense of place within a virtual environment is dependent on many aspects which was further explored. The research scope of assessing visuals for the built environment was focused into three fields, urban design, architectural design, and landscape architectural design. Within our modern cities these fields are closely integrated to create what is known as the built environment, although the visual representations of each field rarely coincide. By examining the different methods of representation used by professionals today a comparison was made between how each field differs in creating a virtual sense of place. Through many searches of the internet numerous examples were found that were evaluated to find key concepts in which made them successful. Identifying the various types of computer software used in the different professions enabled connections to be made between more successful representations. Once the similar concepts and ideas of place were established in the three fields, to further

narrow the research region the field of landscape architecture then became the main focus. To understand the function and use of technology within landscape architecture an in depth assessment of current methods and trends of representations was needed. By identifying the specific characteristics of landscape architectural visuals a connection could be made between their levels of effectiveness. The process of producing representations was studied to compare various types of software.

The previous framework allowed to determine that within the field of landscape architecture there are few examples of representations that succeed in creating a sense of place in a virtual environment. While most examples were aesthetically pleasing, the representation of space was more commonly shown. Understanding the difference of the terms 'space' and 'place' was a crucial step in evaluating the effectiveness and quality of different forms of representations. The understanding of these interchangeable terms allowed for the differentiation between successful and unsuccessful examples.
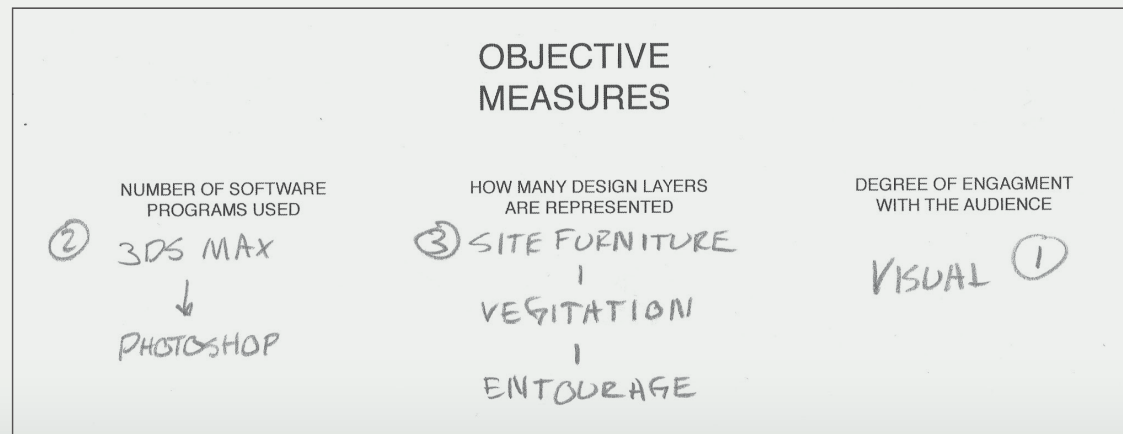
The next step of research was to shift the focus to the most successful examples, which were then used to establish a set of objective measures to evaluate exactly how each achieved the creation of a sense of place within a virtual environment. The data was then divided into two different categories to begin a comparison between multiple successful representations. The two categories were sectioned between which field the examples in question were created for. Category A was composed of visuals made in the design field that were based on space, while category B included representations from other fields that used interactive virtual environments. These two categories represent different types of virtual environments seen today. The examples of 3D renderings and animations are based on spacial design and were created by designers of the built environment, while the interactive virtual environments found were created in other fields such as video game design or web design. Once the data was divided respectively, the use of objective

measures was needed to assess and compare the two categories to further refine which characteristics were successful.

The two categories of examples were then evaluated by creating a set of objective measures, this allowed for the identification of specific elements and their role in the overall success of the visuals. The comparison of the categories began by creating three types of measures that were relevant to each example. Starting broadly the first measure assessed was noting the different types of software used, as well as the number of computer programs used together to create each example. By understanding the types of software used and the order in which they were composed this offers the ability to grasp an idea of how much time it took to create. The comparison can then also be made between the technical skill and technology required for its production. The second objective measure identified how many design traits were represented in each example. The specificity of multiple design layers can offer a critical assessment of how each additional layer contributes to each representation as a whole. The third measure evaluated the degree of engagement with the audience for each example. The level of immersive engagement in each example found was a key factor for assessing its ability to represent a virtual sense of place.

With the objective measures finalized, they were then used to thoroughly examine the two categories of examples. Once the measures were recorded for each example, the results were then described to be further analyzed. Extensive descriptions of the resulted criteria were created to form a record of each example which could then be used for its comparison and analysis. By interpreting the data for each objective measure, connections were made to identify the strengths and weaknesses of each category which allowed the analyzation of each example. Lastly to complete the research, the advantages and disadvantages of the categories could be linked to which combination of measures created the most successful sense of place.

The observational study of personal interaction with new media technology will allow for the knowledge of how we can create new ways to engage with visual representations. By identifying which types of user interfaces are most intuitive, this can help guide how to most efficiently create virtual environments. To most successfully create a virtual sense of place we must first understand how one perceives the physical relationship between themselves and on screen digital information. This gathered knowledge will result in a better understanding of how users can become unconsciously engaged in the visuals they are viewing.

OBJECTIVE
MEASURES

NUMBER OF SOFTWARE
PROGRAMS USED

② 3DS MAX
↓
PHOTOSHOP

HOW MANY DESIGN LAYERS
ARE REPRESENTED

③ SITE FURNITURE
|
VEGITATION
|
ENTOURAGE

DEGREE OF ENGAGMENT
WITH THE AUDIENCE

VISUAL ①

CASE STUDIES

Case Study: 'The Mill' by Chris Kowal

The Mill project offered an in depth look at how high quality renderings and interactivity can be integrated together to achieve an engaging virtual experience. By first concentrating on the spacial design and detailing of the building, the computer modeling work was done in 3ds Max Studio with a relatively simple but extensive virtual set-up. The detailed material textures that have been applied to the spaces offer a high level of realism and visual interest. Since the light quality of the space was most important, the process of adding different types of lighting was the most intensive step. Each light fixture was detailed to the company's wattage specifications to achieve the most accurate representation of spacial illuminance. The combination of high quality texturing and detailed lighting creates a professional looking visual that can easily be understood. To output the virtual model into imagery all of the scenes were rendered multiple times, each pass having different light settings applied. The final step of compositing each light pass into an interactive website interface succeeded in bringing the space to life. By selecting various light types on the right side of the interface, users can witness the image change in real time, allowing for a greater sense of space and user engagement.
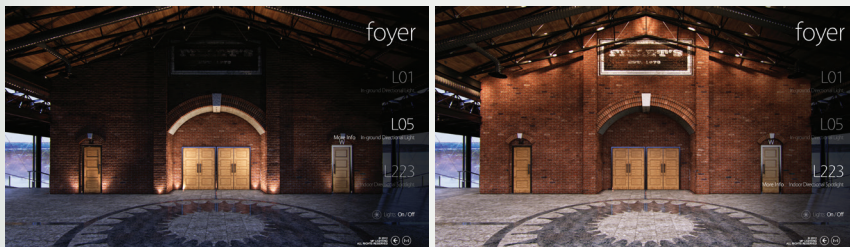
Case Study: Urban Advantage

In each project Urban Advantage works on their main goal is to create visuals that can communicate the conceptual idea of how a space can be improved by adding various landscape traits. This communication is achieved by a method of additive graphical layers, with each layer building on the previous idea. Each visualization is started with a photograph of an existing space to establish a base point. When 3d and 2d design elements are virtually composed onto the base layer the space begins to change. The web interface allows for users to click forward and back to witness the elements appear and disappear. With each layer added a notification appears in the lower left corner to describe the objects added and their function. The simple interface and additive method allows for an easy understanding of the design traits selected and how they are used to create a more successful space.

Existing conditions.

Wide sidewalks, pedestrian lighting, bus rapid transit.

Street trees on far sidewalk.

foyer

foyer

Case Study: Second Life

The virtual world of Second Life is an interactive and engaging representation of space. The user interface is designed to allow seamless spacial navigation through a virtual environment. The ability to move around this world creates the feeling of personal exploration, while various interactive elements enhance the level of user engagement.

Case Study: Kuala Lumpur Day-Night

The time-lapse video of Kuala Lumpur shows how the character of a city can dramatically change from day to night, and also how the physical atmosphere can create certain moods in the built environment. By photographing the city over a various range of days and times it appears evident how urban details reflect different types of weather and lighting. The photography done by Whitworth exemplifies the activity and energy within urban environments by sequencing still imagery together. The composition of each shot reveals how space within the built environment is interconnected and that the surrounding context can add to the creation of a sense of place.
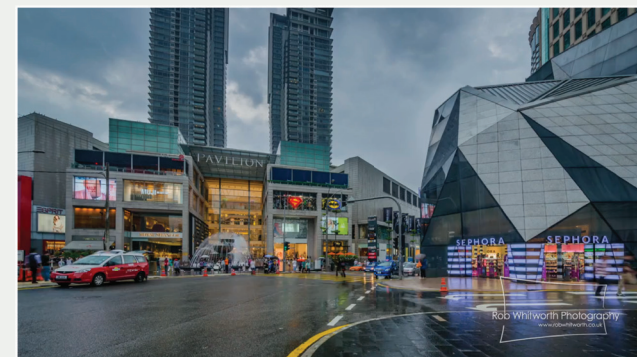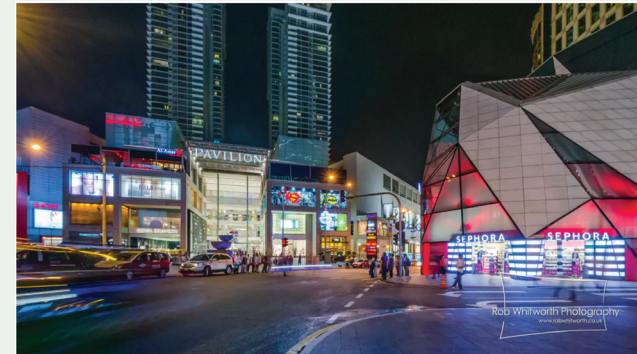
RESULTS & DISCUSSION

Case Study: 'The Mill' by Chris Kowal

The Mill project showcased a simple idea of how architectural renderings can be used in different fields to create interactive experiences. By allowing multiple lighting options to choose from the users become intrigued and curious about the space they are viewing. This spark of interest is created by the visual connection between what one sees as a direct result of their action. It allows the user to ask the question 'what if?" and then by seeing the resulting change in the space they have their answer. While the Mill was only a small scale project, this concept of directly responsive virtual environments has great potential for future visualizations.

Case Study: Urban Advantage

The Urban Advantage visuals offer a great connection to be made between landscape design and user engagement. The use of multiple layers for each design trait breaks down the process into a step by step visual representation that can be easily understood by greater audiences. While static renderings rarely show any thought process but rather only the final product, this step by step use of interactive visuals to show a designer's intentions can be embraced to more clearly engage and convince viewers. The thought process of designers often becomes second nature and it can be difficult to explain clearly to others. In order to truly convince an audience on a certain project, they must also be actively engaged in the thought process to ensure that they have a full understanding of the design being presented. It is the connection between the thought process and the final design that will ultimately convince a person to buy into a design. If it is unclear to one how a designer arrived at an idea, they feel left out of the process and can only view the renderings subjectively. By also engaging the audience in the thought process they can begin to understand how each additional design trait will change the existing space. It is through this connection to the thought process that will ensure landscape design visuals can be presented to wider ranges of recipients.

Case Study: Second Life

The Second Life experience is something that most people have seen before, perhaps not the specific program itself, but the idea of spacial navigation in a virtual environment. It is this main aspect of Second Life that has the greatest potential to be applied to landscape design. Through our exposure to computer graphics and video games in recent years a general knowledge of virtual spacial navigation has been created in our society. By allowing users to experience a proposed project for themselves the feeling of personal exploration will actively engage one to connect with the space being presented, resulting in their imagining of a sense of place.

Case Study: Kuala Lumpur Day-Night

The visually stunning time-lapse video of Kuala Lumpur effectively captures the aesthetic vibrance of an active urban environment. By viewing the constantly shifting perspectives and lighting, this allows for one to understand how much of the built environment changes from moment to moment. Most of the visual beauty of urban cities goes unnoticed by common residents due to the fact that they view the same spaces everyday. Photographers can often capture and exemplify the characteristics of a space that have gone unnoticed by the common passer-by. These certain aesthetic qualities of a space is what makes them intriguing by their always changing mood. Atmospheric details such as cloud cover, sun angle, and weather, can change the mood of the urban environment by creating reflections, shadows, and various levels of light quality. It is these elements that actively bring a space to life, without them our environment would be extremely dull. Renderings are too often lacking this quality of real world atmosphere, which makes them visually disengaging. By creating various moods for a virtual environment through the use of light quality, time of day, and season, this will bring an additional level of realism resulting in a more convincing sense of place.

CONCLUSION

Previously in the field of landscape architecture it has been either too time consuming or too difficult to create convincing visual representations of large scale urban designs. While new forms of hybrid drawing methods have been created to show landscape design traits, they're integration with the overall big picture is often disconnected. This research attempts to bridge the gap between previous methods of representation in the field, and new forms of media to more effectively present our work. Technology advancements have allowed for various types of new software to be adapted for use in other fields; by embracing this idea it would allow a wider range of recipients the ability to experience new proposals. The result will be beneficial to the field of landscape architecture by using new media methods to promote and raise public awareness for large scale urban projects. Informative visuals could also be helpful to publicly display projects which deal with environmental issues. Future research could identify more ways to use and promote landscape design through new media, and as technology continues to advance more efficient methods of representation could be found.

Through the research completed a thorough analysis of current representation methods was shown and the exploration of various forms of media formulated new ideas for landscape architecture visualization techniques. Multiple case studies were sufficient in providing a base for a comparison of visual quality in current graphic representations. A simple study of user interaction with digital media was done by personal observation although through the use of multiple virtual interfaces and surveys a greater knowledge of user interaction methods would be acquired.

PROJECT DEVELOPMENT

[SENSE OF VIRTUAL PLACE]

'A sense of virtual place will develop through such participation and engagement and it should not be unlike a sense of real place. It will involve many senses and emotions because it is medicated electronically, it will vary between individuals and it will also have a community expression"
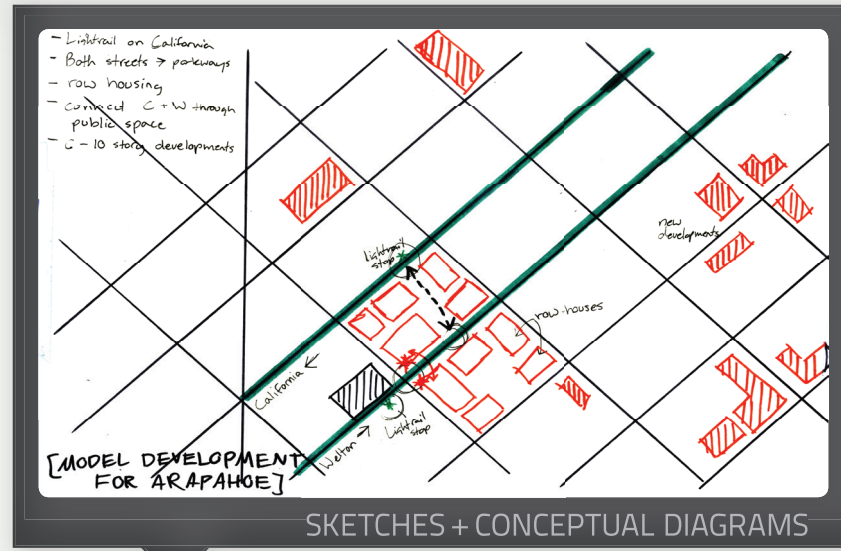
-Edward Relph

PUBLIC
PROCESS
OF DESIGN

PROJECT START-UP MEETING

First meeting between the design firm, contract administration, and project management. Begin site research, inventory + analysis, and needs assessment report.

SKETCHES + CONCEPTUAL DIAGRAMS

PROGRAM DEVELOPMENT

Identify project direction and goals while discussing further ideas for uses, products, and services. This stage is often driven by a current site utilization study.

DESIGN PHASE I
INITIAL CONCEPT

The design phase often begins with hand sketches and conceptual diagrams, which become second nature to designers. Rough ideas are drawn and shown through various hand graphics to emulate the style of the design concept.

PUBLIC OUTREACH MEETINGS

The first meeting discussing a future design is held to raise awareness and to recieve feedback about the initial concept and program elements.

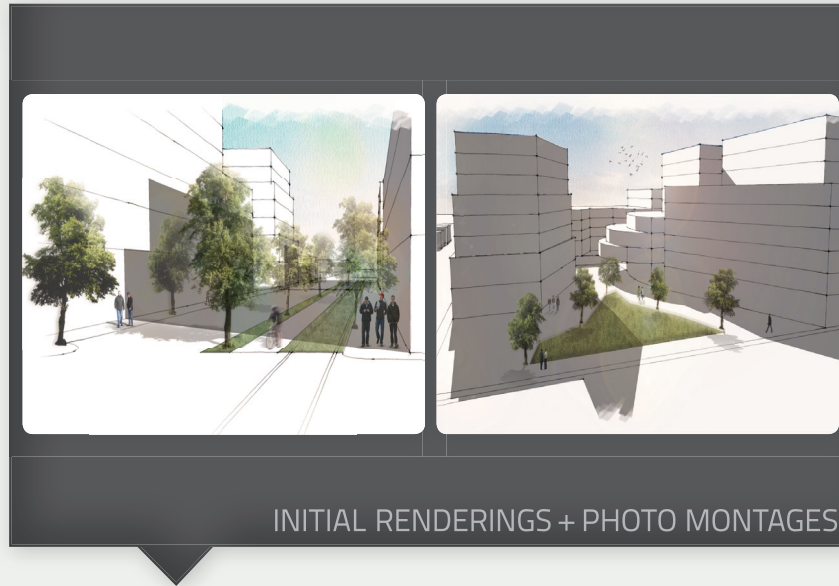## DESIGN PHASE II
SCHEMATIC DESIGN

The schematic stage of the design process is shown through massing models and plan views. The early 3D models are intended to be rough cut, similar to building blocks, which will help the designers envision the exterior profiles.

BUSINESS + FINANCIAL ANALYSIS

Construct market analysis and strategy for the project outcome. Draft operation and management structures. Develop a marketing strategy for advertising the project, i.e. website. Lastly, funding scenarios and prospective financials should be decided upon.
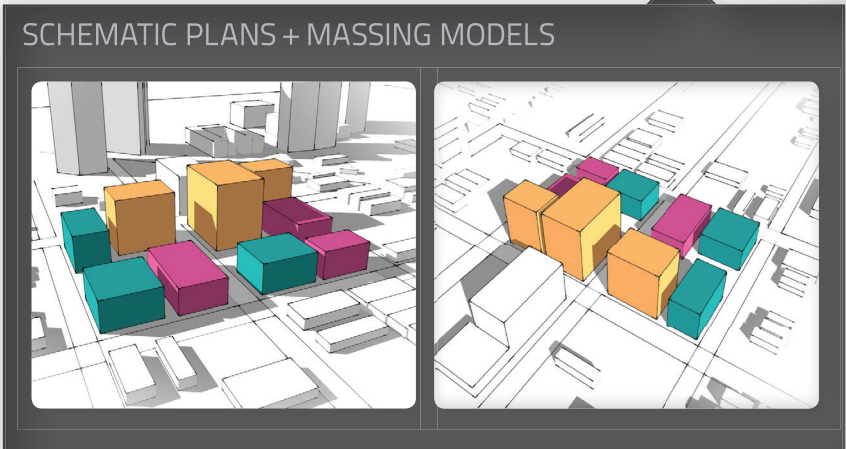
SCHEMATIC PLANS + MASSING MODELS

INITIAL RENDERINGS + PHOTO MONTAGES

PUBLIC OPEN HOUSE

The second public event is held to bring more awareness and give people the opportunity to participate in the design process.

DESIGN PHASE III
DESIGN DETAILS

As the design continues to develop 3D models are used to show the progression. To show certain design details and traits hybrid styles of photo-montages are used to present the project.

TOWN BOARD PRESENTATION

Once a design is near completion a final presentation will be held to discuss any last changes. At this stage the graphics are more detailed and visually appealing.

FINAL DESIGN

When the design is finalized, the 3D model will be updated and photo-realistic renderings will be produced to showcase and promote the project.

FINAL RENDERINGS
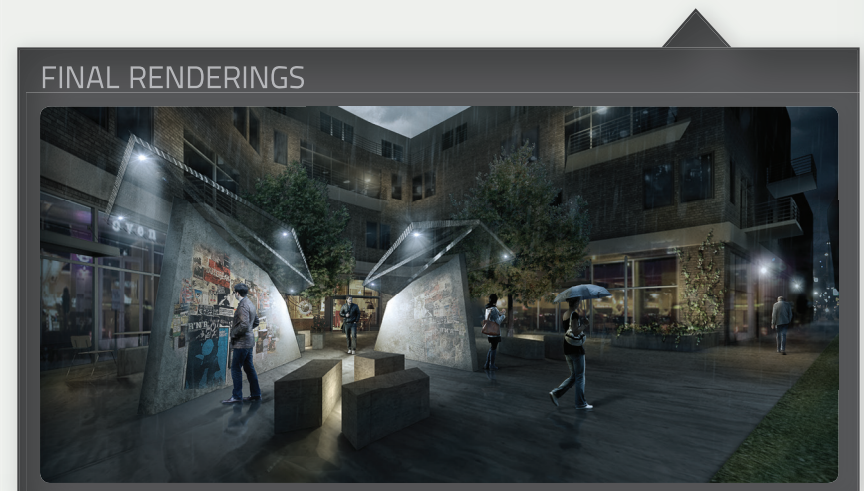
CURRENT
TECHNIQUES ✎
OF VISUALIZATION

TRADITIONAL GRAPHICS
SCHEMATIC DESIGN

For every design project traditional graphics are used throughout the process to help designers colaborate and document their work. These graphics are most commonly plan and section drawings, which are notational graphics used to detail and envision 3D space in a 2D form.
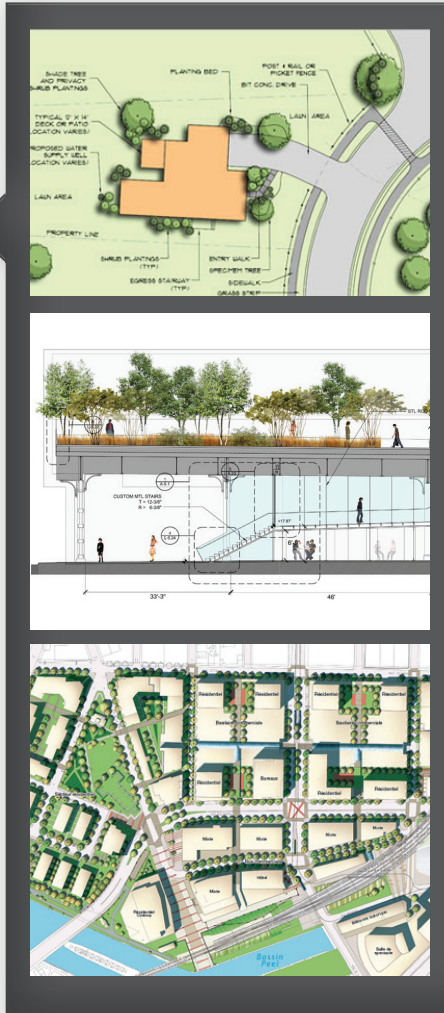
HYBRID STYLES
CONCEPTUAL + FINAL DESIGN

Commonly used for large scale Landscape Architecture projects, hybrid styles of perspective drawing show design traits and convey an overall feeling for the space being shown. These styles are often mixed media visuals or photo-montages to show a sense of space. This type of visualization does not rely on a high level of detial to achieve realism, but instead on an atmosphere to show the life of a design.

1. ronenbekerman.com/wp-content/uploads/2010/09/hybrid-render-les-chylinski-preview.jpg   2. www.b3designers.co.uk/wp-content/uploads/2010/06/Photomontage-of-proposed-park.jpg
3. static.dezeen.com/uploads/2007/10/zha_zorrozaurre-masterplan_crop.jpg 4. www.ronenbekerman.com   5. www.cgtextures.com/designdetails12-masterplan.jpg 6. http://friendsofthehighline.files.wordpress.com/2008/08/gansevoort-section_1000.jpg

PHOTO-REALISTIC
FINAL DESIGN

Ultumately the most popular trend in visualization today is achieving the most photo-real renderings imaginable. This type of style focuses on the small details to achieve a extremely high level of realism. The material textures and virtual lighting are highly important in the process of creating these visuals, which makes them very tedious projects to work on.

Bertrand Beniot

ANIMATION
FINAL DESIGN

The most time consuming, yet rewarding method of visualization is photo-realistic animation. This style will display a project through moving visuals and sequences that guide you on a virtual tour of a design. Simple virtual walkthroughs are common for showing designs, but more recent animations emulate cinematic features composed of slow panning shots and lens focusing techiques.

Alex Roman

EXISTING
SOFTWARE

3D STUDIO MAX
The industry standard for creating 3D models, 3DS Max can be used to visualize highly detialed designs and complex forms using numerous plugins and maxscript modifiers.

MAXWELL RENDER
A rendering program that can be used with other 3D platforms to achieve realistic lighting and material textures, most commonly used for architectural interiors.

V-RAY RENDER
The most popular rendering engine, V-Ray can be used for many 3D programs. The use of highly detailed material parameters and lighting, results can be extremely realistic.

PS LIGHTROOM
Designed specifically for professional photographers, when used for visuals this program can stylize renders similar to processing real photographs.

PHOTO REALISTIC SOFTWARE

TRADITIONAL GRAPHICS WORKFLOW

AUTOCAD
The most common program used by designers today, Autocad is used for creating schematic plan views and laying out various design details and construction documents for contractors.

SKETCH-UP
A simple 3D modeling tool used mostly for early design stages and massing model studies. It can also be used for more detailed design elements if neccessary.

REVIT
A new standard among architecture firms, this program is known for its B.I.M. method. While similar to Autocad, Revit can be used to model complex 3D building infastructure.

PHOTOSHOP
Often thought of as one of the most important programs for designers, this highly versitile graphics program can be used to manipulate and stylize various types of imagery.
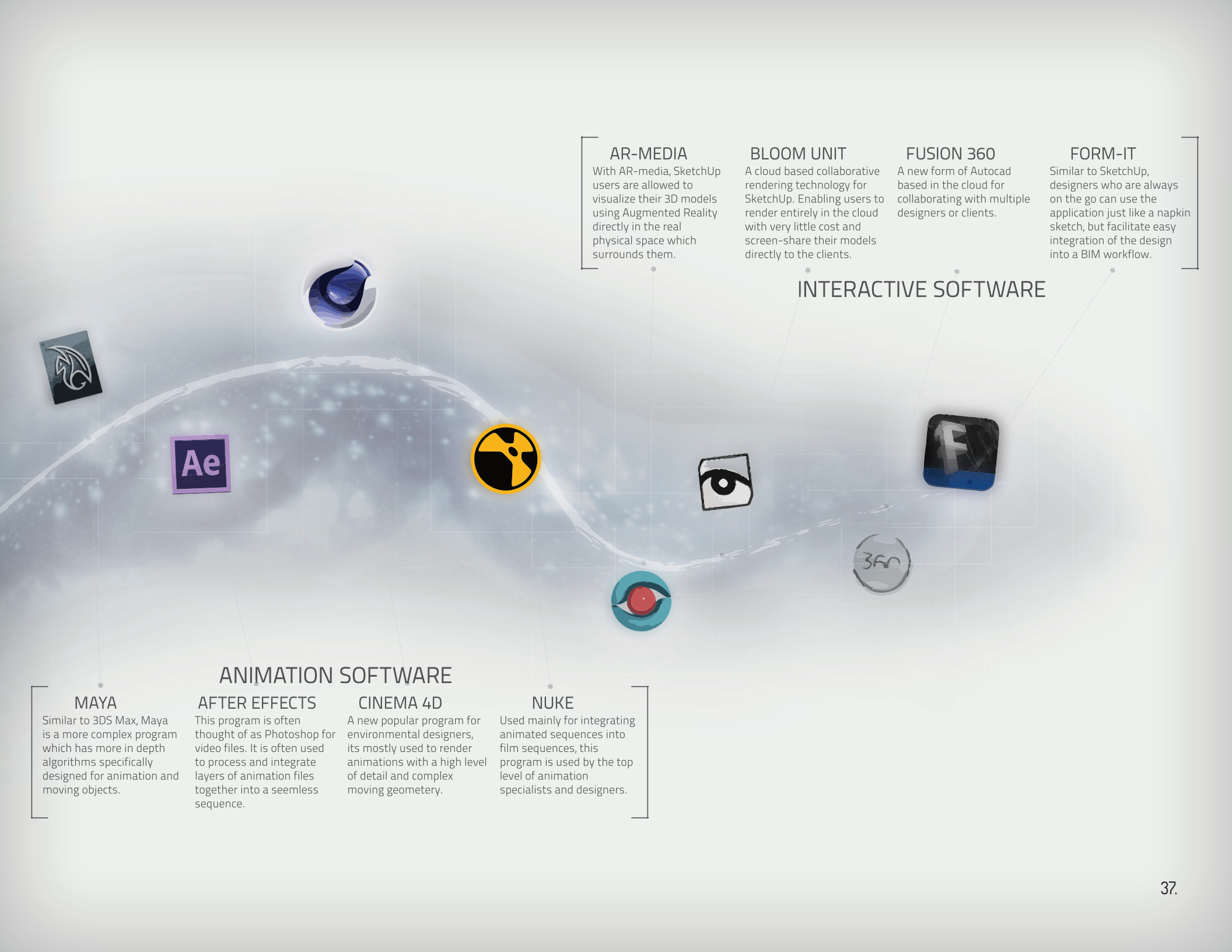
AR-MEDIA

With AR-media, SketchUp users are allowed to visualize their 3D models using Augmented Reality directly in the real physical space which surrounds them.

BLOOM UNIT

A cloud based collaborative rendering technology for SketchUp. Enabling users to render entirely in the cloud with very little cost and screen-share their models directly to the clients.

FUSION 360

A new form of Autocad based in the cloud for collaborating with multiple designers or clients.

FORM-IT

Similar to SketchUp, designers who are always on the go can use the application just like a napkin sketch, but facilitate easy integration of the design into a BIM workflow.

INTERACTIVE SOFTWARE

ANIMATION SOFTWARE

MAYA

Similar to 3DS Max, Maya is a more complex program which has more in depth algorithms specifically designed for animation and moving objects.

AFTER EFFECTS

This program is often thought of as Photoshop for video files. It is often used to process and integrate layers of animation files together into a seemless sequence.

CINEMA 4D

A new popular program for environmental designers, its mostly used to render animations with a high level of detail and complex moving geometery.

NUKE

Used mainly for integrating animated sequences into film sequences, this program is used by the top level of animation specialists and designers.

VIRTUAL
COMMUNITIES
& SOCIAL MEDIA

SPATIAL NAVIGATION

The Second Life experience is something that most people have seen before, perhaps not the specific program itself, but the idea of spacial navigation in a virtual environment. It is this main aspect of Second Life that has the greatest potential to be applied to landscape design. Through our exposure to computer graphics and video games in recent years a general knowledge of virtual spacial navigation has been created in our society. By allowing users to experience a proposed project for themselves the feeling of personal exploration will actively engage one to connect with the space being presented, resulting in their imagining of a sense of place.

DYNAMIC ATMOSPHERE

Certain aesthetic qualities of a space is what makes them intriguing by their always changing mood. Atmospheric details such as cloud cover, sun angle, and weather, can change the mood of the urban environment by creating reflections, shadows, and various levels of light quality. It is these elements that actively bring a space to life, without them our environment would be extremely dull. Renderings are too often lacking this quality of real world atmosphere, which makes them visually disengaging. By creating various moods for a virtual environment through the use of light quality, time of day, and season, this will bring an additional level of realism resulting in a more convincing sense of place.

MATERIAL PARAMETERS

By allowing multiple material options to choose from the users become intrigued and curious about the space they are viewing. This spark of interest is created by the visual connection between what one sees as a direct result of their action. It allows the user to ask the question 'what if?" and then by seeing the resulting change in the space they have their answer.
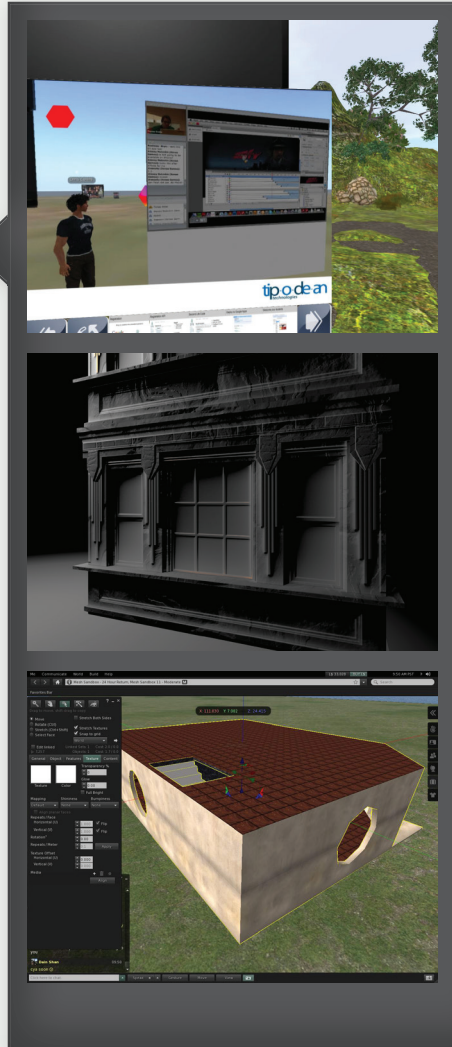

OBJECT MODIFIERS

Built into the software is a three-dimensional modeling tool based on simple geometric shapes that allows residents to build virtual objects. There is also a procedural scripting language, Linden Scripting Language, which can be used to add interactivity to objects. Sculpted prims (sculpties), mesh, textures for clothing or other objects, animations, and gestures can be created using external software and imported.

NEW MEDIA
TECHNOLOGY
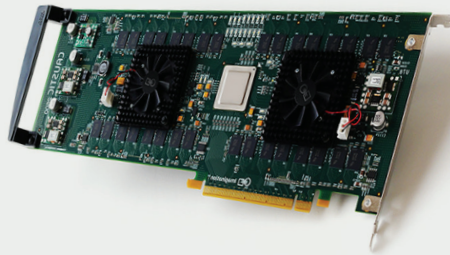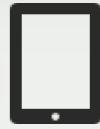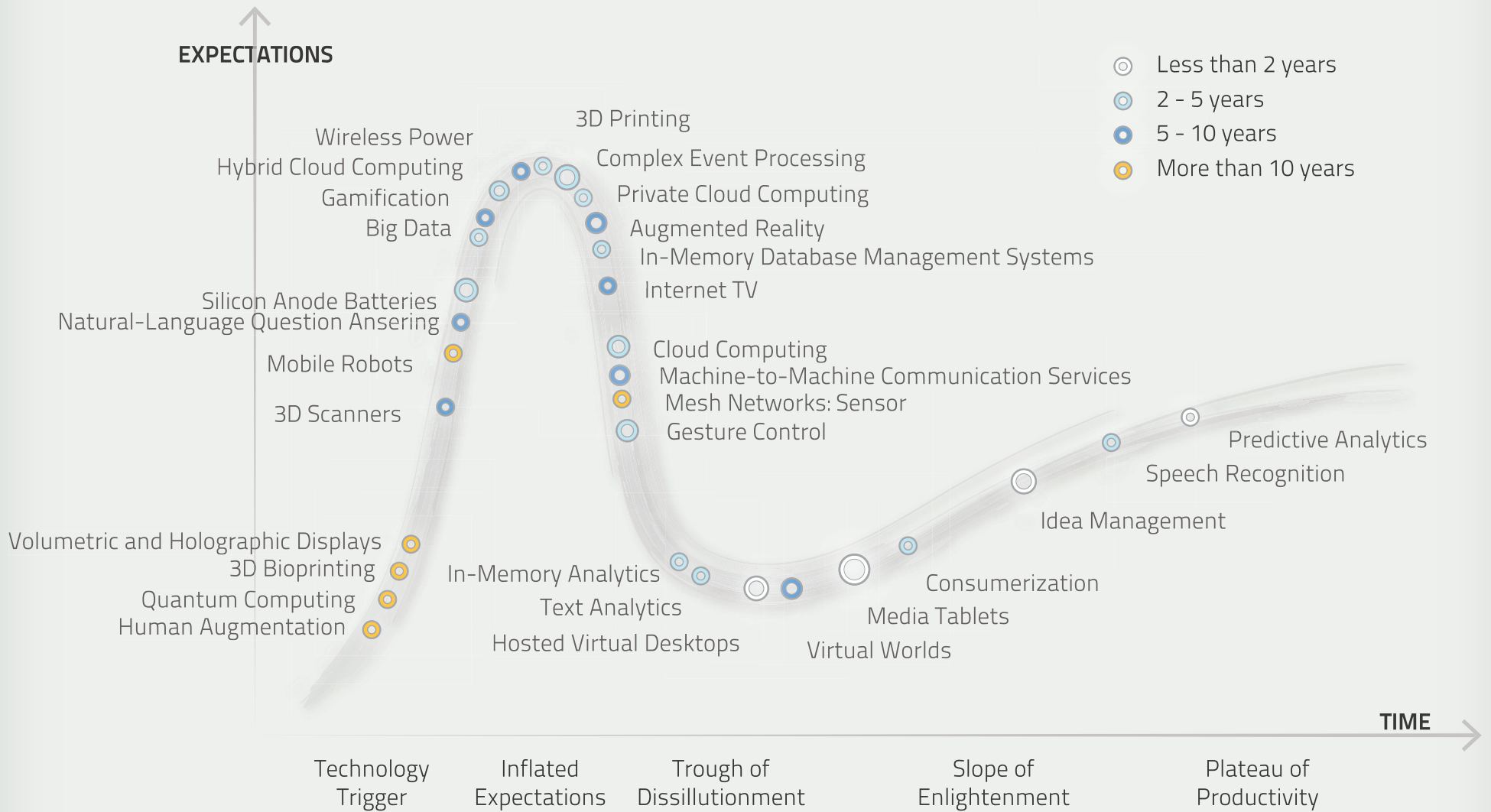

REAL-TIME RENDERING

Caustic Professional/Imagination Technologies

The Caustic Professional card is proprietary hardware raytrace acceleration card that consume only 30-60W of power and are capable of processing up to 160 million incoherent rays per second. Significantly more speed and less power than any current GPU offering by either NVIDIA or AMD. What makes the acquisition of this technology by Imagination Technologies so relevant is the fact that they own nearly 80% of the mobile GPU market.

CASE STUDY: NANTES MASTERPLAN DESIGN

The work of MGDesign shows how large scale landscape projects can be visualized through new types of media to better organize the vast amounts of data and design information included. While in Nantes, France in February of 2012, I had the opportunity to experience the Euronantes project first hand through the use of the touchscreen interface created. The navigation through the virtual masterplan was immediately engaging and exciting. The simple and smooth interface had absolutely no lag time which allowed for the ability to quickly understand how to operate the various movements and functions. Within moments it was easy to unconsciously manipulate the viewing angle in any way imagined without any effort. By zooming into an area the virtual model became more detailed with the appearance of environmental textures and aerial imagery. The integration of detailed site information and imagery created a greater interest in the project by breaking down the large design into smaller and more comprehensible spaces. While some interactive experiences can be hindered by poorly designed interfaces and user controls, the use of touchscreen technology creates a much more intuitive relationship between the technology and user. By embracing this type of user interaction for landscape designs it will be more effective and exciting for audiences to learn about proposed projects.

HYPE-CYCLE GRAPH

EXPECTATIONS

TIME

Less than 2 years
2 – 5 years
5 – 10 years
More than 10 years

3D Printing
Wireless Power
Complex Event Processing
Hybrid Cloud Computing
Private Cloud Computing
Gamification
Augmented Reality
Big Data
In-Memory Database Management Systems
Internet TV
Silicon Anode Batteries
Natural-Language Question Ansering
Cloud Computing
Mobile Robots
Machine-to-Machine Communication Services
Mesh Networks: Sensor
3D Scanners
Gesture Control

Volumetric and Holographic Displays
Predictive Analytics
3D Bioprinting
Speech Recognition
Quantum Computing
Idea Management
Human Augmentation
In-Memory Analytics
Text Analytics
Consumerization
Media Tablets
Hosted Virtual Desktops
Virtual Worlds

Technology
Trigger

Inflated
Expectations

Trough of
Dissillutionment

Slope of
Enlightenment

Plateau of
Productivity

41.

DATA
ANALYSIS

AUDIENCE COMPREHENSION

PUBLIC PROCESS

By simplifying the public presentation process, designers will be able to recieve better feedback from their clients based on the method of representation.

CURRENT TECHNIQUES

The current techniques do not depict the tactic knowledge needed to fully understand a project from a non-designers point of view. By embracing new interactive techinques visuals can be more easily understood by the general public.

EXISTING SOFTWARE

Current software interfaces are much too complex for every-day users to understand and navigate. By adapting current software to new types of interfaces the result will be more interactive and dynamic representations.

SOCIAL MEDIA

The online colaboration of social media can be embraced for new methods of built environment representation. The relationship between the client and designer will be made stronger through the use of new types of virtual design communities.

NEW MEDIA TECHNOLOGY

The ability to create a virtual sense of place at the fingertips of users with tablets will encourage the public to become more interested in design projects. Integrating visualization with the various mobile devices will create new ways for the people to engage in public projects.

PUBLIC PROCESS
INTEGRATION

MODIFYING CURRENT
TECHNIQUES

ADAPTING EXSISTING
SOFTWARE

INVOLVING VIRTUAL
COMMUNITIES
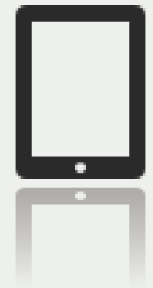
EMBRACING
NEW MEDIA

RESEARCH
SYNTHESIS

HYPOTHESIS

By embracing new hybrid forms of representation designers of the built environment will have the ability to create more widely used and visually engaging visualizations.
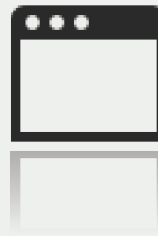
Through the use of new media technology, design concepts and traits can be shown through a transactive method allowing for greater audience comprehension, resulting in more successful design proposals. Finding new creative solutions for design visualization will allow for additional ways of interaction between designers and clients.
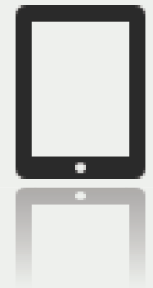
| PUBLIC PROCESS INTEGRATION | MODIFYING CURRENT TECHNIQUES | ADAPTING EXSISTING SOFTWARE | INVOLVING VIRTUAL COMMUNITIES | EMBRACING NEW MEDIA |

PRECEDENT STUDY

>>> [FARGO URBAN DEVELOPMENT]

DESIGN MODEL
[THE IDEA]

[INTERACTIVE DESIGN OPTIONS]

(1)

CITY OFFICIAL

SITE ANALYSIS

[UNDERSTANDING THE SITE]

By hosting early open fourms for citizens to attend people are actively engaged in the site evaluation and can voice their own opinions regarding specific needs.

By hosting early open fourms citizens can be actively engaged in the site evaluation process and can voice their own opinions regarding specific needs.

PUBLIC

(3)

FINAL DESIGN DEVELOPMENT

[EXPERIENCING A SENSE OF PLACE]

To experience the final design details through a transactive method will allow for better understanding and visual connection with the site design.

OPPORTUNITIES **&** CONSTRAINTS

(2)

DESIGN CONCEPTS

The ability to view multiple design solutions will allow for a comparison to be made between various details in order to further refine the final proposal.

DESIGN TRAITS

DESIGNER

[EXPLORING MULTIPLE CONCEPTS]

[PRECEDENT STUDY – FARGO URBAN DEVELOPMENT]

CONCEPT MENUS

DESIGN OPTIONS

Conceptual Design 1
"Street Level Vitality"

Play Concept Sequence

View Design Details

View Design Details

Conceptual Design 2
"Connecting to the River"

Play Concept Sequence

View Design Details

View Design Details

Conceptual Design 3
"Fargo Performing Arts Center"

Play Concept Sequence

View Design Details

CONCEPT 1

MATERIAL OPTIONS
[GRAVEL / CONCRETE]
[PLANTINGS / WATER FEATURE]

CONCEPT 1

MATERIAL OPTIONS
[GRAVEL / CONCRETE]
[PLANTINGS / WATER FEATURE]

CONCEPT 2

MATERIAL OPTIONS
[GRAVEL / CONCRETE]
[WOOD / MESH]

CONCEPT 2

MATERIAL OPTIONS
[GRAVEL / CONCRETE]
[WOOD / MESH]

CONCEPT 3

MATERIAL OPTIONS
[GRAVEL / WOOD]
[LOW GROWING / PRARIE GRASS]

SITE
ANALYSIS

1. SITE INTRODUCTION & ANALYSIS VIDEO

By first engaging an audience in the initial inventory and analysis stage, this will ensure a greater understanding of site opportunities and contraints which will lead to design traits.

>>>

DESIGN
CONCEPTS

2. CONCEPTUAL DEVELOPMENT VIDEOS

The ability to view and compare multiple conceptual designs will allow for more public feedback and help to identify specific programming needs.

>>>

[PRECEDENT STUDY – FARGO URBAN DEVELOPMENT]

CONCEPT 1

"STREET LEVEL VITALITY"

CONCEPT 2

"CONNECTING TO THE RIVER"

CONCEPT 3

"FARGO PERFORMING ARTS CENTER"

DESIGN
DEVELOPMENT

3. FINAL DESIGN INTERACTION

Creating a sense of place through high quality graphics and user interaction will actively engage viewers to experience the final design for themselves.

>>>

[INTERACTIVE OPTION SCREENSHOTS]

CONCEPT 1

CONCEPT 2

CONCEPT 3

55.

CONCLUSION

FINAL DISCUSSION

The development of a precedent study was an effective method to test the design hypothesis and has allowed for a greater understanding of real world opportunities for new media graphics. The research conducted can contribute to current literature by making a strong connection between built environment design and interactive media. By embracing the findings shown, designers will be enabled to engage their clients in an interactive experience resulting in an overall greater understanding of the design presentation. Providing active user engagement will involve clients and public audiences in the design process, resulting in the strengthening of the relationship between the designer and their clientele.

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    Kathleen Pepple

LA 272 Studio - Spring 2010
    Matt Chambers & Dominic Fischer

LA 371 Studio - Fall 2010
    Stevie Famulari

LA 372 Studio - Spring 2011
    Kathleen Pepple

LA 471 Studio - Fall 2011
    Jay Kost

LA 472 Study Abroad Studio - Spring 2012
    Kathleen Pepple

LA 571 Studio - Fall 2013
    Mehran Madani

LA 572 Design Thesis - Spring 2013
    Advisor: Mehran Madani