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Grapefruit Design Process

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Learning Objectives

- Engage in an open discussion to listen to and learn from each other.
- Discuss the possibility of different scenarios which deviate from the current design process.
- Discuss current technology and possibilities of using those for new methodologies.
- Explore ‘out of the box’ processes using technology which may not be commercially available... yet.

Description

As the AEC industry continues to rely on its current design process, technology allows for the exploration of possibilities that may differ from the current workflow. The AEC has been using the same methodology for decades, way before we even had computers. This discussion poses the question: Shouldn’t we look at a holistic change of that methodology taking in consideration future technological advances? This session will offer a forum to discuss various hypothetical possibilities regarding the architectural design process and its interaction with technology, hoping to objectively look at areas which can be improved. During this roundtable, we’ll share and discuss experiences, successes, failures, ‘wish lists’ and have an open discussion so we can all learn from each other. Every company has their own way to proceed in the design process, but even with the vast number of possible design solutions for buildings, shouldn’t the process be one that can leverage technology to its advantage?

Speaker(s)

Dr. Eliel De la Cruz - I am currently the Practice Technology Leader in the America - East Region for HKS Architects. I was lucky enough to start my architectural career at an early age. I finished a 5-year architecture program when I was 21, then did 2 masters in Architectural Design and Computational Design, (SCAD, and GATech), and later a Ph.D. in Architecture at the University of Sydney in Australia. All my studies and professional experience have revolved around Design and Computational Design. I'm passionate about new technologies and finding ways to use them to improve our designs, buildings, cities, and our lives. My area of research focuses on understanding the variables that influence the adoption of new technology in the architectural design process.
I'm a geek who loves movies, anime, bowling, archery, guitar playing and learning new things in life. Cheers!

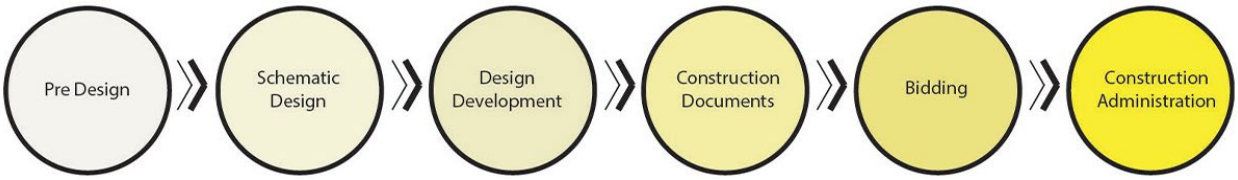
Cindy Wood - I am currently the Firmwide BIM Training and Development Leader for HKS Architects. I have been in the AEC industry for the past 16 years. After graduating with a Bachelor of Environmental Design studies with a Co-op focus at Dalhousie University in Halifax, Canada I made the trek across the continent and established myself in Los Angeles starting my career at HKS Architects. Five years ago, I took on the role of Practice Technology BIM Specialist for the Western Region of the company to help improve their project workflow and modeling skills. I use my experience from working on small and large Revit dedicated projects to help bridge the gap between the drawing software tool and practical usability needs of Architects and Interior designers. I was one of the top-rated class featured speakers at Midwest U 2018.
My hobbies include curling, sewing, winter sports, music, and dancing.

What is the question?

As the Architecture Engineering and Construction (AEC) industry continues to rely on its current design process, technology allows for the exploration of possibilities that may differ from the current workflow. The AEC has been using the same methodology for centuries, way before we even had computers. This class poses the question: **Shouldn't we look at a holistic change of that methodology taking into consideration future technological advances?** The proposed design methodology will offer a platform to explore various hypothetical possibilities regarding design and its interaction with technology, hoping to objectively look at areas that can be improved. In our findings, we'll share and discuss hypotheses, experiences, successes, failures, 'wish lists' all related to the design process. Every architecture company has its own ways of proceeding in the design process, but even with the vast number of possible design solutions for buildings, shouldn't the process be one that prioritizes leveraging technology to its advantage?.

Understanding where we are at

Since the rise of civilization, and more recently the popularization of great engineering projects in the world in the early 1960s, a great deal of attention has been given to the problem of design methodology. In our second chapter we will elaborate on views related to the design process some two thousand years ago, which prompts the question, how much of what was done back then is still utilized today in our industry? It has been our experience that the methods of design traditionally used by architects are very adept at dealing with one design solution at a time, meaning one building, yet incapable of seamlessly replicating the intended 'final product' (e.g. Construction Documents) for a similar or slightly different type of building without reverting back to the proverbial design board. The current design method is not adequate to deal with the complexity of solving multiple design problems of a similar design solution to a level of development and documentation that could be considered as a finished product. The Author suggests that in an architectural design environment, the need for a design methodology that exploits current and upcoming computational design tools, due to the complexity and number of variables involved in a project, is inevitable. However, it is required to select a design methodology which would not only exploit the latest design tools, but one that would not hinder the designer's creative process. In the traditional design process, the 5 to 7 different design phases are aligned for designers as if they do not have any choice but to follow the lineal process. The Author instead is in favor of a design methodology in which multiple design solution processes could be performed in a simultaneous manner, working towards multiple automated final products during the process.



Architectural Design Phases

Through the Grapefruit alternative design methodology, this class will first examine various definitions from several scholars about design methodology. It will also present a section on the potential benefits for developing a design method that focuses on multiform design solutions.

Brief History of the Design Process

Although to many the subject of design as a process seems like a new interest, architectural history show Vitruvius expressing his views about the process over two thousand years ago. Vitruvius stated (Lang, 1987, p. 37): "architectural designing is the process of selecting parts to achieve a whole". Exploring across the history, scholars and architects have stated some thoughts on the question of the design process. Alberti (1485), for example, felt about the design process similarly to Vitruvius, whereas Descartes (1637) created his own ideas for constructing his own creative attempts in his Discourse on method. After Descartes, architects such as Laugier (1753) explained the designing process as decomposing a problem, resolving the parts, and then combining the partial results into whole ones. This line of thinking is often referred to as the rational method, which has inspired creators up to present-day. Some like Le Corbusier, described his own design method in very similar terms in vers une architecture (1923). The process is though as a decomposition/composition procedure involving a number of stages: the preparation of the problem in terms of the tasks; design standards formulation; and the rearrangement of these into the solution as built form.

Grapefruit Design Methodology

Taking as reference the car industry, when Henry Ford revolutionized the industry, he took a process that was slow and inefficient and increased its productivity hundred-fold by changing the process in which the cars were built. If we are to take that same reference, today's architectural design process is the equivalent of creating a single concept car each time a car is needed by a user. Granted that cars mass production is a different kind of project, with a different scale and different rules altogether, however we will focus not on the assembly line, but on the change of the methodology as something we could capitalize on.

There is a band of musicians, you can find them on Youtube.com that are called Pomplamoose, a friend who knows French told me that it means Grapefruit -- I saw a video in which they described the process that they follow when creating their music. To understand the context of what makes their process unique I'll briefly describe my limited understanding of the music industry process. In the music world, similar to how we do things in architecture, there is usually a muse moment, in which a lead designer has a grandiose vision of what the design should look like. In the music industry that would be the 'aha' moment of inspiration for composers. After many sessions, rehearsals, etc. there is a moment in which they assemble the band and audio engineers, to eventually do a recording session. Like architecture, this process can be unique to each artist, and even unique to each song.

What Pomplamoose band does is to get the musicians they need for a recording, and once they have all the required players, they condensed all recording sessions of several songs in 2 or 3 days. Reducing a process that could sometime takes weeks or months into less than a week. In

the architecture world we have design charades, but those typically focus on trying to find 1 solution to a design problem, sometimes different design options or variations, but ultimately 1 of those is chosen and then the rest of the team, or production teams, elaborates that through the linear design process of Design Development (DD) and Construction Documentation (CD). The Grapefruit design methodology is an ambitious process which aims to combine existing and upcoming technology to allow a designer, or an architecture company, to develop multiple project solutions up to (or close to) CDs from the schematic phase. Like a design charade, by gathering a diverse group of designers, project architects, project managers, and construction administrators, in a condensed session, while utilizing different computational design tools they should be able to develop several architectural projects and have them ready, for future use, or for design alterations.

Looking at the technology that we currently have available that affords for some of this to happens, we see companies like Autodesk who purchased Spacemaker, which is an AI based generative design tool that helps designers and developers to visualize in real time multiple solutions provided to their specific site, programmatic requirements, and specific site requirements. We start seeing more often generative design used in early stages of design, designers using Grasshopper, Dynamo, and other tools running live to see real-time changes to their whimsical push and pull of their design shapes. In the academic world we see fantastic projects that combine the familiarity of the user experience in our phones and tablets with the benefits of simply solid modelers like FormIt. All of those tools are not necessarily new, although their implementation has not reach full adoption in our industry yet, but we have seen them for a number of years now. Yet once we start looking into documentation for construction, the details, the specifications, those are the area where we are hoping to see machine learning, combined with AI to start producing those details and documents on our behalf. Even better, while we are at it, we could also start looking at what are the things that we really need to transmit for construction? Augmented Reality (AR) presentations with mapped coordinates? Robotic data as a deliverable for construction? Using Tandem in combination with Autodesk's Collaboration Cloud for Digital Twins? Digital tracking of physical elements for facilities managements? There seems to be a lot of things that we could currently do, and while some of it is moving fast, we as an industry are still moving at the very slow pace that we moved when we started looking into BIM since the 1970's. I am hoping that the current speed of technology, (Ubiquitous computing, quantum processors, AI) in other areas of our lives continue to drive and force our industry to adapt and start implementing some of these solutions faster.

This methodology would have multiple benefits, first and the most obvious one, it would drastically decrease the time required for teams to develop a project up to CD level. Picture a company that has a healthcare sector, they could have 3-4 partially developed projects ready to an 60% or 70%, so that by adjusting the site requirements, input the programmatic requirements, the different metadata and other variables specific to each project, the CD team could have a project at an 80% completion within days instead of months.

Conclusions:

We understand that this may be one of many possible solutions to better implementing technology in the architectural design process. And some of the proposed ideas may sound too ambitious or even sacrilegious to some, especially those who have been in the computational design field, or architecture for a while, and it may well be that we do not have the right kind of technology to achieve this in an efficient and elegant fashion yet, but we do have to start thinking about this kind of possibilities, so that in the near future we can start developing the kind of solutions that would make this, or maybe even better alternatives, a possibility and not just a dream.

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