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PARTICIPATION + ARCHITECTURE

Jennifer Bielaskie

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ABSTRACT

"The only absolute architectural truth that I have found is that participatory design always works"

—Charles Moore, *GHOST*, 186

This thesis proposes that participation by the client in the full process of architectural production is the first step towards an ideal, fully integrated collaborative architecture. A new participatory process of architectural design which involves the architect and client will be explored in this thesis in attempt to become a catalyst for a more comprehensive level of collaboration in architecture.

A new design process will propose game playing as a strategy to encourage client participation in the design process. In all processes, regulating structures are essential, and a re-writing of the current means and methods of architectural production through game play may allow a new participatory process to become a viable alternative to conventional mass-market standards.

ACKNOWLEDGEMENTS

I dedicate this thesis to the people in my life who have showed me, though they may not know it, that the current methods of conceiving and building architecture may not be perfect; in fact, they may not even come close. To these people, my professors and my clients over the past several years, I thank you for inspiring me. Working with you has given me the hope that participation can make a difference in the way we all experience the built environment, and it may also provoke the transformation of the processes and values of conventional architecture practice.

To my family who has pushed me all my life, thank you. I would not be where I am today without your support and guidance.

1.0 PRE-SCRIPT
1

2.0 DESIGN GAMES
6

3.0 POST-SCRIPT
166

4.0 WORKING NOTES
171

[PRE-SCRIPT]

PARTICIPATION
+ ARCHITECTURE

In contemporary society, we increasingly rely on modern technology to alleviate us from the mundane processes of everyday life. If this digital disconnect¹ in society continues it will have alarming consequences for the future of the architectural profession, as it is through the participation in mundane processes that the discovery of new ideas can occur. This divide between physical and digital realms was predicted almost 30 years ago by Giancarlo de Carlo, in *An Architecture of Participation*, where he stated that we should not "use progress as justification for technology and mitigation of human anguish as a justification for art, and more than this, use technology and art as justification for architecture."² While both art and technology may generate buildings of a differing variety and hold their place in the profession of architecture, neither can create good architecture on its own. Architecture should not be thought of as either art or commodity, but both in a process which actively engages society.

By encouraging participation between those within the architectural profession and those outside of it, we may be able to blur the boundaries between art and commodity and expand the imagination and knowledge of all those who become involved in the processes of architectural production. Notions of participation are not often considered in practice because they do not fit within the typical patterns of architectural production. In *Architectural Practice: A Critical View*, Robert Gutman leads us to believe that,

¹ The term digital disconnect emerges from a previous collaboration between myself, Dylan Durst and Jeff Salmon where we explored the role of technology in our daily lives. See "Corporal Limbo: Collaborative, Responsive, Interactive, Architecture" Roger Connah and the Operatics Studio, Carleton University, 2009.

² De Carlo, Giancarlo. "An Architecture of Participation." *Perspecta*, 17 (1980): 74-79. JSTOR. 19 October 2008 <<http://www.jstor.org/stable/1567006>>

digital disconnect is a subconscious state of being between the digital and the physical. While engaging in the technology of our day-to-day lives, we often lose ourselves. Our mind tends to wander to far off places in the virtual realm, places we were unaware that we going, yet end up there non the less. After all, we turn back to reality and forget almost instantaneously that we were there, what we went there for and how we even got there. No matter how deep we immerse ourselves into technology, our body remains in physical space. This tug between our mental and physical being places our entire existence in an in between space, in limbo.

Robert Gutman (1927–2007) is an influential professor and critic. He was a key figure in bringing social science into the heart of architectural education and practice, exploring the relationships among public policy, architects, buildings and their users.

Giancarlo de Carlo (1919–2005) is a distinguished practitioner and respected critic and writer of international renown. Born in Genoa, he became a member of CIAM and Team Ten, and has taught at Yale, MIT and Instituto Universitario di Architettura in Venice.

there are many reasons why architects, like members of other professions, cling to an outmoded or anachronistic conception of social reality. To acknowledge its true character is to shatter several myths concerning the power, freedom, and autonomy of the profession.³

However, as more communities and building users are showing interest in the construction of their built world, we can see participation slowly becoming more frequent and accepted in the design of buildings, but as Peter Blundell Jones notes, "too often this involvement is token, bringing a degree of worthiness to the architectural process without really transforming it."⁴ If we are to truly gain from participation between those within the profession and those outside of it, it will involve reaching beyond just listening to members of society as they voice their opinions. We should engage in a prolonged dialogue throughout the course of design and "recognise that the products of participation have their own value system that stands alongside that of conventional architecture."⁵ Participation, in this sense, can begin to transform the way we conceive of our built environment.

Through a participatory based design process, we may explore and conceive of an architecture which represents not only the architect, but the user as well. "[Our] ability as designers cannot begin to match the richness generated by a diverse mixture of able, involved, and informed players.

Peter Blundell Jones is a British architect, historian, academic and critic. He is a prolific author on architectural history and theory.

³ Gutman, Robert. *Architectural Practice: A Critical View*. (New York, NY: Princeton Architectural Press, 1988) 2.

⁴ Blundell Jones, Peter, Doina Petrescu and Jeremy Till, eds. *Architecture and Participation*. (New York, NY: Taylor & Francis Group, 2005) xlii.

⁵ Blundell, *Architecture and Participation* xv.

All of our efforts cannot begin to reproduce the variables which [can arise] from different pairings, different moods, different situations."⁶ If Richard Bender is correct, and participatory efforts are made throughout the process of architectural production where we are able to accommodate, inspire, exchange and barter ideas with one another, then in time participation may grow beyond a simple action and into a reciprocal collaboration, giving back equally in the knowledge and contributions it receives.

If participation can be understood as a contribution, whether mental or physical, to the design process at any given time, then we may be able to draw a connection between this action and that of making, of inputting into an existing production system. The act of collaboration takes involved interaction and communication one step further, transforming the making into growing. A participant may be aware of the contributions he or she is making to a project, but there may also be a subconscious action which would, when the dialogue is mutual, absorb as much as you give, thus growing the individual's comprehension. In discussing contemporary art, Umberto Eco believes that collaboration seeks to "collapse the distinction between performer and audience, professional and amateur, production and reception."⁷ It is through the learning and growing of the individual that the blurring of these boundaries can occur, turning the simple act of participation into collaboration.

Richard Bender is a professor, architect, civil engineer, and planner with an international practice in urban and community planning, town planning, and campus planning for universities, the arts, media, and entertainment.

participation is the simple act of contribution, either mental or physical, with no requirements or guarantees that one will achieve or acquire.

collaboration can be seen as a superimposition of a multiplicity of disjointed ideas. It is a recursive process where two or more bodies work together towards an intersection of common goals. Collaboration does not require leadership and can sometimes bring better results through decentralization and egalitarianism.

Umberto Eco (1932-) is an Italian medievalist, semiotician, philosopher, literary critic and novelist. Eco's work in literary theory developed over his career through his ideas on the "open" text, in which words do not have meanings that are simply lexical, but rather, they operate in the context of utterance.

6 Bender, Richard. "Games." *JAE*, 33.1 (Sep., 1972): 2. JSTOR. 3 October 2009 <<http://www.jstor.org/stable/1424455>>
7 Bishop, Claire. "Introduction: Viewers as Producers." *Participation: Documents of Contemporary Art*. Ed. Claire Bishop (Cambridge, Mass: The MIT Press, 2006) 10.

Through the experiencing of growth by the individual, a sense of empowerment can be achieved. Though collaboration may question the authorship of the final product, there is no reservation that the end result could not have been achieved by any one individual. Eco states that "collaborative creativity is therefore understood both to emerge from, and to produce, a more positive and non-hierarchical social model" as each participant's voice is heard. He goes on to say that "a restoration of the social bond [will occur] through a collective elaboration of meaning."⁸ This open social process is conditional in the sense that it sees each contributor as knowing that he must always try to deepen his own understanding of the work. The act of collaboration sees each member grow independently but parallel, without negating the others influence in their growth.⁹

The ideal desire for collaboration, however, begins with the simple act of participation. With the architect at the epicenter of a participatory process, clients and users may become consultants of sorts, continually feeding information to the architect. By simple inclusion and participation in the process, the client is given access to a wealth of information and knowledge which can be absorbed and may eventually lead to active collaboration, expanding the imagination of all involved. Both society and the profession must be shown the value of a new process and come to understand that change is essential in evolution. Change, however, cannot be set into motion until someone makes the first move. Why not take that first step?

⁸ Bishop 12.

⁹ Eco, Umberto. "The Poetics of the Open Work." *Participation: Documents of Contemporary Art*. Ed. Claire Bishop (Cambridge, Mass: The MIT Press, 2006) 38.

The whole of Western thought is profoundly influenced through and through by the idea that all things- all events, all people, all mountains, all stars, all flowers, all grasshoppers, all worms- are artefacts; they have been made. It is therefore natural for a Western child to say to its mother, "How was I made?" On the other hand, that would be quite an unnatural question for a Chinese child, because the Chinese do not think of nature as something that was made. Instead they look upon it as something that grows, and the two processes are quite different. When you make something you put it together: you assemble parts, or you carve an image out of wood or stone, working from the outside to the inside. However, when you watch something grow, it works in an entirely different way. It does not assemble its parts. It expands from within and gradually complicates itself, expanding outwards, like a bud blossoming or a seed turning into a plant.

—Allan Watts
The Tao of Philosophy, 4-5

[DESIGN GAMES]

FRAMEWORK_{2.1} | SCRIPT_{2.2} | PRE-PRODUCTION_{2.3} | PRODUCTION_{2.4}

PARTICIPATION
+ ARCHITECTURE

THE GAME

A series of architectural components have been designed for this thesis, and through an interactive design game, each participant will be faced with numerous choices. Through the exploratory process, participants will make decisions about massing, composition, materials and articulation to reach the final goal: an architecture conceived through a more elaborated process of participation.. As decisions are made, chance may bring about new ideas which will contribute to the participants understanding of architecture and design.

In participatory design, decisions must be reached democratically. As a player, both the architect and the participants share the responsibility for the project. To be successful, they must work collectively towards a common goal, and in the process, all players and components will be pushed to their creative limits.

"Ideally, democracy is a system in which political power rests with the people: all citizens actively participate in the process of self-representation and self-governing, an ongoing discussion in which a multitude of diverse voices converge..."

— **Group Material**
Participation, 135

If participation is to be introduced into the process of architectural design, there may be an infinite number of ways in which interaction could be encouraged. In this manner, participatory architectural processes may be seen as open works in progress. With regards to participation in design, Umberto Eco sees open works as "world[s] based on ambiguity, both in the negative sense that directional centres are missing and in a positive sense, because values and dogma are constantly being placed in question."¹

Walter Benjamin has said that a work of art should allow viewers to be involved in the process of production, that an apparatus can turn the consumer into the producer, the spectators into collaborators.² With collaboration as the ideal objective and participation as the vehicle to achieve it, it seems, then, that it may be relevant to consider a new architectural framework in the context of an apparatus or a game. In an architectural gaming issue of *Journal of Architectural Education*, Juan Pablo Bonta says that "games have no predictive or prescriptive value"³ and Luis Summers states that "games give flexibility and the ability to deal with variables and relationships that are difficult to quantify."⁴ Though we may not be able to understand all of the complexities of integrating participation in the process of design, the framework itself may allow for enough flexibility to accommodate those unknown variables.

¹ Eco 30.

² Eco 31.

³ Bonta, Juan Pablo. "Simulation Games in Architectural Education." *JAE*, 33.1 (Sep., 1971): 12-18. JSTOR. 3 October 2009 <<http://www.jstor.org/stable/1424458>>

⁴ Summers, Luis. "Operational Games in Architecture and Design." *JAE*, 33.1 (Sep., 1971): 2-7. JSTOR. 3 October 2009 <<http://www.jstor.org/stable/1424456>>

open work should be understood not as an incomplete project or object, but as a continually changing process, the game. While complete variations of an object may result through participation, the process of architecture itself must continuously evolve with new ideas, processes and materials.

Walter Benjamin (1892-1940) was a German intellectual (philosopher, sociologist, literary critic, translator, essayist) occasionally associated with the Frankfurt School of critical theory. His sociologic and cultural critical thought provided a significant contribution to aesthetic theory and to Western Marxism.

Juan Pablo Bonta is a former professor of the Universities of Buenos Aires, and Maryland. He is also the author of several books on the topic of architecture and its interpretations.

Luis Summers is a Professor of Engineering, receiving his PhD, MS in Structural Engineering and a B.Arch from Notre Dame. His research is based in computer-aided design and structural analysis in design.

Though there needs to be scripted and regulated rules, the variability of experiences will continually enhance the game, or perhaps games, without deviating from the framework.

We know that a game in general has a syntax which is widespread; anyone, no matter his/her age, race, or religion, can quickly learn to play, manipulate and achieve a desired goal in the framework of the game. For a participant, "once you understand the rules, the moves, and the other players, you have many opportunities to adjust your play."⁵ In *Games*, Richard Bender provides us with a generalization of architectural gaming;

In terms of a chess game: a board, a set of possible moves, and some rules.

The frame has been worked out, refined, added to, adapted and improved over the years. Within its framework each person can play his or her own game. New players or "old pros" can enjoy the game. Each of us brings something special to the game and each takes something different away from it.⁶

Though the players may be working in opposition rather than collectively, there still exists a high degree of participation and learning throughout the course of the game. For this reason, a game may be successful in defining an alternative to the conventions of architectural production,

the framework is the field of relations which individuals must operate within as they design and construct architecture. It provides boundary conditions within which rules, such as those of a game, may be identified by participants.

⁵ Bender 2.
⁶ Bender 2.

an alternative which could lead to fulfilling collaborations. The consequences of one's moves and decisions will be immediately observed. Each player can reflect internally without being judged by players in a higher position.⁷

As there are many ways in which participation and interaction can occur in a potentially collaborative design process, we should be careful not to become restricted to only one set of rules that can be applied to the framework/convention. As Gary Stevens observes in *The Favoured Circle*, "people do not run their lives by adherence to rules. Daily life is a lot messier, full of tactile improvisations and strategic vagueness."⁸ The ambiguity of the rules can be left to evolve as circumstances change. As in the game of chess, you are simply given the board, the pieces and a printed sheet describing the rules. The steps to be taken are left to the user. It will be the architect's role to not only oversee the entire process, but also to write the rules of the game which are unique to each architect's process as long as he remains within the framework boundaries.⁹ After playing the game, the architect may come back and modify his/her own rules. Rather than arguing over interpretations or cheating, rather than restricting ourselves or reverting back to current conventions, change the rules of the game.

⁷ Summers 2-7.

⁸ Stevens, Gary. *The Favoured Circle*. (Cambridge, MA: The MIT Press, 1998) 54-55.

⁹ This thesis attempts to define the framework or boundary conditions for an alternative participatory method of architectural production. This framework defined in terms of open-work and film production is only one possible option; more viable options or frameworks may present themselves through new or established methods of participation in architecture as they become more popular.

"To accomplish this transformation, we do not present a standard version of participation; we even contest that a standard, unique, version of participation could ever be possible. The danger with a normative technique is that it sees the user (once again) as standard, there to be subjected to common methods. Instead, one has to accept that with multiple users, multiple desires and multiple contexts, multiple forms of participation are necessary."

—Peter Blundell Jones
Architecture and Participation, xvi

Garry Stevens is the founder of the Key Centre for Architectural Sociology.

2.1 THE FRAMEWORK

In *Participation*, Claire Bishop leads us to believe that there are two continually used motives for participation (in art):

an authored tradition that seeks to provoke participants, and a de-authored lineage that aims to embrace collective creativity; one disruptive and interventionalist, the other constructive and ameliorative.¹

The framework of the architectural game seeks a combination of these methods of participation to encourage the ideal goal of collaboration. On one hand it does seek to embrace the creativity of participants in a positive manner, even provoking them to participate as it may become a necessity of convention, however, it does not try to eliminate the author entirely. It is therefore a participatory, yet highly authored process.

Remaining open in the manner of a work of art, the framework will provoke participation between all members of the profession and society, aiming to eliminate the hierarchies of convention. It will provide boundary conditions which will help to order the process of architectural production in a linear manner without the necessity of segregating individuals. With the motives identified, one of the biggest questions we may now be faced with in this transformation is *how do you invite participation into the architectural process?*

Claire Bishop is an Associate Professor of Art History and an internationally acknowledged scholar of contemporary art. She is widely considered to be an original thinker and creative interpreter of contemporary art, focussing on socially-engaged art and spectatorship.

PA

2.1 THE FRAMEWORK

¹ Bishop 11.

With the use of information management tools, it is not too difficult to integrate members of the profession. But how can society, the users and clients, become integrated into the process and not just passively involved? At the most basic level of participation, it seems quite simple. If you give a child a set of Lego, they will choose what is most appropriate and pleasing to them and build what they want. If you take away some of their building blocks, essentially adding restrictions, they do not cease to build, they simply adapt. Providing society with the tools or game pieces to participate in design or construction might possibly be this simple, so perhaps, the more relevant question to ask is *where do you encourage participation in the process? Where will the maximum creativity and potential for collaboration be achieved?*

If we look to film and theatre, it may provide inspiration for making these courageous and complex relationships possible, to allow participation and collaboration in an authored environment. As technologies advance, hierarchies in the field of film production have begun to collapse. Though a linear method of production still exists, popular culture film of the 1960's saw collaborative methodologies being embraced much more completely. There are many participants who become involved at various stages in the process, each having the freedom to contribute creatively, yet no individual is more important than the next. They rely mutually on one another to make the project work, without collaboration in the field the industry would collapse. At the same time, however, the project always gives credit to the directors and the author, the writer of the script and owner of the story, (though even those boundaries are being blurred by the artists

"All complex human endeavours including architecture require a regulating structure to organize the inherent chaos that underlies its making."

— Stephen Kieren and
James Timberlake
Refabricating Architecture, xii

themselves as they cross-over into multi-disciplinary roles) no matter how many participants are involved in bringing the project to life.

A recent trend in architecture, that of Integrated Practice², behaves much like standard film production, concluding with the distribution of the product to the consumer. We may be able to see how many of the same relationships between members of the film industry can correlate well in architecture, but the key ingredient that is lacking in regards to the proposed framework is society, the audience. Theatre, more precisely collaborative theatre, seeks to challenge not only the roles of those involved in production, but also the role of the audience or spectator, turning passive observers into collaborators. By using audience participation, the performer invites the audience to feel a certain way and by doing so they may change their attitudes, values and beliefs. Though a new architectural framework may not be as cruel, in its many definitions as Artaud's *Theatre of Cruelty* for example, there are many aspects which we can draw inspiration from. In Artaud's experimental theatre, there is a unique language, halfway between thought and gesture, it is both in the spiritual and physical realm.³ By hurling society into the centre of the action, it forces them to react and engage on an instinctual level. This required participation can affect the spectator on a subconscious level, bringing about the act of collaboration.

² Refer to Integrated Practice by George Elvin for a more comprehensive look into this process. Integrated Practice is set up much like design-build in terms of legal contracts, as contractors are part of the team from the start, and each professional becomes more like a consultant to the process.

³ Innes, Christopher. *Avant Garde Theatre: 1982-1992*. (New York, NY: Routledge, 1993)

Antonin Artaud (1896-1948) was a French playwright, poet, actor and theatre director. Artaud believed that theatre should affect the audience as much as possible, therefore he used a mixture of strange and disturbing forms of lighting, sound, and other performance elements which he explored in his *Theatre of Cruelty*.

Through the introduction of the audience in the performance, theatre effectively disperses the final stage of distribution into the process. The new framework which will generate architecture by including society, more in line with methods of contemporary art, will follow a method that combines both film and theatre production. The linear production methods will apply, with the exception of the distribution and sales stage, which will provide a role for the users and society at each stage in the process.

THE SCRIPT

A script is a story, and every story has an author. It begins with a draft, and is then re-worked over and over to develop the clarity, structure, characters, dialogue and style. Once you begin to transpose the story into a production, the script becomes a screenplay and forms the rules of the process. It gives the actors a character to embody and actions to be performed; it gives the director an atmosphere and feeling to strive for. It creates a visual aesthetic for the set designer and inspires a soundtrack. Even though these aspects of the film are quantifiable and can be understood explicitly, each participant will bring his/her own interpretation to the stage. Changes will inevitably come about once each of the participants begins to work with one another, gaining deeper understandings of their roles and how those roles can evolve. No matter what is done to shape the story and enhance the end performance, the identity of that script still belongs to its author.

"If we want to build in a more flexible and varied manner, the architect must give up the idea of being personally responsible for every detail of every building he designs. He must design at a higher level of abstraction-- specify rules and boundary conditions, and leave the concrete instantiation to the end user or to chance."

— **Remko Scha and
Eric Vreedenburgh**
Towards a different architecture

In the first phase, the architect will take on the role of the author, writing a script (or game) for design collaboration. The notion of scripting holds the potential of accessibility and flexibility for not only the architect, but the client as well. Each architect holds the ability to design his/her own script within the given framework, while the public is able to choose from a variety of scripts that suit their needs. It gives the architect flexibility and the public variety. The script should be tectonic and compositional; it should address formal massing strategies as well as functional and programmatic requirements. At the same time, the script should consider issues of character – material and articulation – by defining in advance the sequencing and degree of participation throughout the framework as all fundamental design issues may or may not be apparent in the tectonic design. All considerations should be generated from the architects own beliefs of architecture while at the same time remaining open. Precisely imprecise, the script is a flexible tool used to design architecture through participation. It is generative rather than obstructive, seeking a deeper understanding through collaboration.

While designing the script, the architect should work with other disciplines to develop a fabrication system, making it fluent with the conventions of our time. It is in this way that scripts will continue to evolve and generate new solutions within the given framework. As technologies advance, so to will the fabricating methods of components and scripts themselves. Kieren and Timberlake expand on this vision stating that “production becomes part of the design process by working with assemblies from the outset; designers picture how things are made, their sequence

“The designer is no longer concerned with expressive details. He only defines the “rules of the game”, which determine which situations are possible at all. Rules which specify the size of the playing field, which pieces are in the frame, what groupings of these pieces are possible, which moves can be made – just as in chess. In a particular context the architect can thus (if necessary) make decisions about scale, rhythm, or the repertoire of applicable elements.”

—Remko Scha
Towards and Architecture of Chance

Kierentimberlake Associates
LLP was founded by Stephen Kieren and James Timberlake in Philadelphia, 1984. Both have been recipients of the Rome Prize and numerous other distinguished awards, and currently lead research studios at University of Pennsylvania School of Design, exploring the interface between architecture as art and the integration of advanced technologies in materials and product engineering.

of assembly, and their joining systems.” Materials scientists are drawn in where relevant and all disciplines are “used as a collective source of inspiration and constraint.”⁴

While each player is able to form his/her own ideas of form and space, what is key is that their ideas can be presented in a manner suitable to the notions of a game. For participation to be feasible, the script must make the rules implicit, requiring little to no explanation. Even more important, is that the script must be able to generate tangible pieces for manipulation, like any game, tokens or tools for play which will transform the passive notions of participation in architecture through physical integration. Parallel to Eco’s reference to contemporary art and theatre, “the author seems to hand [the script] on to the performer more or less like the components of a construction kit....The very fact of uncertainty is itself a positive feature.”⁵

PRE-PRODUCTION

In both theatre and the new architectural process, pre-production is the stage where the design is planned and visualized. The relationships between the client or participant and the architect are forged, sites are chosen as are other individuals who will become involved at various points in the process. Once the design process begins, the script is passed through the hands of many people, transforming into a raw work in progress. Though there may be some pre-scribed formal tendencies in the architect’s script, and some new restrictions introduced through the site and the

⁴ Kieren, Stephen and James Timberlake. *Refabricating Architecture*. (New York, NY: McGraw Hill Companies Inc., 200) 23.
⁵ Eco 22.

client's requirements, the work involving the client and other participants implies the mutation of the project beyond just a conglomeration of components. The working, or more accurately growing, nature of pre-production is open to continuous generations and virtually unlimited possibilities.⁶ The more involved the participant becomes, the more he will learn and the more he will consciously be able to react. A successful player must be able to compromise, keep an open mind and have a willingness to be challenged by and listen to other players. Understanding how other players work and being able to see the big picture are also key. Henri Pousseur's views on the participation of the spectator in art poses a clear picture:

the poetics of the 'open' work tend to encourage 'acts of conscious freedom' on the part of the performer and place him at the focal point of a network of limitless interrelations, among which he chooses to set up his own form without being influenced by an external necessity which definitely prescribes the organization of the work in hand.⁷

It is therefore left open to the architect as to his degree of participation in this stage of the game. Some scripts and some participants may not require much involvement from the architect at all, others may require more. What must be made clear is that the architect does not dictate the moves of his participants, but merely facilitates those moves.⁸ The loss of control in this scenario

⁶ Eco 38.

⁷ Eco 23.

⁸ This statement is essential, as it reflects the belief that participants have valid contributions to make to the process of architectural production and that the architect should be open to these ideas and contributions.

Henri Pousseur (1929-2009) was a Belgian composer devoted to avant-garde research. Generally regarded as a member of the Darmstadt School in the 1950's, Pousseur's music employs serialism, mobile forms, and aleatory, often mediating between or among seemingly irreconcilable styles.

should not be feared by the architect, for as Eco asserts, "the invitation offers the performer the opportunity for an oriented insertion into something which always remains the world intended by the author."⁹ The author, in this case the architect, offers to the performer a work to be completed knowing that there is the possibility of numerous different personal interventions to be brought forth by the performer. Eco continues on to say that:

He does not know the exact fashion in which his work will be concluded, but he is aware that once complete, the work in question will still be his own. It will not be a different work, and, at the end of the interpretative dialogue, a form which is his form will have been organized, even though it may have been assembled by an outside part in a particular way that he could not have foreseen. The author is the one who proposed a number of possibilities which had already been rationally organized, oriented and endowed with specification for proper development. ...actualizations of a series of consequences whose premises are firmly rooted in the original data provided by the author.¹⁰

PRODUCTION

The author puts forth a script with the intention that it will be desirable and anticipates that it will be realized through the collective efforts of the participants. In the pre-production process,

⁹ Eco 36.

¹⁰ Eco 36.

the interpretation of the script has occurred in an artistic manner and a product has been defined in its structural entirety, even if the structure in the architectural sense is open to interpretation itself. Once these raw elements have been defined, the production (or filming) can begin. At this stage in the framework, the architect's, as a director of sorts, involvement is once again crucial. The raw work which the participants have produced will not be complete, as is consistent with any open process. It is therefore the architect's role at this point to add a level of detail to the project, articulating each in a unique fashion, and ensuring that all the client's needs are being met.

Articulation of the details of a project go hand in hand with material selections, and while some scripts may have material properties inherent in them, there will inevitably require a degree of refinement in any given project. In any script, there is a degree of repetition and foreshadowing, and in the architectural sense, this to may be the case. The combination of detail and material will produce a character for the project, which despite the formal qualities alluded to in the nature of script, has the potential to generate multiple opportunities within these conditions. The articulation of the materials and the details should add a level of legibility to the building in response to the site and should remain appropriate or faithful to the nature of the script itself. It may take many attempts until both the client and the architect are satisfied with the end result, requiring intense and frequent correspondence, it may even require taking a step back and re-working the components once more. At this point, the thought of having to re-work the design may seem counter-productive and much too similar to current convention, but by utilizing

components or modular systems, the re-working at this stage will be much easier. If the script is to be formed around the requirement of producing tangible pieces or modules which can generate infinite possible projects, these modules can easily exist in digital space as well as physical space, creating the opportunity to utilize technology as a tool for economy.

Up until this point in the framework, the computer has intentionally been avoided, so as to not propose that any form of participation should occur in the digital realm. But with the raw elements chosen, the architect can quickly import them from the digital version of his script and further manipulate the design. Once the design is finalized, working drawings and specifications can easily be extracted. The specific technology to be used during this phase of the process is entirely open to the architect or the client, however, it must possess the ability to manage information (BIM technology) through simulation in order to be efficient.

POST-PRODUCTION

In film, the post-production process is the final step in editing and assembling the film, making sure that it runs smoothly before being passed on to its intended audience. Beyond the role of technology to provide a standard of presentation, the modular or component based process will also lend itself to being transcribed into a system of fabrication, making the framework even more attainable to the mass-market.

"Technology need not be invisible for craft to retain its integrity; at the same time, the exploitation of technology does not necessarily entail the design of a 'machine for living'."

– Susan Piedmont-Palladino
Devil's Workshop, 6

Though fabricating components in a factory is not a new idea, it is one that has perhaps not been understood to its full potential. The construction process in a factory has the ability to maintain its linearity; however, the processes may become overlapped. The contractor is able to jump into construction much sooner, as early as the initial scripting phase, and has the added benefit of working alongside the architect and the product engineer throughout the process to maximize the efficiency of construction. On-site work is minimized and while one task is being finalized, another has already begun, ultimately fostering teamwork between the trades as precise communication becomes necessary.

For the process to reach a state of habitation, many participants will be required to physically produce the components and erect them on-site. Even though the building may reach a state of completion, the living interactions that occur in time along with the knowledge gained throughout the process, may shape the architecture further into the future, so in a sense, it may never be complete. The notion of incompleteness is one that will definitely apply to the work of the architect. Not only may his script need to be re-written after time and participation influence his own understandings and beliefs, but the entire possibility of works created through the script may never come to fruition. Eco was precisely accurate when he said that "every performance offers us a complete and satisfying version of the work, but at the same time makes it incomplete for use, because it cannot simultaneously give all the artistic solutions which the work may admit."¹¹

"We have the resources of freedom, technology, and wealth that other ages could only dream of. We have only to open our minds to new ways of practicing architecture, engineering and construction. When beliefs change, actions will follow. Then we may see architects, engineers, and builders shaping a world that is brighter, healthier, more just, and more abundant."

—George Elvin
Integrated Practice, 218

¹¹ Eco 33.

2.2 THE SCRIPT

With the role of the architect evolving, we now assume the role of composer, which implies the arrangement of components which can be produced through our modern modes of construction. Limitations, such as sustainability and fabrication, can be used to when considering the design of components for the script. Standardized building materials can provide a start, as typical building materials in the construction industry follows a strict scale; for example, a piece of plywood, or drywall, or any sheet material is four-feet by eight-feet. A stud comes in an eight-foot length, and becoming more common are nine-foot¹ and ten-foot increments of these standard materials. We can space studs at two-foot increments to match this unit of measure and the closer the dimensions of your design adhere to these construction elements, the less waste will be created from altering materials, subsequently reducing the cost of labour and time.

While simple, planar or individual components such as construction materials can quite easily be modelled and manipulated by participants to create massing and compositional structures, much like Lego blocks, this script sees these components as being assembled into a module in the factory before being sent to site. Therefore, the script becomes a modular component based system, of which standard elements are incorporated for efficiency. To limit the amount of on-site work necessary, the modules will be completely self-sufficient entities, including all insulation,

"Only within strict limitations is freedom possible."

—Igor Stravinsky
GHOST, 205

PA

2.2 THE SCRIPT

¹ While not all materials are available in nine-foot lengths, drywall is now manufactured in this dimension, making the finishing of interiors with a nine-foot ceiling height more economical.

mechanical, electrical and plumbing functions, as well as all interior finishes such as flooring and cabinetry. As this is a theoretical project, the design of these modules will be based not only on material dimensions, but also on local road restrictions for transportation and on precedent projects for tectonic clarity.

RESTRICTIONS

Ideally, the fabrication of modules off-site will allow virtually anyone, anywhere to participate in the design of their own home. While each site may restrict the design of the building from the on-set, it is the question of moving the modules to the site which will inevitably decide whether such a process is even feasible. While road restrictions are different depending on the region, it is the Ontario load restrictions² which will be most relevant to this script.

The Highway Traffic Act (HTA) establishes a set of regulations for standard and oversized vehicles in several situations. Due to the nature of modular construction, we can right away eliminate the use of standard vehicles for the transportation of this script. Therefore, we must look at the regulations imposed on oversized vehicles, for which a permit is always required. There are three ways in which permits are issued: annually, on a per project basis, or per trip. Each of these permits provides different specifications for the vehicles and/or loads on 2-lane highways as well as multi-lane highways. With all of the options available, the most appropriate restrictions to

² Ontario, Ministry of Transportation, "A Guide to Oversize/Overweight Vehicles and Loads in Ontario." The Ontario Ministry of Transportation.. 18 February 2010. 22 February 2010. <www.mto.gov.on.ca/english/trucks/oversize/guide.html>

"Remaining removed from the phenomenon of mass-production or thinking we must protect our professional turf in the face of it will only make architects irrelevant."

—Brian Mackay-Lyons
GHOST, 128

incorporate into the design of the module would be a per project based permit³, as annual permits imply continual use and each project is likely to consist of more than one module.

Project based permits allow for the transportation of objects or structures over a route for a period of up to 6 months, depending on the contract issued. The dimensional restrictions for combination vehicles are 36.58m (approximately 120'-0") in length, and 4.3m (approximately 14'-1") in width with no height restrictions. If the height of the vehicle exceeds 4.3m, the route must be cleared beforehand, and some loads may require an escort. Based on these restrictions, the overall dimensions of the module cannot exceed 120'-0" x 14'-1" including all finishing, and should be limited to a single story in height.

TECTONICS

Starting with the road limitations and the restrictions of standardized materials, we can begin to layout the dimensions of the modules. Since the modules will be built in the factory, we can use more commercial applications of a material. Drywall, for instance, is typically installed horizontally in residential construction, creating a great deal of cutting, taping and finishing, while in commercial applications it is installed vertically, creating only vertical joints. Standard height of a piece of drywall is 8'-0", however, you can also find 9'-0" and 10'-0" heights. Therefore, the finished interior height of the module will follow these dimensions.

³ A per project permit costs approximately \$200, a fee which can be reasonably added to the budget while many typical fees (such as engineering services and materials) associated with conventional design processes will be incorporated into the cost of the modules themselves.

Placing two pieces of drywall side by side, you are able to create an 8'-0" width, and with three pieces, a 12'-0" width. For each module to be self-sufficient, it is necessary to include the dimensions of a standard two-by-six stud (5-1/2") and the thickness of a piece of drywall (1/2") to each side, which will add a total of one-foot to the width of the module. Therefore, the modules will come in exterior dimensions of 9'-0" and 13'-0" before the application of sheathing and exterior finishes, which may vary in thickness depending on the material. With a maximum width of 14'-1", there is sufficient allowance remaining to apply almost any type of exterior finish before leaving the factory.

The length of the modules can be quite long, up to 120'-0", but for the sake of participation, the length will be restricted to increments of the width. Therefore, there will be 9'-0", 13'-0", 18'-0" (9 x 2), 22'-0" (9 + 13), and 26'-0" (13 x 2) long modules. This combination of widths and lengths will allow participants to orient all modules in a number of arrangements without creating random deviations from the standard dimensions. Being of moderate scale, these modules would be quite easy to install on site with a small crane, though it will be more beneficial to join several units end to end off-site before transporting and installing them on-site.⁴ Multiple modules can also be placed end to end on a truck to limit the number of trips required to deliver the modules to the site.

Given that transporting modules will generate a great deal of vibration and stress, the structure

⁴ It will be during the production phase when the architect is consulting with both the client and the fabricators to decide which modules may be combined into a single, longer module in the factory.

of the modules should be designed to resist these forces. While wood seems like the most economical material to build with, it may not be the most practical for structural purposes. If steel is incorporated into the module, at least in a structural capacity, it may also be possible to create more flexibility in the potential facades and floor plans by reducing the required structure. Creating a rigid steel frame around the perimeter of the module will provide this structural integrity and flexibility. For each unit to be self-supporting, the beams around the perimeter of the structure will only be supporting the loads of the modules themselves. If the maximum length of the module is 26'-0", then it is within reason to expect a single steel beam to span the entire length, eliminating the need for intermediate supports. These simple spanning beams are to be 3'-1/2" x 10" x 1/4" HSS members supported on 3'-1/2" x 3'-1/2" x 1/4" HSS posts at all four corners.⁵ All connections will be either welded or bolted and the entire frame painted with an intumescent paint to provide fire resistance. Most members will be enclosed within the roof, floor and walls of the module, however, if the members are exposed to exterior conditions, painting will prevent corrosion.

With a structurally rigid frame, the walls, floors and roofs can be simple infill panels in the frame, meaning that they can be constructed simultaneously or even in another factory. The floor and roof panels will also contain the required thermal insulation, much like Structurally Insulated Panels (SIPs)⁶. The insulation and moisture protection which will be incorporated into these panels

⁵ Structural steel members have been sized using simple spanning building code charts. However, once dead and live loads are considered, the strength of the module may be insufficient, making the contributions of the product engineers and materials scientists at this stage crucial.

⁶ "SIPA: Structural Insulated Panels Association," 2007. Structural Insulated Panels Association. 16 November 2009 <www.sips.org>

will be far superior to what is typically constructed on-site. These panels will span a maximum of 12'-6" and sit inside the 10-inch deep steel frame. Sandwiched between two 5/8" sheets of plywood, standard dimension two-by-ten members at 16-inch centers will form the structure and perimeter of these panels while high density Expanded Polystyrene (XPS) will fill the cores to provide a thermal resistance value of approximately 47.5 (based on R5.0 per inch).

For the exterior roof condition, it may be possible to add trusses on-site to obtain a traditional roof line, however, the standard module will have a flat roof. To achieve a watertight roof, a 3/4" layer of sheathing with a waterproof membrane will be applied over the insulation panel. The perimeter of the module will use a 2x6 member to create a raised lip to contain any required ballast and to provide the flashing and drainage of the roof. If an overhang is desired, 2x4 members will be placed under the sheathing layer and cantilevered the distance of the overhang. With a flat roof, it is also possible to sit a standard flat element roof deck on the finished roof to bring the level flush with a second story module. For interior conditions such as two-story spaces where insulation is not required in the ceiling, the structure may be left exposed on the underside or contain plumbing, electrical and mechanical work, however, where the solid insulated panels are required these services will be concealed in bulkheads or fully dropped ceilings.

Because there is the added requirement of electrical work to be incorporated into the

walls, and the layout of such may differ from project to project, the walls will be constructed right in the steel frame. Non-loading bearing, these walls will be constructed of two-by-six members with a single top and bottom plate. For exterior walls, mineral fibre batt insulation with a thermal resistance value of R19 will be included. For interior walls within the module, or perimeter walls which do not fall on the exterior of the final building, two-by-four members may be used. In order for a clear height of 8'-0" or 9'-0", there will be either a dropped ceiling of 1'-1 1/2" (for electrical and duct work) or two-by-three strapping applied to the underside of the roof panels directly (for electrical only, mechanical will be concealed in bulkheads). If there is a second floor to be added to the structure, the ceiling height will be 9'-0" with electrical and duct work contained in the cavity where the ceiling panel would have existed. It may be then also be possible in some instances to extend the ceiling to 10'-0" by placing the drywall directly on the underside of the module panel above (for electrical only, mechanical will be concealed in bulkheads).

The tectonic features of the module allow for a variety of formal massing opportunities. Without the need for structural walls, there is also a great deal of flexibility in the compositional potential of these masses. With both walls and windows having the independence to be manipulated in innumerable ways, the participants may become overwhelmed with the freedom available to them, and therefore, some compositional choices should be pre-defined.⁷

⁷ The formal tectonic aspects of the module have been defined in reference to Marmol-Radziner Prefab, as this system had the potential to address several issues which were in the forefront as the notion of the script evolved. Typically, the architect would generate an idea about the script and would work in conjunction with other individuals to determine the best way to articulate such a script.

Marmol Radziner Prefab
combines the efficiency of factory-built homes with the benefits of custom residential design. Prefab modules are built in a factory and shipped complete with pre-installed interior and exterior finishes, flooring, appliances, and more. Marmol Radziner Prefab have been a key source of inspiration and guidance throughout this thesis.

Figure 1 tectonic details of the module

DISSECTING

The simplicity of manipulating a series of modules into a formal massing will hopefully be intrinsic for the participants, but if there is no guidance for the composition or arrangement of the functional elements of living spaces, the end result will be an abstract massing strategy. If the participants are to define how their spaces are to be connected, both interior and exterior, then it will be necessary to provide them with a series of potential circumstances. With little interruption from the architect, these potentials will show the participants what is and is not possible within a given module (such as spatial requirements for a stair), and within a series of modules. Some participants may choose to directly implement these suggestions into their own project, however, as they invest more time into understanding the script and its limitations, they may begin to develop compositions entirely on their own.

Living spaces can typically be defined in terms of use: public, private, semi-private and circulation. If each module is given its own function, we can perhaps then begin to define some possible internal compositions for each module. Rather than defining these layouts independently, several precedent projects will be dissected in order to achieve a balanced and diverse catalogue of possibilities. The precedent projects are all prefabricated systems which are based on modular construction techniques, therefore, it is reasonable to expect that this script could be applied to such existing projects.

Resolution: 4 Architecture is a firm dedicated to addressing the 21st century conditions through intelligent architecture and design. Their prefabrication system, *the Modern Modulo*, is a systematic methodology of design that seeks to offer the option of "mass customization" to the single-family housing market while aesthetically transforming the sub-urban fabric of America's domestic landscape.

The dissection will be performed in terms of massing and composition simultaneously. With the dimensions of the modules clearly defined, the plans of the precedent projects will be pulled apart, re-scaled, and slightly altered if need be in order to divide the functions of spaces into separate modules.

It has become clear through the dissection that there are several strategies implemented by these firms in terms of the composition of space. Based on the dimensions of the module, several options for each function will be selected and further designed for pre-production participation. The principles of the precedent projects regarding horizontal circulation, such as corridors and open circulation, have been accepted and a standard for such will be applied. A width of 3'-1 1/2" will be given to all corridors and door openings, to absorb the inclusion of a 4 1/2" interior wall thickness within the finished 8'-0" and 12'-0" widths and a 3/4" door casing. Further to this, corridors will always occur on the perimeter of the module. By keeping hallways to the perimeter of the modules, they may be converted into interior space for another room, or into storage space should the modules be arranged in such a manner where the corridor is not required. By not defining any doors, but simply leaving openings, it will be up to the participant to choose the level of privacy required for any given space, as well as how these thresholds operate in relation to the flow of their space.

Figure 2 stair and fireplace options; dissecting Resolution:4 Architecture, two story bar (source: www.resolution4.com)

Figure 3 ceiling extension and glazing options; dissecting Resolution: 4 Architecture, two bar bridge, three bar bridge and lifted bar (source: www.re4a.com)

Figure 4 railing and post options; dissecting Marmol-Radziner, South Ridge and Hidden Valley (source: www.marmolradzinerprefab.com)

Figure 5 dissecting Marmol-Radzoner, Desert House prototype, Palms and Grey Fox (source: www.marmolradzinerprefab.com)

With potential interior compositions mapped out, the exterior composition of the skin is still undefined and ambiguous. By offering several options to the participants in regards to exterior window and door apertures, such as full height or punctuated, they will be able to determine the transparency and level of connection their space has with the exterior. By pulling apart the modules into this third layer, that of the skin, the participants will be able to see how spaces may be affected by the choices they make. For example, if the participant designs module by module, and then attempts to intersect two modules, the skin will have to be altered to reflect this. It will show the participant the consequences of their actions and contribute to their understanding of the design process.

RE-INTERPRETING

While it is ultimately the participant's decision as to the massing and compositional output of the script, it is the architect's responsibility to fully understand the limits and implications of such freedom within their script. With a massing and composition strategy defined, the boundaries of the script and the module should still be tested. What are the limits of it? Can it be sympathetic to traditional notions as well as the modern notions which are demonstrated in the dissection of prefab precedents? If the module has the capacity of producing both modern and traditional compositions, then how can one limit the application of a 'style' or character so that it is appropriate to the project?

A re-interpretation of several traditional floor plans will occur along with several contemporary layouts realized through traditional rather than prefabricated building techniques. This re-interpreting will use the interior compositional layouts dissected above to re-create these floor plans at the scale of the module and will also allow alternate floor plans to be created which have not yet been established. Though some slight changes in the overall plan will inevitably occur, the limits of the script will hopefully become evident.

The limitations of the module are quite vast. While there are some formal characteristics of traditional styles of architecture, such as turrets and bay windows, which cannot be achieved through the simple rectangular modules, it is quite possible to compose simple traditional layouts through the script. Several situations, such as split levels and garages, cannot be created through the modules as the structure gets in the way. It, therefore, appears that through the re-interpreting of these plans, that it may be more appropriate to not replicate these plans but rather to adopt the principles of these layouts in a more contemporary manner that is sympathetic to the module and to the demands of the current generation. If a garage is desired, perhaps a carport can be created instead by raising modules off the ground, and if split levels are desired, they may only be by a few steps to maintain clear head heights throughout the space. So while it may be necessary to accept that any given script cannot create every formal or spatial condition which is possible, compositional inspiration may be drawn from these more traditional projects and therefore should

¹ All limiting notes can be found in an extended text in the final chapter, working notes.

DreamHOMESource is a catalogue of residential floor plans which can be purchased by the public. The designs within to book are all standard examples of what one might expect to find in a suburban neighborhood across North America. Styles range from contemporary to farmhouse to Mediterranean.

The New Wood House by James Grayson Trulove is a compilation of modern homes which make use of wood and other sustainable materials and techniques.

LIMITATION NOTES

What are the possibilities and limitations of the module? Through the re-interpreting of a variety of floor plans, several questions were posed and answered, while other issues and potentials were made obvious. A written chronology of my thought process throughout the interpreting of the chosen projects was incorporated into the drawing panels.

Stinson Beach House, Turnbull Griffin & Haesloop Architects

- sloped roof: hat components should have same slope and built-in gutters at low ends so they don't create valleys for water to sit. Could span several modules in length but will need to be divided into widths of 33'-0" maximum.
- clerestory windows: on high side of slope are possible, but with the structural frame below and above, they be quite small.
- conclusion: plan was able to be duplicated almost identically in layout and scale with standard layout modules. The interior openings are optimal for modules as there is no possibility of sloping clear span interior ceilings with a hat component due to the necessary structure and maximum width.

Figure 6 re-interpreting Turnbull Griffin Haesloop, Stinson Beach House (source: Trulove, *The New Wood House*)

Figure 7 re-interpreting Safdie Rabines Architects, Bradley-Cohen House (source: Trulove, *The New Wood House*)

Bradley-Cohen House, Safdie Rabines Architect

- exterior stairs: have to be a separate component, they cannot be inside the module unless the stair is covered by a roof or frame. The structure would have to be exposed to the exterior.
- fireplaces: must exist on exterior walls otherwise they interfere with the adjacent modules structure
- roof deck: is a 'flatpack' element which simply rests on top of another module with a flat roof to allow drainage and bring floor height up to same level.
- conclusion: floor plan was easy to duplicate with minor variations in the interior stair which because it's a switchback, could not have full height storage below the landing due to the module structure interfering with door height.

Figure 8 re-interpreting eplans.com, HPK1200010 (source: DreamHOMESource)

HPK1200010 and HPK1200058, eplans.com

- loft spaces: can be achieved by stacking modules of same size or with a smaller module above. Creates ledges over closets in stair units when the stair is on an exterior wall or lofted below.
- stairs should have the option of starting off a room, not a hallway. If you push it forward it leaves room for a bench or storage on an extended landing or storage for a module backing up to it.
- porches: can be created through exterior modules and may be used to support modules above
- cantilever: of upper units could be done but additional structure may need to be incorporated into lower units. It may create 'floating' corners of upper unit if modules are shifted in direction or dimension.
- bay windows could be appendages but may not even be necessary as the modules tend to create a better used space
- flipping and shifting modules layout form floor to floor can allow functions to be contained in a single unit rather than straddling several units. Where possible, this should be done to avoid seeming rooms together on-

Figure 9 re-interpreting eplans.com, HPK1200058 (source: DreamHOMESource)

- site. All pre-defined module options are self contained and to should be any custom layouts.
- garages: in basement are more practical than having yet another system of component for walls. If all enclosed garages are in this condition, then full split levels cannot be done either, but the stepping of modules in multi-levels is still possible.

- conclusion: the cookie-cutter choppiness of the original plans are simplified through the use of module layouts which follow the dimensions of an inherent grid with 3'-1 1/2" hallways and 2'-0" built-in depths. The new layout does not sacrifice much in space or flow, and the space which is sacrificed is absorbed through larger built-ins and better organization of space.

Figure 10 re-interpreting eplans.com, HPK1200002 (original) (source: DreamHOMESource)

- roofs sloped on interior: would have to be done on-site as modules are rectangular, caused issues for vaulted ceilings also. Can vault a single unit by truss and eliminate ceiling panels, but for multiple units it would have to be beams disrupting span- could be an effect of false beams
- garages: should be built on-site. Need to eliminate a lower beam to drive over therefore removing structural integrity of module. Could be a panelized SIP's system. In pre-production, what is the standard? Some simple posts to create carport or image cards of garage sizes?
- split level: is possible with u-shaped stair option but beams get in the way of head height and landings. The module would either have to be tweaked to allow this- a 2 storey module, or exists as a void in the modules with stairs inserted as an object rather than a module. If roof is sloped over stair, the void is the only possible option as module would penetrate the roof, could create 'dormer' effect. Void would possibly need panelized walls if on an exterior wall, same panel system as garage?
- arched windows possible within the module height, not

George Barton Residence, Frank Lloyd Wright [1903]

- roofs: will be separate from modules and will require quite a bit of on-site work. Trusses may be partially assembled off-site to a maximum width of 14'-0"
- bump-outs: bay windows and fireplaces and other such nooks may be 'hung' off the main modules or rest on foundation. These bump-outs will be during production to 'tweak' space where desired.
- bathrooms over stairs do not leave sufficient headroom, small powder rooms will work
- 'flatpack' elements such as deck of roof height extensions can be in any size but should stick to the dimensions of the module for prefabrication means. Make a smaller series of dimensions for decks and porches and stairs (3 riser maximum)
- finishing: brickwork should be done on-site OR use new non-bearing stone veneer products. Don't get same mass of wall but has similar visual qualities. Exposed beams of custom millwork can be incorporated but may come at a cost. False posts may be constructed like walls, unique to each project depending on the mass of them.
- modules may exist as exterior porches or as a combination

Figure 12 re-interpreting Frank Lloyd Wright, George Barton Residence (source: Storer, The Frank Lloyd Wright Companion)

also consider a set of details and materials as a way in which to articulate such projects in manner which is sympathetic to both the module and traditional notions.

ARTICULATING

Within the script, the articulation and appropriateness of a character should be defined in advanced. Though the compositional limits are open as is the range of possible 'styles', the limits as to what may be appropriate in terms of character may be more refined. In both modern and traditional compositions, the degree of appropriateness may be vastly different so how do you define the limits of an element's appropriateness? Are they implicit in the script (meaning the elimination of controversial elements altogether) or are they explicit? If they are explicit, we must be able to communicate or restrict the client from making inappropriate decisions about the character of any given project. While the module considers the materials of construction, it does not incorporate any fixed aesthetic or rigidity of character. There will be more potential participation by leaving the character of the project ambiguous during the pre-script phase of the process, and incorporating the articulation of material and detail at a later phase of the process.

The character of a building may be articulated in several ways, through the materials, the details and through appendages. Architectural elements such as fireplaces, railings, sunscreens, awnings and roof overhangs, as well as more traditional details such as vaulted ceilings, all contribute to the character of a building. By objectifying these elements in a reflection of mass-

floor plans can be unique or composed from existing 'templates'

- hardscapes and landscape done on-site
- conclusion: very possible for a near exact plan, though slightly smaller in scale, to be achieved assuming that bump-out appendages are an option. It is more appropriate to adopt the principles of this plan and reinterpret it into a more contemporary dwelling that is sympathetic to the module and to the demands of the current generation. We must accept that any given script cannot create every formal or spatial composition which is possible, therefore, though the elements and methods of articulation may be sympathetic to a range of projects, they do not necessarily need to include all possibilities.

"Any plan attempting to define in advance all the activities of design and construction in too much detail is obsolete before it is implemented."

— George Elvin
Integrated Practice, 82

production², these components may be added on to contribute formally to the look and feel of a space, but they can also have a tremendous impact on the function of space. As separate components or appendages, these elements must be both responsive and appropriate to the form and functions of space. Therefore, while the participants design the formal massing and composition of space in the pre-production phase, the architect must take on the responsibility of ensuring appropriateness through the articulation of materials and details during the production phase.

How does the architect go about satisfying issues of appropriateness as well as the client's desires? In a series of form and character guidelines, *GOLDEN: The Intensification of the Found*, a number of different options were calibrated for both composition and massing strategies, as well as materials and articulation strategies. Andrew King and Associates evaluated the community's responses in these areas using a variety of qualitative methods. The guidelines were drawn from qualities already present in the town rather than from a fabricated notion of what the town should be.³ In this script, the form guidelines are drawn from the construction industry as a means of fabricating a module that is environmentally responsible. As the project is not site specific, a character cannot be drawn from such an imaginary place nor should personal opinions

² While material choices and certain details may be incorporated into the design at the factory throughout the construction process, some elements will have to be installed on site. For these elements, the tectonics are defined in response to the tectonics of the module (see figure 1.1) but the scale of some of these elements, such as decks and sunscreens, may be defined on a per project basis. Each of these elements will be shipped as "flatpack" product, with simple connection details to minimize the installation time.

³ Andrew King and Associates. "Golden: The Intensification of the Found." National Urban Design Awards Submission, 2010.

Andrew King is an architect, author, critic, curator, and educator. His design work and critical essays have been published in several national and international art and architecture journals, and he was selected as one of Canada's design leaders by The Globe and Mail.

or restrictions be imposed. The character guidelines will thus be established from the fabricated notion of the module and the limitations explored above. A set of possible character options that can be applied to the form will be catalogued and through active discussions between the architect and participants, a series of appropriate materials and details will be applied to each project during the production phase.

2.3 PRE-PRODUCTION

With each new project, the site visit and the history of any site may influence the character of the project, as well as the form. In a formal manner, the site will restrict dimensions in massing and composition. In a character manner, some options may be eliminated or added to the catalogue by the architect before being presented to the client during production to ensure appropriateness to the form as well as sympathy to the site. Because of the customization of the catalogue for each project, the initial pre-production phase of the process will see the architect exploring material and detail relationships with the site while the client is exploring formal relationships.

Each client, before interacting with the script, must provide the architect with a simple set of information regarding the project so that he or she may determine the pieces in play. Based on the information provided by the client before this physical interaction, the architect may eliminate some of the components or cards from play. For example, if the project is to be a bungalow, then there is no need to burden the client with vertical circulation elements, unless they intend on having a full foundation with additional living space. The structural modules defined in the script will be constructed as a series of scale components including the frame, panels or wall skins, vertical circulation modules and floor/roof surfaces.

All of the components will work with and within one another to create an abstract massing of space while scaled cards of the possible module layouts can be arranged simultaneously within the

modules to compose the space within the mass. These cards and modules will be manipulated on a scaled image of the site plan which the client will supply the architect with prior to commencing participation. As the massing and subsequent composition of a project will be restricted by the site and the zoning bylaws, the setbacks, lot coverage and building height restrictions, as well as environmental and contextual issues will be included on this site plan.

In an effort to help the client understand the financial aspects of their project, the composition book which demonstrates the limits of the system and is to be used as a reference for the participant, will include the square footage per module and also a base price per square foot in a range of finishes: low, medium or high quality. Catalogues of materials and details which articulate and define a character of the project in the next phase will also have a low, medium and high price-point, so that the client is aware of the dispersing of their funds to different areas. The price of the base module and materials applied can only be a percentage of the total budget, however, to allow for transportation, installation, and miscellaneous fees such as additional electrical or mechanical detailing.¹

It will ultimately be the architect's responsibility in the production phase of the process to determine the appropriateness and feasibility of the clients decisions. Though the participant will

¹ The cost of the modules should have a fixed price, as should all components and elements such as windows and railings. With all pricing disclosed, a client can then choose where they want to disperse their funds, for example having a smaller space with higher quality finishes, versus more space with basic finishes. A fabricator and full scale prototype would be required to determine the actual cost of the elements.

be able to generate a building that fits within site restrictions and their spatial requirements, and during production their aesthetic tastes, the architect may have to reinterpret the final product to ensure that all building codes and monetary restrictions are met, and also that the most efficient use of modules has been chosen to create the space.

FABRICATING GAME PIECES

The process which is set into motion through this framework not only questions social issues, but technological issues as well, bringing both into harmony with one another. As the author and conductor of the script, an initial attempt at understanding and implementing the tools of technology was made to fabricate the game pieces to be manipulated during the testing of the game. While translating the theory of the module into an abstracted set of pieces for play, it became clear quite quickly just how vast a script may be and how essential technology has become.

After designing the abstracted pieces of play for the game- the frames, wall panels, floor/ roof surfaces and vertical circulation- I began to wonder just how many pieces would be required in order to allow for a collaborative design process to successfully begin to test the game. If the precedent projects which had been dissected and re-interpreted were to be possible through the game, then I would need at least as many components. In breaking the projects down into the number of modules required to create them, along with trying to determine which modules were most common, a definitive result could not be achieved. The number of modules required ranged

from 7 to 25, and while the smaller projects used no more than two of the same size module, some of the larger or more symmetrical layouts used up to ten modules of the same size. While the larger module sizes, those with 13'-0" widths, were used more frequently, there was not a single module that was not represented in at least one of the projects. Multiplying the frequency by the number of modules, the sheer quantity of pieces that would need to be produced was overwhelming.

Though the number of components required to generate full scale projects may be extensive, it may be possible to test the game theory with fewer components. At a certain point, the quantities of components and compositional possibilities may inevitably become overwhelming, not only for me as the conductor, but for any participant as well. Therefore, while endless possibilities are able to generate an infinite number of actual projects from a single script, the vastness may prove to be counter-productive to the collaborative potential of the game. Therefore, the number of components fabricated for the testing of the game has been limited, vertical circulation units have been omitted and roof and floor panels combined.

Before using a CNC machine to produce the game pieces, several materials were tested to determine which would be the most durable. The result was that plastic, more specifically plexi-glass, allowed for enough flexibility within each component to prevent breaking under the pressures of human manipulation. An added benefit of this materials is that the opacity allows the participant to maintain unobstructed views of the space they are working within. The composition

cards have also been produced on clear acetate so that they may be overlapped or even traced and manipulated by the participant with erasable markers.

While the design of the script and fabrication of the modules has evolved throughout the process of design, one constant has remained throughout: architecture, no matter how many components or methods of fabrication there are, can only exist as a democratic process, where relationships are forged and pushed to their limits. With that hope, I set the game free, having

Figure 14 the game includes frame modules, panels and surfaces as well as composition or layout cards. The scale of the game is $\frac{1}{2}$ " = 1'-0" for the massing components and composition cards are at the same scale to allow them to places directly into the modules.

frames are the cube-like components of the game. They have been designed with 4 posts, one at each corner, and "beams" on all edges- top and bottom. The beams along the bottom feature grooves for the wall panels to sit into, and a recessed inside ledge for floor panels to sit upon. The upper beams have been cut all the way through, leaving only enough material at the corners to maintain structural integrity. With these slots, wall panels may be dropped into and slide across the tracks created on the bottom beam. As well as this basic frame, the components have also been subdivided laterally with the same grooved and channelled beams. This will hopefully allow for modules of different sizes to abut one another, as well as delineating interior and exterior space within the same module and also allowing for partial floors.

panels are the exterior skin of the module. They have been manufactured in 2'-0", 3'-0", 4'-0", 6'-0" and 8'-0" widths with all types of glazing etched into the surface. This provides the client with opportunity to see the size of windows in relation to the space.

absolutely no idea what kind of monster may emerge, a true motive to any collaborative process. Regardless of who has made the key decisions, I have every confidence going into the tests that any project which emerges will possess the identity of this script and its author.

TESTING

The testing of the pre-production phase of the game is underway. As the script was intended to be usable by anyone, the participants chosen come from a variety of backgrounds. As the conductor of the tests, overseeing the game play, I aim at exploring 3 primary limitations of the game:

What are the functional limits or restrictions of the game? I am interested in determining whether the design of the game pieces allows for people to participate and to design without getting in the way of their creative freedom. It will also be interesting to see how a person's background may influence their interpretation of the game. Do pieces operate in a manner that is basic enough for the participant to quickly understand how it works and then move on to the design of their project?

Is participatory gaming more successful when only one participant plays the game with the architect, or when a group of people begin to interact? It seems that group participation would yield a greater variety of results and higher

surfaces are the floor or roof panels which fit into the recessed edges inside the frames. They are grooved on the underside to accommodate the intermediate divisions within some modules, and also allow that smaller surfaces can be inserted into larger frame and still be supported.

potential for collaboration, as participants push one other to uncover more ideas, however, the components of the game may not be loose enough to allow for this rapid exchange of ideas. One person, then, may be able to achieve a more complete project as they work through it on their own terms. Can participation grow into an active collaboration if only the participant and the architect or gaming apparatus are involved? Is this too similar to convention?

Is there a tendency towards some pieces and compositions over others? As the author, I was not able to determine which pieces would be favoured by the participants over others, perhaps because of my own stylistic preferences. Drawing and testing the limits of the script yielded a high variety of possibilities, and for the game to be successful in the future, the variety of pieces used should be just as diverse. Are there any pieces which should be included or redesigned? If some pieces are never used, should they then be removed from the game? If pieces are so easily removed, how do you ensure a sufficient number of options will always remain?

[COMPOSITIONS]

SMALL_{2.3.1} | MEDIUM_{2.3.2} | LARGE_{2.3.3} | X-LARGE_{2.3.4}

PARTICIPATION
+ ARCHITECTURE

RULES OF THE GAME

The script, as the first phase of the game, has broken down the process of design into 3 subsequent phases of collaboration:

pre-production

The massing and composition of the project is to be designed by the user. A variety of game pieces constituting of structural frames, floor/roof surfaces, and the wall panels (or skin) are to be manipulated into a formal mass and the composition cards are to be arranged simultaneously to create a layout for the interior space. The frames can be placed side by side or stacked on top of one another and the floor, roof and wall panels can be simply placed into the openings and grooves of the frames.

production

Once the massing and composition of the project is complete, both the user and the architect explore the materials and articulation of the project. The architect begins by transposing the project into a computer simulation program and integrating it into the site. The user then scores the elements in the various categories of materials and articulation: elements, finishes, stairs + railings, cabinetry, and fixtures. The architect uses the information provided by the user to establish the look and feel of the living space in an appropriate manner.

post-production

Once the project has successfully been defined in terms of massing, composition, materials and articulation, the architect finalizes the simulation of the space in its entirety and fabrication begins. The architect and the fabricators will work simultaneously on the project to ensure complete accuracy so that when the project arrives on-site, the modules will fit seamlessly. The site work, including grading and foundations, will be completed in preparation for the installation of modules simultaneously. After the modules arrive on site, it will take several weeks to put the finishing touches on the project.

MODULE SIZES

9'-0" x 9'-0" = 81 ft ²	+/- 72 ft ² [finished]
9'-0" x 13'-0" = 117 ft ²	+/- 106 ft ² [finished]
9'-0" x 18'-0" = 162 ft ²	+/- 149 ft ² [finished]
9'-0" x 22'-0" = 198 ft ²	+/- 183 ft ² [finished]
9'-0" x 26'-0" = 234 ft ²	+/- 217 ft ² [finished]
13'-0" x 13'-0" = 169 ft ²	+/- 156 ft ² [finished]
13'-0" x 18'-0" = 234 ft ²	+/- 219 ft ² [finished]
13'-0" x 22'-0" = 286 ft ²	+/- 269 ft ² [finished]
13'-0" x 26'-0" = 338 ft ²	+/- 319 ft ² [finished]

PA 1.0

PA 1.0 is a small retreat ideal for an individual or couple in a country setting. The glass walls of the PA 1.0 fold away, visually and physically linking the landscape with all of the indoor areas of the house. A large overhang provides shade for the large outdoor deck which expands the living space when desired. Overhangs also reduce direct sunlight and harsh weather in any climate.

- 676 ft² of Living Area
- 1 Bedroom
- 1 Bathroom
- Open Concept Living Area
- Covered Deck [228 ft²]
- Single Story

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
Scale 1/8" = 1'-0"

PA 1.1

This light-filled home features an office or guest bedroom on the main level which is completely secluded from the main living space. By elevating the living area, a double/tandem carport provides an easy parking solution. With an overall width of only 17'-2", the PA 1.1 is ideal for dense, urban infill lots.

- 755 ft² of Living Area
- 2 Bedrooms
- 1 Bathroom
- Private Office/Guest Bedroom
- Elevated Living Area
- Tandem Carport

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 1/8" = 1'-0"

SECOND FLOOR PLAN
scale 1/8" = 1'-0"

PA 1.2

PA 1.2 is the perfect vacation home or live/work residence. The main floor features a large office with a private entrance while the second floor features a den with oversize glass doors which open to a large roof deck and outdoor fireplace. The large expanses of glass doors throughout the house provide abundant light and ventilation, and create flexible spaces within the home.

- 992 ft² of Living Area
- 1 Bedroom, Office and Den
- 1.5 Bathrooms
- Two Stories
- Roof Deck (220 ft²)
- Indoor/Outdoor fireplaces
- Basement [optional]

SPECIFICATIONS

APPEARANCE

PA 1.3

This small family home provides the ultimate in indoor/outdoor living. It features an open concept main floor with large glass doors which open to a semi-enclosed courtyard created by the L-shaped layout of the house. The large roof deck accessible from the second floor adds another 306 ft² of living space and if desired, the carport could be converted to a covered outdoor entertaining patio.

- 1012 ft² of Living Area
- 3 Bedrooms
- 2 Bathrooms
- Two Stories
- Roof deck [306 ft²]
- Basement [optional]
- Carport

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 1.4

PA 1.4 is the ideal country home for a growing family. Inside the main entrance, there is a large laundry/mudroom with washroom. The irregular shape provides views around the property and 3 separate entrances and a central stair provide easy opportunity to expand out or up.

- 1042 ft² of Living Area
- 2 Bedrooms and Den
- 2 Bathrooms
- Laundry/Mudroom
- Single Story
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 1/8" = 1'-0"

PA 1.5

This open light-filled space is ideal for contemporary living. A double height living space with a loft, along with 2 bump-out office/study nooks and a walk-through master bedroom closet provide abundant storage within an open concept. The narrow 18'-0" width allows for situation in dense urban sites, although the windows provide expansive views for larger open sites.

- 1107 ft² of Living Area
- 2 Bedrooms and Loft
- 3 Bathrooms
- 2 Office/Study Nooks
- Two Stories
- Double Height Living Area
- Basement [optional]

APPEARANCE

SPECIFICATIONS

FIRST FLOOR PLAN
Scale 1/8" = 1'-0"

SECOND FLOOR PLAN
Scale 1/8" = 1'-0"

PA 2.0

PA 2.0 is the perfect home for a young family or live/work residence. The main floor features a large kitchen, an office and wall to wall storage along the staircase, all surrounded by large expanses of glass doors which allow the indoors to expand onto the wrap-around deck. The second floor features a den or second bedroom connected to the master suite with oversized glass doors which open to a large roof deck and outdoor fireplace.

- 1276 ft² of Living Area
- 1 Bedroom, Office and Den
- 1.5 Bathrooms
- Two Stories
- Roof Deck (212 ft²)
- Indoor/Outdoor fireplaces
- Basement [optional]

APPEARANCE

SPECIFICATIONS

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 2.1

The PA 2.1 is a modest yet functional single family home. Inside the main entrance, there is private entry hall adjacent to a family bath. Two bedrooms also occupy the front of the house, while the master bedroom is separated by the open concept living space and features a private bath and walk-in closet. With slight modifications to the side entrances, the 18'-0" width allows for situation in long, narrow sites.

- 1308 ft² of Living Area
- 3 Bedrooms
- 2 Bathrooms
- Open Concept Living Area
- Single Story

SPECIFICATIONS

APPEARANCE

■ FIRST FLOOR PLAN
 Scale 3/32" = 1'-0"

PA 2.2

This small family home features an open concept main floor with separate living and dining areas, and a laundry/mudroom beside the main entrance. The second story of PA 2.2 is completely private, devoted to the 2 bedrooms and master suite which features a large bath and private roof deck.

- 1346 ft² of Living Area
- 3 Bedrooms
- 2.5 Bathrooms
- Two Stories
- Laundry/Mudroom
- Private Roof Deck [46 ft²]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 2.3

This modest 2 story family home features a private master suite on the main floor and 2 separate bedrooms on the second story. PA 2.3 offers many flexible options, including the conversion of one bedroom into a loft overlooking the main space, the possibility of 2 separate roof decks, or even adding square footage to the second floor in the place of the roof decks.

- 1350 ft² of Living Area
- 3 Bedrooms
- 2.5 Bathrooms
- Two Stories
- Double Height Living Area
- 2 Optional Roof Decks [607 ft²]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 2.4

PA 2.4 is a large open concept home ideal for families with teenagers or live-in relatives. The main floor features a large kitchen and living area with a single bedroom and abundant storage. The second floor features a large roof deck, a lookout to the living area below and 2 bedrooms, each with their own bath.

- 1491 ft² of Living Area
- 3 Bedrooms
- 2.5 Bathrooms
- Two Stories
- Double Height Living Area
- Roof Deck (312 ft²)
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 2.5

This large family home provides the ultimate in indoor/outdoor living. It features an open concept main floor with large glass doors opening to a semi-enclosed courtyard created by the L-shaped of the house. Guests will have their own private suite off the courtyard and a large roof deck accessible from the second floor overlooks it. The carport can also be converted to a covered patio for more entertaining space.

- 1506 ft² of Living Area
- 4 Bedrooms and Den/Office
- 2.5 Bathrooms
- Two Stories
- Roof Deck [342 ft²]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
 scale 3/32" = 1'-0"

SECOND FLOOR PLAN
 scale 3/32" = 1'-0"

PA 2.6

This large family home features an open concept main floor with a distinct dining nook, large kitchen, and an office which opens onto a covered outdoor living space. The second floor of PA 2.6 is completely private, featuring a master suite with roof deck and walk-in closet and 2 large bedrooms with a family bath.

- 3542 ft² of Living Area
- 3 Bedrooms and Office
- 3 Bathrooms
- Two Stories
- Roof Deck [98 ft²]
- Covered Deck [325 ft²]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
Scale 3/32" = 1'-0"

SECOND FLOOR PLAN
Scale 3/32" = 1'-0"

PA 3.0

PA 3.0 is a large open concept home ideal for any family. The main floor features a carport with side entrance, a large kitchen and living area and a single bedroom with bathroom. The second floor features a lookout to the living area below, a large master suite, a second bedroom and an office/guest room which opens to one of the 2 large roof decks.

- 1610 ft² of Living Area
- 3 Bedrooms and Office
- 3 Bathrooms
- Two Stories
- 2 Roof Deck (350 ft²)
- Carport
- Basement [optional]

SPECIFICATIONS

APPEARANCE

PA 3.1

PA 3.1 is a large family home ideal for any large lot. The front porch opens into a double height entry and the main floor continues on with a separate dining room, eat-in kitchen, and living room. A powder/laundry room has the potential to access an attached garage built on-site. The second floor features 3 bedrooms and a large master suite.

- 1655 ft² of Living Area
- 4 Bedrooms
- 2.5 Bathrooms
- Two Stories
- Double Height Entrance
- Attached Garage [optional]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 3.2

This open light-filled space is ideal for contemporary living. A double height living space with a catwalk above leads to 2 bedrooms on the upper level linked by a jack-and-jill bath. Off one bedroom is a large roof deck. Tucked away from the large open concept living area on the main floor is a private master suite.

- 1700 ft² of Living Area
- 3 Bedrooms and Study Room
- 2.5 Bathrooms
- Two Stories
- Double Height Living Area
- Roof Deck (158 ft²)
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 3.3

PA 3.3 is the ultimate in outdoor entertaining. The large dining and living room opens onto a deck which is flanked by an outdoor dining room on one side and a sun porch on the other. Another deck connects the kitchen and outdoor dining room and features an outdoor fireplace.

- 1758 ft² of Living Area
- 3 Bedrooms
- 3 Bathrooms
- Outdoor Dining Room (144 ft²)
- Single Story
- 3 Decks (492 ft²)
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
 Scale 3/32" = 1'-0"

PA 3.4

This large family home features a formal dining room and living room, a large eat-in kitchen, laundry room and den on the main floor. The double height living room is overlooked by a bridge that leads to the large master bedroom suite and 2 more bedrooms.

- 2012 ft² of Living Area
- 3 Bedrooms and Den
- 2.5 Bathrooms
- Two Stories
- Double Height Living Area
- Deck (156 ft²)
- Basement [optional]

SPECIFICATIONS

APPEARANCE

PA 3.5

PA 3.5 is a large family home ideal for entertaining. It features a formal living and dining room which opens onto a cozy outdoor patio, and large kitchen and family room on the main floor. The second floor features a large master suite with private roof deck and outdoor fireplace along with 2 additional bedrooms or offices and a second roof terrace. An attached garage could be built off the main walk-up entrance.

- 2,178 ft² of Living Area
- 3 Bedrooms and Family Room
- 2.5 Bathrooms
- Two Stories
- 3 Fireplaces
- Roof Deck [3,43 ft²]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 1/16" = 1'-0"

SECOND FLOOR PLAN
scale 1/16" = 1'-0"

PA 4.0

This large single family home features a completely secluded second story with master suite and den that walks out onto an oversized roof deck. The main floor includes an open concept living area with 3 bedroom and 2 baths along with 2 possible bump-out office/study nooks on the stair landings. The large roof deck provides ample room for entertaining or future expansion.

- 2326 ft² of Living Area
- 4 Bedrooms and Den
- 3 Bathrooms
- 2 Office/Study Nooks
- Two Stories
- Roof Deck (865 ft²)
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

PA 4.1

PA 4.1 design is the ultimate in indoor/outdoor living. The large home is characterized by large expanses of trellised decks which bring the exterior into the home and links all areas of the house, including the detached guest suite. The second floor is devoted exclusively to the master bedroom suite which has a large roof deck which holds the potential to expand upwards.

- 2308 ft² of Living Area
- 4 Bedrooms and Office
- 4.5 + .5 Bathrooms
- Family Room
- Two Stories
- Roof Deck [1244 ft²]
- 4 Decks [1428 ft²]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 1/16" = 1'-0"

SECOND FLOOR PLAN
scale 1/16" = 1'-0"

PA 4.2

This narrow family home is ideal for narrow sites and those who require an oversized light filled studio or showroom. The unique shape of PA 4.2 creates a central courtyard to filters light into the studio and open concept living space and the split level adds an element of interest. A central stair leads to the private second level and a third floor roof deck, which could be built-up in the future.

- 2601 ft² of Living Area
- 3 Bedrooms and Studio
- 2.5 Bathrooms
- Two Stories
- Courtyard
- Roof Deck [490 ft²]
- Basement [optional]

SPECIFICATIONS

APPEARANCE

FIRST FLOOR PLAN
scale 3/32" = 1'-0"

SECOND FLOOR PLAN
scale 3/32" = 1'-0"

SOURCES

www.re4a.com

www.marmolradzinerprefab.com

www.cleverhomes.net

www.hivemodular.com

DreamHOMESource

The New Wood House

Case Study #1

Masters of Architecture Students, 1 week

If the game and components of it are to be vague and simple enough for those uneducated in the field of architecture to interact with, those who have been educated in the field should have an advantage. In an attempt to test the physical limitations of the game pieces and the amount of interest there may be in playing the game, I have staged my first case study. Without any detailed information on my project or thesis, I have left the game sitting out in the common area of the Masters of Architecture students studio spaces. It has been my experience at this school that creative minds like to play, and when left something they can play with, they are often compelled to explore.

Day 1— The pieces have been strewn about- a sign that someone is interested. Though I am unsure of who has made the initial move in the game, it appears that they may have been able to understand how the pieces function without prompting. Their appears to be numerous frames which now have wall panels inserted into them, and composition cards lay on top. Though the modules have not been arranged in any particular manner, this is a potentially good sign.

Figure 15 Day 1- unknown exploration and the resulting chaos of the game.

Day 2— The pieces are in the same state. It appears that whoever had shown initial interest has not come to explore more. This could be for numerous reasons, perhaps the participant was an outsider from the program who has not come back, or perhaps the interest was only surface and there is no inclination to explore further.

Figure 16 Day 3- the first complete module, a simple cube.

Day 3— As I approach the game play area, someone appears to be playing with the game. There is now a cube with wall panels on each side. I decide that it would be valuable to have an opinion of the game pieces, and the limitations of them:

The main issue with the pieces of play seems to be that the grooves for walls should be the entire width of the wall, (rather than stop just before the corner) as you need to use at least 3 pieces (panels) to make a wall so that you can slide a piece under each "tab" and then drop the last into the middle. Because of this, you run out of the smaller pieces very quickly and have more large pieces leftover.

The conversation went on further to comment about the composition cards, more specifically the stairs, stating that without a specific module for a stair, there is no rule which limits the glazing around the side of the stair or makes sure that stairs are aligned on top of one another. This is the first indication that perhaps the vertical circulation modules should not have been omitted from the test.

Figure 17 Minimum 3 panels to complete a single wall in the module.

Rather than ending the trial at this point in time, I decided to leave it be and see if anything else would emerge and whether I could find more people participating in the game. The comments I received from participants were surprisingly all on the same topics as first brought to my attention. Perhaps this should not be a surprise, as those participating in the game are all in the same field of architecture.

The comments were quite simple: it was impossible to tell the scale of the modules and pieces, the grooves should not stop short of the corners as it sometimes restricts you from doing what you want to do, such as making one large window instead of multiple smaller ones. The pieces seem to be a good starting point for exploring things, but it would take some time to adjust to the system and understand everything you can do with it. Time which students simply do not have enough of at this point in time.

Another observation I noted over the course of the week was that never once did I encounter a situation where more than one individual was participating in the game at the same time. This may or may not be in contrast to the individual, design oriented mind of the architect, however, there is still some interest in the pieces. It seems that each person just starts where the last left off, changing what they see fit and adding to it. The massing of components appears to be on the level of sculpture, no real composition has been explored, only the creation of objects.

Case Study #2

Married Couple, 2 hours

After the basic testing of the game for functional limitations of the pieces, I decided to move forward with a test outside of the professional field, to a certain degree. I have chosen a married couple, my parents, to begin this test. I have chosen these participants for two reasons, firstly because they have been given some background information on the project over the course of past several months, and secondly, because they have very different minds coming from opposite careers. My mother has a background in banking and accounting while my father is a carpenter by trade. It is my hope that in choosing these participants, some sort of compositional form may be presented at the end of the session, even though there is no site.

Hour 1— It has taken quite a bit more explaining than I had initially anticipated for the participants to get started. The initial response by my father was to start with the basement or foundation, while my mother wanted to explore the composition cards before beginning. After I explained that it was not necessary to design structurally, that this was a game with the goal of determining an overall size, shape and layout for their potential house, my father agreed with my mother and they began to sort through compositions. Once they found layouts that they liked, my

mother was more than willing to write upon them and scribble changes with the markers, while my father began to layout the frames.

Figure 18 Case Study #2- process

Hour 2— After beginning to arrange some of the frames and insert windows, they came to the same issues that had been previously determined in the first case study- that they had to use more small windows than large, and it was difficult to put the windows exactly where and how they wanted them. It also became apparent to them that they couldn't angle walls, or suspend a floor in one module, but would need to do 2 full stories. One comment that remains vivid in my mind is "that's a big f###ing window!" Scale is a definite issue- without telling participants the scale or giving them some sort of site plan or reference, scale will always be an issue.

My brother then walked in and added another participant to the game. While all three of them were able to negotiate without too much disagreement, the project became overwhelming. My mother could not keep up with all the changes on the layout cards, and all the pieces got jumbled together because of lack of space. She complained that she couldn't see all the options simultaneously and didn't know which pieces to start with, because no matter where she started things kept changing rapidly. There was no order, something that she does not like.

Figure 19 Case Study #2: process

After the session had ended, there was no project on the table, just a fragment of it. I asked for some comments and ways that it could be improved to make it easier, and it seems that more space and some logical order to start off with would have been a big help. Some way to record what you had already done incase you wanted to go back would have also helped a great deal. And though my father is a builder by trade, he said that he had a hard time picturing the project, especially with the lack of foundation. He said that he got tied up in the structure, he could build a house but not with this game.

After we had left the table, I showed my mother the incomplete composition book, something I had intentionally refrained from showing them in hopes that it would not place any preconceived ideas into their design and that they would generate their own ideas. Her only comment was that what she wanted to design would never be possible with the game. Everything appeared too modern for her tastes, and that yes, examples would have helped them by giving them a starting point to see what was possible, but that they would probably never choose to build with such a system because it just wasn't in their style.

This comment reflected back to earlier notions which I had explored in the re-interpreting of the script. It did confirm that there may be many scripts out there with different styles that may be more suitable to a client or participant. The ability to choose a system that will work for you and your tastes is imperative to achieving the design you want.

As far as space and scale is concerned, the ideal place to play the game would be in a large open studio. A space where there is a large surface and also perhaps a white board where participants can organize their thoughts. A digital camera could also take instant snap shots of the progress for future reference. In order to establish a scale, the site plan previously mentioned will be imperative to any real-situation projects. With the limitations of the site, the participants may be better able to understand the scale of what they are building, and just how much space the building is going to take. Having the composition book as a reference, though it may imprint ideas on the participant, may also be able to help them determine scale and give them a jumping point for the collaboration—finding a layout that is close to what they had in mind and manipulating it until the desired result is achieved.

Case Study #3

Single Male, 1 hour

This case study happened by chance. My brother who happened to walk into the Case Study #2 session, began to play around with the game after the rest of the participants had left the table. With no instruction, just the interest that he had picked up on his own from joining another session, he began his own project.

At an earlier point in this thesis, I had considered the idea of gaming as a three-dimensional space. I had envisioned a full scale installation where participants manipulated walls and floors on a tracking system which would automatically feed into a computer simulation software.

If such technology exists and collaboration could be made with computer engineers and other such specialists, creating such a tracking system for the game pieces, whether full scale or hand-held, would improve the game greatly. Not only would it allow for players to record their movements, but it would also allow for an instantaneous movement into the next phase of design.

Figure 20 Case Study #3- Process.

Hour 1—I offered to sit with the participant and offer him some instruction on how the game worked, but I quickly got rejected in my attempts. He told me that he understood it, and that he didn't want what had already been started. His reaction was to take it all apart and start over. He told me not to worry about anything, just let him at it. He wanted to start with the overall look and then worry about the details later.

After all the pieces were dismantled, he began to arrange frames. It seemed that he was on a mission, knowing exactly what he wanted to do, he just needed to find the pieces to make it happen. After just a short time

he claimed he was finished, however there were no composition layouts or floors, and most wall panels were missing.

This result somewhat perplexed me. On the one hand I was excited that he was so interested in the game and could understand it with no help, on the other hand, I had no idea what he had designed. I asked him to explain what was going on in his head, what did he see when he looked at all the stacked frames. With hand gestures, he began to show me where his kitchen was, hidden under a lofted second story. He pointed to the bedrooms and bathrooms, which only existed in his head, and also pointed to the imaginary front door.

Figure 21 Case Study #3- final explanation of design.

When I asked him why he hadn't used the layouts and window panels to finish the space his reply was simple, he couldn't find what he wanted. Where my mother had been overwhelmed with options, it seems my brother wanted even more pieces and even more variety. He wanted to be able to chop half a wall off creating a loft with a sloped ceiling and add dormers, things this script does not accommodate. He could see every detail inside that frame, the details which no one else could see.

This case study has perhaps brought up a few more questions than answers. It has allowed me to see that the game can be visualized by certain individuals who may not appear to be creative minded. It has shown that even if the restrictions of the rigid frame do not allow for something you seek, that you may still continue by visualizing it in your mind. Though another script may have better suited my brother, the concept of gaming and hands-on involvement in the design process appealed to him. This outcome also raised the question, when is the game complete? Do you need a fully finished composition, with layouts and windows and doors, to be able to move on to the next phase?

This question may have a simple answer, yes. Because there was only one participant, he could visualize the project. Though he could explain it to me, there is no guarantee that I understood it completely. And if there had been other participants, they likely would not have followed. Being that we cannot read one another's minds, I believe that it is a necessity to complete the massing

and composition phase of the game before moving on. If the first phase must be finished before moving on and the participants are required to complete, they must be reminded that this is not necessarily the end result. Nothing is set in stone and they can always go back and make changes as they see fit.

Another question again surfaces in this study, one that questions how many participants need to be involved in order for collaboration to occur, and with how many participants is this script most successful. It seems that people are able to work with one another to reach a mutual decision, that the ideas of one person can fuel those of another. It also appears, however, that the single participant is able to achieve a more complete result. This again raises the question, *can participation grow into an active collaboration if only the participant and the architect or gaming apparatus are involved?*

2.4 PRODUCTION

After 3 case studies, there is no complete massing or composition to proceed to the next phase with. While I could attempt many more case studies, I fear that the same results will keep occurring. Exploring design with the level of involvement and interaction which this process requires takes time, more time than any volunteers seem to be willing to spend on a fictional project. Therefore, rather than completing a sample project independently, which contradicts the main goal of this thesis, the game will remain open-ended in the hopes that a complete study may at some point emerge out of chance and allow for the testing of the production phase to begin.

Once the client has established a mass and composition which they are satisfied with, the architect must step in to help articulate a character for each project. The first step in finalizing the design is to transpose the project brought forth by the participant into the BIM software. With standard module sizes and layouts, it is a simple matter of choosing from a database of options and importing them into a new workspace. At this point, the architect should review and interpret the project, and also take into consideration the foundation and other site conditions which may have been overlooked by the client. Through pre-established component libraries, the architect is able to generate, rather quickly, a digital simulation of the project. To move beyond the composition and technical requirements of the project, the architect will then have to consult with the client to establish a set of defining characteristics for the project.

character is the style which a project takes on after materials and detail have been articulated. While a script may have some character properties imbedded in it, due to the rules defined by the architect's own ideas and beliefs, the final style should be reached as a collaborative effort between the architect and the participants.

With the ease of updating digital material libraries to reflect the clients composition and massing decisions, libraries of materials and details which had previously been catalogued in their full extent by the architect will be refined and presented to the client. Further to the basic compiling of materials and articulation, information will be divided into a series of catalogues or workbooks: elements, finishes, railings + stairs, cabinetry, and fixtures. The participant will be presented with these catalogues¹ and they will begin to score the elements. By ranking elements rather than outright selecting them, the architect will have the flexibility to interpret and refine the character, ensure appropriateness and also to substitute for local materials or similar alternatives. The architect in this sense is the mediator between the participant and the information management technology.

While the character has the potential to be quite extensive, as shown from the script tests, and result in complex catalogues of information, it is not reasonable to think that every single possibility must be included. By including too many options, the selection process becomes drawn out and some materials may not be used frequently enough to be included in the catalogues. The architect should thus reserve the right to not only substitute materials on a per project basis, but must also be able to update their libraries as they see patterns emerge over time. With this particular script, the potential for contemporary compositions and massing seems to outweigh the possibility of

appropriateness is a level of continuity between materials and spaces. The architect must ensure that the materials and articulation of them meets the intent of the participant and that it is possible within the design.

¹ The materials and details catalogues should exist in a digital library which can be updated with ease and be presented to the client in this fashion. Rather than just simple catalogues of materials, images and examples should be used to clarify the elements and areas which are being scored.

traditional layouts being brought forth, therefore, it seems that the selection of material and details should be weighted similarly. There may be other scripts which see the reverse, and for clients with a strong tendency towards a certain character, these scripts and catalogue may better suit their needs. If we expected a single script and catalogue to satisfy every individual's needs, then the profession would become very restricted and would cause more architects to practice outside the framework in the same capacity as the architect's of the current restricted market.

SCORING

Scoring is based on a simple number system. The scale ranges from -3 to +3, with a 0 indicating no preference one way or the other towards a material or element. Within the workbooks or computer database, the participant is asked to assign a number to each material or element, the architect then works with the participant to implement the character or style into the design. For example, the participant ranks 3 possible exterior materials. The architect will then discuss with the client how these materials are to be applied and where. It will allow different materials to be used in different spaces, and with the architect mediating through simulation, the participant can see how each of their choices will affect the final look of their space.

[FINISHES]

EXTERIOR_{2.4.1} | INTERIOR_{2.4.2}

FLASHING

HORIZONTAL AND
VERTICAL WOOD SIDING

CEMENT BOARD PANEL

STONE VENEER

There is a variety of exterior cladding and window materials and also many ways in which they can be applied. While materials affect the weathering of a house they can also define a style, and using more than material can add interest to the facade. Cedar siding can be installed vertically or horizontally, while cement board can be installed in vertical or horizontal planks or panels, such as the corrugated aluminum panels.

1.0 EXTERIOR

STONE VENEER

antique white

white

aluminum

linen

CEDAR SIDING

CEMENT BOARD
CORRUGATED ALUMINUM PANEL

1.1 WINDOW FRAMES + FLASHING

Window frames and flashing can add significant details to the exterior of the house. Windows can be left with a wood finish or they can be clad in aluminum. The aluminum cladding for windows is available in the same colours as the flashing, and while they may be chosen to match, they can also be chosen to contrast one another.

Marmol Radziner Prefab

WOOD

ALUMINUM CLADDING

white

light grey

dark grey

navy

black

CERAMIC

GLASS

All interior walls have a basic gypsum board finish. The standard finish is a rich white, however, any paint colour can be request and applied during the site installation and finishing of the project. There are also two accent materials which can be applied to any interior wall: wood and tile. For tile walls, a tile size, shape and pattern must also be selected. (More materials options are also available.)

2.0 INTERIOR

2.1 FLOORING

There are many options to choose from for floor coverings and all have a distinct look. If tile floors are desired, a tile size, shape and pattern must also be selected.

SIZE

ACCENT TILES

STANDARD TILES

PATTERN

NATURAL STONE

HARDWOOD
CORK

CERAMIC

SOURCES

www.trendir.com
www.bannontile.com
www.anchorbaytile.com
www.westcoastinc.com
www.eurotile.ca
www.blueoxmill.com
www.southweststonesupply.com
www.signaturestoneinc.com
www.stoneselex.com
www.remodelista.com

[STAIRS + RAILINGS]

PARTICIPATION
+ ARCHITECTURE

"Miami" by Milk Design

OPEN RISER
TREAD
STRINGER
PA
2.4.3 STAIRS
131

In most compositions, stairs and railings will be required, and the articulation of these can contribute significantly to the overall appearance of the finished space. The customization of stairs and railings occurs independently. First, a stair is chosen based on style and finish, then a railing is designed in the same manner. There may be both interior and exterior railings to consider, and the architect will ensure not only that the overall aesthetic is achieved, but also that all local codes are being met.

Once the design has been finalized and the project moves into the production phase, the stair and railings will be fabricated independently. Once both the building construction is complete, the stairs and railings will be fully integrated into the module to add the finishing touches to the space before shipping.

3.0 STAIRS

3.1 STRINGER STYLE

STANDARD

OUTSIDE SUPPORT

OPEN SUPPORT A

OPEN SUPPORT B

• only standard and outside support are available in wood finishes

3.2 STRINGER MATERIALS

maple

white oak

walnut

zebra

ebony

SOLID WOOD

white

grey

crimson

chocolate

black

stainless steel

METAL

3.3 TREAD & RISER MATERIALS

Stair treads are available in a range of finished to match any of the hardwood or laminate flooring options. The stair riser is optional in the standard and outside support stringers, and if desired can be built to either match or contrast the tread.

SOLID WOOD

"Fulton" by Milk Design

"Chicago" by Milk Design

The railings are a key design feature in any home and are comprised of 3 basic elements: the frame, the balustrade and the rail cap. Once the railing has been designed, it can then be mounted in 2 different ways depending in its location and also the desired appearance.

4.0 RAILINGS

4.1 FRAME STYLE

Resolution: 4 Architecture

SOLID

WOOD OR STEEL; SQUARE

STEEL; RECTANGLE

STEEL; DOUBLE RECTANGLE

* solid railing is clad to match interior or exterior finish

4.2 FRAME MATERIALS

maple

pine

cedar

white oak

walnut

SOLID WOOD

white

chocolate

black

stainless steel

METAL

4.3 BALUSTRADE

The balustrade is available in horizontal, vertical and panels within the frame. They can be inset into the frame or in some instances, outset or mounted to the side of the frame.

steel frame, inset steel frame, outset wood frame
HORIZONTAL ROUND

steel frame, inset steel frame, outset wood frame
HORIZONTAL SQUARE

"Damen" by Milk Design

"Fulton" by Milk Design

"Michigan" by Milk Design

"Chicago" by Milk Design

4.4 RAILING CAP

4.5 RAILING CAP MATERIALS

SOLID WOOD

white

METAL

The mounting of the finished railing can be as important to the final appearance as the styles and materials themselves. Traditional top mounting creates a clean look while side mounting adds a little extra detail and can also give a few extra inches to a hallway or deck.

4.6 MOUNTING

TOP MOUNT

SIDE MOUNT

SOURCES

www.milkdesign.net
www.vivahardware.com
www.mogg.ca
www.agsstainless.com

[CABINETS]
TYPE_{2.4.5} | FITTINGS_{2.4.6} | STYLE_{2.4.7}
FINISHES_{2.4.8} | HARDWARE_{2.4.9}

"Carol" by Scavolini

TYPICAL UPPER

FULL CABINET

141

BASE CABINET

All kitchens, bathrooms and storage spaces are organized using a series of standard cabinet units designed to suit individual needs. The customization process begins by ranking the options in each of the 3 categories -type, style and finish- for each of the functions identified. Through a combination of shelves, drawers and rods, it is possible to create practical solutions for any space, ranging from kitchen pantries and laundry rooms to bedroom wardrobes and studies. After the options have been scored, the architect analyzes the preferences along with the composition presented in the pre-production phase in order to achieve an aesthetically appropriate and highly organized living space.

Once the design has been finalized and the project moves into the production phase, the cabinetry will begin to be fabricated. When both the building construction and finishes are complete, the cabinetry will be fully integrated into the module for shipping.

5.0 TYPE

- 9'-0"
- 8'-0" [typical ceiling]
- 7'-0"
- 0"
- 9'-0"
- 8'-0" [typical ceiling]
- 5'-4"
- 7'-0"
- 4'-4"
- 0"
- 3'-0" [extend upper]
- 0" [base cabinet]
- 9'-0"
- 8'-0" [typical ceiling]
- 7'-0"
- 5'-0"
- 3'-0"
- 1'-4" [bench]
- 0"

BASE CABINET
1'-0" or 2'-0" depth

TYPICAL UPPER
1'-0" depth

EXTENDED UPPER OR BASE
1'-0" or 2'-0" depth

FULL CABINET
1'-0" or 2'-0" depth

• base cabinet also available without storage for use as built-in headboard

5.4 KICKSPACE

Cabinets can be installed on a traditional plinth with a variety of finishes or on raised legs, depending on the function and the overall aesthetic of the space.

white

black

stainless steel

solid wood

aluminum leg

- solid wood plinths have option of matching or contrasting base cabinet

PA

2.4.5 TYPE

143

"Carol" by Scavolini

TYPICAL UPPER

STEEL RAIL

EXTENDED
BASE CABINET

BASE CABINET
& PLINTH

5.2 OPEN SHELVING & RAILS

SOLID SHELF

SOLID SHELF WITH ALUMINUM BRACKET

• solid shelves available in thermofoil and solid wood finishes

STAINLESS STEEL SHELF

STAINLESS STEEL RAILS [available in 2', 6', 8' and 12' lengths]

'GRUNDTAL' by IKEA

5.3 FRAME & FITTING MATERIALS

stainless steel

white

black

MELAMINE
METAL

maple

hickory

walnut

white oak

cherry

SOLID WOOD

by KraftMaid

ADJUSTABLE SHELVING [Shown without door]

ROLL OUT SHELVES [available with 2', 6", 8" and 12' sides]

FIXED OPEN SHELVING

DRAWER PARTITIONS

All cabinets can function in 2 ways: with interior fittings fastened to the door panel, such as standard drawers, or they can contain independent fittings. These independent fittings will customize any cabinet for it's function, whether it be for a kitchen, wardrobe or bathroom. Standard interior fittings are adjustable shelves, fixed shelving compartments, hanging rods, and roll out shelves. Standard drawers can also be partitioned with adjustable trays.

6.0 FITTINGS

"Pax" by IKEA

HANGING RODS FOR WARDROBE CONFIGURATIONS

OPTIONAL INTERIOR FITTING CONFIGURATIONS FOR FULL HEIGHT CABINETS

7.0 STYLE

All cabinet doors can operate in 4 basic ways: standard hinged door, drawers or pull-out style doors [except typical upper cabinets], sliding doors and flip-up doors [for upper cabinets only]. The interior fittings of the cabinet can operate with the door, such as in standard drawers and pull out pantry units, or independently. If only independent fittings are being used, such as in closets and wardrobes, the doors are not necessary.

by KraftMaid

FLIP-UP DOORS

"Pax" by IKEA

SLIDING [OVERSIZED] DOORS

"Carol" by Scavolini

PULL-OUT DOORS/DRAWERS

SOLID DOOR STYLES

AVAILABLE IN THERMOFOIL AND SOLID WOOD FINISHES

AVAILABLE WITH CLEAR OR FROSTED GLASS

INSERT DOOR STYLES

AVAILABLE IN ALL FINISHES

SOLID WOOD

LACQUERED GLASS

SATIN & HIGH GLOSS THERMOFOIL

frosted

clear

"Crystal" by Scavolini

Cabinetry does not have to be framed into walls, end panels and full height side panels give a finished look in any space.

8. DOOR FINISHES

"Sax" by Scavolini

WORKTOP

WORKTOP END PANEL

blizzard

While a worktop may not be necessary for all spaces, they are integral to the overall look and feel of the space. While the traditional worktop rests on top of the cabinet frame, they may also wrap down the side in more contemporary spaces. The worktop may at times be a simple finish surface for a bedroom wardrobe or desk, but they are also resilient to tougher conditions.

8.1 WORKTOP

CAESARSTONE
QUARTZ SURFACES

SOLID WOOD
METAL

WILSONART LAMINATE

by Amerock

9.0 **HARDWARE**
 AVAILABLE IN BLACK, NICKLE, POLISHED AND BRUSHED STAINLESS STEEL FINISHES

MULTI-LENGTH PULLS

SOURCES

www.scavolini.com
www.ernestomeda.com
www.caesarstoneus.com
www.formica.com
www.wilsonart.com
www.amerock.com
www.ikea.ca
www.kraftmaid.com

[FIXTURES]

FAUCETS_{2.4.10} | SINKS+BASINS_{2.4.11} | APPLIANCES_{2.4.12}

10.0 FAUCETS

Cabinetry and interior fittings contribute to the function of a space, but equally important to both the appearance and function is the choice of fixtures and appliances. Fixtures and appliances include faucets, sinks, fridges, dishwashers, vent hoods and ranges, [which can be single units or separate cooktop and oven].

by IKEA

10.1 KITCHEN AND UTILITY FAUCETS
 AVAILABLE IN BLACK, NICKLE, POLISHED AND BRUSHED STAINLESS STEEL FINISHES

10.2 BATHROOM FAUCETS
 AVAILABLE IN BLACK, NICKLE, POLISHED AND BRUSHED STAINLESS STEEL FINISHES

11.0 SINKS + BASINS AVAILABLE IN CAST ACRYLIC AND STAINLESS STEEL FINISHES

SINGLE BASIN; STANDARD OR UNDER MOUNT

DOUBLE BASIN; STANDARD OR UNDER MOUNT

OVERSIZED BASIN; APRON MOUNT

TRIPLE BASIN; STANDARD OR UNDER MOUNT

AVAILABLE IN CAST ACRYLIC FINISHES

STANDARD VANITY SINK; STANDARD OR UNDER MOUNT

BATHROOM SINKS
AVAILABLE IN CAST ACRYLIC, STAINLESS STEEL, GLASS AND STONE FINISHES

VESSEL SINK

11.1 SINK MATERIALS

stainless steel

white

sand

grey

black

CAST ACRYLIC
METAL

clear

tinted

gold

blue azure

crimson

GLASS

white marble

wood vein marble

fossil granite

smokey granite

golden marble

black granite

STONE

12.0 APPLIANCES

AVAILABLE IN BLACK, WHITE AND STAINLESS STEEL FINISHES

INTEGRATED FRIDGE AND FREEZER

12.1 FRIDGES + FREEZERS

STANDARD FRIDGE
[fridge: 14 cu.ft., freezer: 4 cu.ft.]

SIDE-BY-SIDE, COUNTER-DEPTH
[fridge: 14 cu.ft., freezer: 9 cu.ft.]

FREEZER DRAWER, COUNTER-DEPTH
[fridge: 17.3 cu.ft., freezer: 7.5 cu.ft.]

12.2 RANGES

SLIDE-IN RANGE WITH CERAMIC COOKTOP

SLIDE-IN RANGE WITH GAS COOKTOP

PROFESSIONAL RANGE WITH 5 BURNER GAS COOKTOP AND CONVECTION OVEN

12.3 COOKTOPS

4 BURNER GAS COOKTOP, BLACK, WHITE OR STAINLESS STEEL SURFACE

4 BURNER GAS COOKTOP, BLACK, WHITE OR STAINLESS STEEL SURFACE

4 BURNER GAS COOKTOP, TEMPERED GLASS SURFACE

4 BURNER CERAMIC GLASS COOKTOP

3 BURNER GAS COOKTOP, TEMPERED GLASS SURFACE

'NUTID' by IKEA

2.4. OVENS

CONVECTION OVEN WITH WARMING OVEN

STANDARD OVEN

CONVECTION OVEN

DOUBLE CONVECTION OVEN

12.5 DISHWASHERS

STANDARD

- integrated door panels are available in all thermofoil and solid wood finishes for counter-depth fridges or dishwashers

SINGLE OR DOUBLE DRAWER

INTEGRATED DISHWASHER

12.6 HOOD VENT

CABINET MOUNTED VENT

EXTRACTOR HOOD, WALL MOUNTED

EXTRACTOR HOOD, CEILING MOUNTED

SOURCES

www.scavolini.com
www.ernestomeda.com
www.kraftmaid.com
www.everyselsink.com
www.homedepot.ca
www.ikea.ca

[POST-SCRIPT]

PARTICIPATION
+ ARCHITECTURE

THE DEFENCE

Through the testing of the game, problems will inevitably continue to surface regarding the design and limits of the system. The defence may then be considered another method of participation, which, through discussion may provide answers or solutions towards any necessary refining of the game. As product engineers and other such professionals have not been used in the design of the script as they were not accessible, the knowledge of the panel could become key in successfully understanding the game in a more than speculative manner.

At the heart of this thesis lies the belief that successful architecture cannot emerge unless a level of collaboration which engages the user is able to influence the process of architectural production. It accepts that continual change is necessary in order to progress and relies on a participatory design process as a catalyst to bring about change and potential collaboration. In this method, architecture is no longer to be seen as a static building but as a perpetual work-in-progress of which we are all a part.

An open method of architectural process is a social issue which questions the relationships that exist within a society and also the conventional system which we operate within. As an open work-in progress itself, the game may never be complete, but as a tool for a participatory design process is still worth exploring. It is my belief that the game can in fact generate good architecture through participation without undermining the role of the architect, and that through this new process, a re-imagination of the means of architectural production can occur. Refining the game strategy in order to allow for successful forms of communication and participation relies on the limitations of what society can offer, trial and error will be necessary. However, will society become a willing participant?

Blurring the boundaries between the client and architect through participation has been the first step towards the ideal of a fully integrated collaborative architectural process, attempting to alter the process of architectural production. Architectural design as a game was intended to

"No one can whistle a symphony.
It takes an orchestra to play it."

— H.E. Luccock
Integrated Practice, 41

actively engage society to affect growth, and also to put real value or worth back into our buildings through human interaction. The technologies of information management and fabrication were to be essential in reaching this goal. Reflecting back, this goal may have been naive; conventions will only change if the people within it also change. While some will be reluctant to change, others will show interest. Should we passively accept this, or should we attempt to provoke them?

Though you cannot provoke the unwilling, you can provoke those interested in participating. Collaboration as a superimposition of ideas may be realized through participation and may not necessarily require simultaneity of experience. If the exchange of information could occur at different instances and collaboration can be understood as a strictly subconscious form of growth, then provocation during participation may allow for this growth to occur, regardless of how many participants are playing the game. In reference to my third case study, by requiring the participant to complete any given phase of the project, we would be provoking them to learn. By provoking them we believe they will understand more about the process and about architecture once they are finished. Therefore, though this form of participation does not rely on constant communication and the bartering of ideas, it can still create growth in the individual.

The architects role in this growth or potential collaboration has occurred long before the participant has even been considered. Through the script, the architect has embedded limitations which will encourage the participant to constantly question what he or she is doing and why. At

the same time, new processes and materials, and also the actions of the participants, will have the architect exploring and growing on their own. Though still relying on the processes and people involved in them, collaboration through provoked participation could become an independent experience.

The true growth which occurs through collaboration may occur outside of participation in the design process as society grows and learns of their built environment. Provoking participation may be the catalyst in this social change. From this thesis investigation comes two open-ended questions: *Is gaming the best way to encourage or provoke participation in the pursuit of an alternative, collaborative architectural process? -and- What, in an alternative method of architectural production, should be the role and responsibility of the architect?*

"Change is always more successful if those people most affected by it feel they have helped shape it."

— George Elvin
Integrated Practice, 193

[WORKING NOTES]

GLOSSARY^{4.1} | LIMITATION NOTES^{4.2} | BIBLIOGRAPHY^{4.3}

4.1 GLOSSARY

appropriateness ⁽⁷⁹⁾ is a level of continuity between materials and spaces. The architect must ensure that the materials and articulation of them meets the intent of the participant and that it is even possible within the design.

character ⁽⁷⁵⁾ is the style which a project takes on after materials and detail have been articulated. While a script may have some character properties imbedded in it, due to the rules defined by the architect's own ideas and beliefs, the final style should be reached as a collaborative effort between the architect and the participants.

collaboration ⁽⁸⁾ is a superimposition of a multiplicity of disjointed ideas. It is a recursive process where two or more bodies work together towards an intersection of common goals. Collaboration does not require leadership and can sometimes bring better results through decentralization and egalitarianism.

digital disconnect ⁽⁶⁾ is a subconscious state of being between the digital and the physical. While engaging in the technology of our day-to-day lives, we often lose ourselves. Our mind tends to wander to far off places in the virtual realm, places we were unaware that we going, yet end up there non the less. After all, we turn back to reality and forget almost instantaneously that we were there, what we went there for and how we even got there. No matter how deep we immerse ourselves into technology, our body remains in physical space. This tug between our mental and physical being places our entire existence in an in between space, in limbo.

the framework ⁽⁹³⁾ is the field of relations which individuals must operate within as they design and construct architecture. It provides boundary conditions within which rules, such as those of a game, may be identified by participants.

open work ⁽¹²⁾ should be understood not as an incomplete project or object, but as a continually changing process, the game. While complete variations of an object may result through participation, the process of architecture itself must continuously evolve with new ideas, processes and materials.

participation ⁽⁶⁾ is the simple act of contribution, either mental or physical, with no requirements or guarantees that one will achieve or acquire.

4.2 LIMITATION NOTES

What are the possibilities and limitations of the module? Through the re-interpreting of a variety of floor plans, several questions were posed and answered, while other issues and potentials were made obvious. A written chronology of my thought process throughout the interpreting of the chosen projects was incorporated into the drawing panels.

Stinson Beach House, Turnbull Griffin & Haesloop Architects

- sloped roof: hat components should have same slope and built-in gutters at low ends so they don't create valleys for water to sit. Could span several modules in length but will need to be divided into widths of 13'-0" maximum.

[these hat components are intended to have exposed interior ceilings with the same slope as the roof. If the ceiling is to be flat inside, then a standard truss could be used. To avoid interior beams, a custom profile could also be used as long as it is able to bear directly on the top of the module frame at both ends, basically, there is no need to stick build a knee wall at one end of the module.]

- clerestory windows: on high side of slope are possible, but with the structural frame below and above, they be quite small.
- conclusion: plan was able to be duplicated almost identically in layout and scale with standard layout modules. The interior openings are optimal for modules as there is no possibility of sloping clear span interior ceilings with a hat component due to the necessary structure and maximum width.

Bradley-Cohen House, Safdie Rabines Architect

- exterior stairs: have to be a separate component, they cannot be inside the module unless the stair is covered by a roof or frame. The structure would have to be exposed to the exterior.
- *[incorporating the stair into the module itself would minimize on-site installation and may also make the stair safer in exterior weather conditions by providing a wall to one side. If the extension of the frame to the exterior does not compromise the design, then this is the better option.]*
- fireplaces: must exist on exterior walls otherwise they interfere with the adjacent modules structure
- roof deck: is a 'flatpack' element which simply rests on top of another module with a flat roof to allow drainage and bring floor height up to

same level.

[the roof decks is designed similar to that of a shipping crate, with side rails and decking material on top. The open sides of the frame will allow for a scupper detail for drainage. Railings will also have to be included in the design of roof deck spaces but will be separate components which are to be installed on-site unless it is a solid rail, in which case it may be built in factory as part of the deck frame.]

- conclusion: floor plan was easy to duplicate with minor variations in the interior stair which because it's a switchback, could not have full height storage below the landing due to the module structure interfering with door height.

HPK1200010 and HPK1200058, eplans.com

- loft spaces: can be achieved by stacking modules of same size or with a smaller module above. Creates ledges over closets in stair units when the stair is on an exterior wall or lofted below.

[the lofted space can only be the same size or smaller than the base unit, because if more than unit is to be lofted, the structure will be visible in the space. Only in layouts where the stair has a bathroom or closet incorporated into the plan will a ledge be required to enclose the ground floor space unless the walls are extended for the full 2-story height.]

- stairs should have the option of starting off a room, not a hallway. If you push it forward it leaves room for a bench or storage on an extended landing or storage for a module backing up to it.

[The library of stair layout options will incorporate this option.]

- porches: can be created through exterior modules and may be used to support modules above
- cantilever: of upper units could be done but additional structure may need to be incorporated into lower units. It may create 'floating' corners of upper unit if modules are shifted in direction or dimension.
- *[the maximum span for a cantilever will have to be designed by an engineer, however, because the units are self-contained structurally it should reasonably be able to span 1/3 of the length with 2/3 tied back to other modules as a standard rule of thumb. Additional horizontal support may be incorporated into the frame of the modules to provide a bearing point and bolting or anchoring section.]*
- bay windows could be appendages but may not even be necessary as the modules tend to create a better used space

- flipping and shifting modules layout form floor to floor can allow functions to be contained in a single unit rather than straddling several units. Where possible, this should be done to avoid seaming rooms together on-site. All pre-defined module options are self contained and to should be any custom layouts.
[additional structure will have to be incorporated into the frame of the lower modules to provide bearing for these staggered modules above. It may also be possible to simply join modules end to end in the factory to avoid the seaming together of units and also to ensure that the structure and bearing are sufficient.]
- garages: in basement are more practical than having yet another system of component for walls. If all enclosed garages are in this condition, then full split levels cannot be done either, but the stepping of modules in multi-levels is still possible.
[having a secondary system to the modular system which cannot be built in the factory may make the system as a whole too complicated. It would be much simpler to suggest that all garages and foundations, where one and the same or not, are done on-site and do not have any relation to the factory where the fabricated modules are being built, other than the confirm and synchronize dimensions and compatibility through BIM software. If the garage is above grade and not part of the foundation, then SIP's may be used, but this should be coordinated through a separate manufacturer and the decision of material choice should be considered on a project to project basis. For example, if it is a detached or small garage in a remote location, it may be easier to stick build than coordinate the installation of SIP's panels. The coordination of the module installation would be done by the contractor who works at the factory, and since the garage and foundation are to be done while this contractor is building the modules, a secondary contractor will have to be used.]
- conclusion: the cookie-cutter chopiness of the original plans are simplified through the use of module layouts which follow the dimensions of an inherent grid with 3'-1 1/2" hallways and 2'-0" built-in depths. The new layout does not sacrifice much in space or flow, and the space which is sacrificed is absorbed through larger built-ins and better organization of space.
- **HPK1200002**, eplans.com
- roofs sloped on interior: would have to be done on-site as modules are rectangular, caused issues for vaulted ceilings also. Can vault a single unit by truss and eliminate ceiling panels, but for multiple units it would have to beams disrupting span - could be an effect of false beams

- [the module does not create any sloped spaces, it is only if you are trying to re-create some other spatial condition where you run into these issues. Therefore, it is only going to diminish the benefits of fabrication by allowing for these sloped ceiling conditions to exist. The only manner in which an alternative ceiling to the standard flat ceiling be introduced, is in the form of roof components. These elements are added on-site and could easily contain vaults—with false beams- or coffeers or any other architectural feature so long as they remain simple and respect the nature of the module.]
- garages: should be built on-site. Need to eliminate a lower beam to drive over therefore removing structural integrity of module. Could be a panelized SIP's system. In pre-production, what is the stand-in? Some simple posts to create carport or image cards of garage sizes?
[If the garages are built on-site, do they use vernacular materials or the same materials as the foundation, or are they also a fabricated building method? If it is a panelized method, it would require a longer on-site installation time than the module system, but may be faster than traditional framing methods. Therefore, the panels would have to be delivered to the site before the modules in order to prepare the garage as a site condition for which the modules are installed on or around.]
- split level: is possible with u-shaped stair option but beams get in the way of head height and landings. The module would either have to be tweaked to allow this- a 2 storey module, or exists as a void in the modules with stairs inserted as an object rather than a module. If roof is sloped over stair, the void is the only possible option as module would penetrate the roof, could create 'dormer' effect. Void would possibly need panelized walls if on an exterior wall, same panel system as garage? [a 2-storey module could be used in the game so that participants may see the potential of staggering the modules to create step down spaces. These spaces may be an entire split level, in which case a void would be required if there is a basement as well, but they may also be stepped by 3 risers and make use of the smaller stair components discussed above.]
- a separate window in a roof extension or peak.
- angled walls are a custom layout, not typical. Only if the client wants it.
- The nature of the module is that everything seems to work better on grid axes.
- the more options, the higher the cost. Fewer options will equal more efficiency as the fabricating repetition is eased on multiple projects at a time rather than larger scale single building application.
- stepping exterior walls works when underside of roof is directly on top, otherwise a beam will be left exposed.
- art nooks are possible on interior walls, upon client request. Not typical.

- [not even necessary?]
conclusion: floor plan is possible, but complicated roof lines create too much on-site work which equals cost and time. Split level options cannot be created through the module unless there is no basement and a 2-storey module can be cleared for transportation height to the site from factory. The solution: component panels and stair inserts, or staggered rather than full split levels.

George Barton Residence, Frank Lloyd Wright [1903]

- roofs: will be separate from modules and will require quite a bit of on-site work. Trusses may be partially assembled off-site to a maximum width of 14'-0"
[with the exception of the basic flat roof, all roof details will have to be separate appendages of the module. In the case of a flat roof, a parapet wall may extend above the height of the module in the factory, but any type of overhang must be attached on-site. If there are to be different roof styles, for example height extensions for double height spaces, gabled or hip roofs, then these would all have to be designed to sit simply on the top of the module and assembled on-site. These could be designed as partial components and be fabricated by a truss supplier, sent to the main factory for a dry fit, and then shipped in whole to the site for final assembly.]
- bump-outs: bay windows and fireplaces and other such nooks may be 'hung' off the main modules or rest on foundation. These bump-outs will be during production to 'tweak' space where desired.
[To rest on the foundation is a simple technical detail, where the 'hanging' of elements requires considerably more engineering. Bolting the frames together may suffice, but brackets or some form of tie-in may also have to be considered. These bump-out units should come in standard sizes similar to a deck component or roof component, maximizing the customization of the elements and minimizing the technical detailing required. These standard options will be presented to the client in the production phase of the project along with stairs, railings, windows and other elements which contribute to the character of the project.]
- bathrooms over stairs do not leave sufficient headroom, small powder rooms will work
- 'flatpack' elements such as deck of roof height extensions can be in any size but should stick to the dimensions of the module for prefabrication means. Make a smaller series of dimensions for decks and porches and stairs (3 riser maximum)
[in any construction, no wood product can be within 8" of the finished grade, therefore, the modules will have to sit on some sort of foundation

above the grade. The height of the finished floor above grade should allow for a single set of stairs with a maximum of 3 risers to reach the ground, as these stairs do no require a handrail and could also be used to step or split levels of a dwelling.]

- finishing: brickwork should be done on-site OR use new non-bearing stone veneer products. Don't get same mass of wall but has similar visual qualities. Exposed beams of custom millwork can be incorporated but may come at a cost. False posts may be constructed like walls, unique to each project depending on the mass of them.
[It seems possible to add about any aesthetic feature, such as millwork, to a project. It brings forth the question of how much is enough? Where do you limit the catalogue so that the options do not become so abundant that the benefits of fabrication are lost?]
- modules may exist as exterior porches or as a combination [of interior and exterior space]
- floor plans can be unique or composed from existing 'templates'
- landscape and landscape done on-site
- conclusion: very possible for a near exact plan, though slightly smaller in scale, to be achieved assuming that bump-out appendages are an option. It is more appropriate to adopt the principles of this plan and reinterpret it into a more contemporary dwelling that is sympathetic to the module and to the demands of the current generation. We must accept that any given script cannot create every formal or spatial composition which is possible, therefore, though the elements and methods of articulation may be sympathetic to a range of projects, they do not necessarily need to include all possibilities.

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