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Connecting Client Needs to Design Solutions: A Framework for Converting Programmatic Concepts Into Design Concepts

1 Introduction

According to the National Certified Interior Design Qualification (NCIDQ) Interior Design Reference Manual (Ballast, 2021, pp. 27-4), basic interior design services include 1) programming, 2) schematic design, 3) design development, 4) contract documents, bid- ding, contract administration, and designer responsibilities, and 5) purchase orders. In other words, based on the results of documenting and organizing the intangible client's needs (programming), these needs are now realized through a tangible, visualized design (schematic design), and the elements of experience required to make this visualization result into reality (design development) are documented (contract document and so on). There is not sufficient research on how programming and schematic design are interconnected throughout this process. In spite of materials explaining the entire process, there may be a tendency to describe what process should be used when designing and what should be done at each stage (Botti-Salitsky, 2017; Nussbaumer, 2009), or how to develop each pieced design concept that reflects research without describing how it can be integrated (Robinson & Parman, 2015; Robinson, 2020). Furthermore, the existing materials are intended to assist the process in focusing more on solving the specific problems derived from in-depth research. As a result, there is a lack of literature on the decision-making process that takes into account all possible approaches to solving each problem comprehensively. Moreover, the proportion of research in design practice has increased, as needs from various perspectives must be addressed (Davis, 2008), and this makes it difficult to prioritize based on a large amount of information and to determine whether to complete the project with a unified integrated design. Regarding this issue, this chapter introduces a framework for converting programmatic concepts into design concepts, using the author's case studies from practice and teaching materials.

2 Framework

The framework comprises three phases: 1) programmatic concept development, 2) precedent study for possible design solutions, and 3) design concept development. In this chapter, newly developed step-by-step examples are used to illustrate the approach, as well as examples from a previously published paper (Park & Kim, 2022).

Phase 1: Programmatic Concept Development

Programmatic concepts are abstract approaches the designer can use to solve the client's goals and needs. This differs from the design concept, which represents the physical solution (Ballast, 2021, p. 4-4 & p. 6-6). There are numerous references to the programmatic concept development process in the interior design discipline (Robinson & Parman, 2015; Robinson, 2020). More references may exist for supporting the programmatic concept development, especially for establishing a prioritized hierarchy in the goals and needs of clients when expanding the discipline of design research and business, such as with knowledge funnel (Martin, 2009).

Having been exposed to all of the references listed above, the author has developed a programmatic concept with the concept wheel (UnitasBRAND., 2012), which is still being used in practice and academia. The concept wheel consists of three layered circles (Fig. 1). The first circle contains the symbol representing the project's goal, which can be achieved when the project meets all the needs of the client; the second circle contains the three keywords that make up the symbol; and the third circle contains the strategies needed to implement each keyword. What follows is a brief explanation of how this concept wheel (Fig. 1) is completed:

1. Through research methods such as interviews, precedent studies, case studies, site analysis, and program analysis, approximately 16 to 20 words representing the value of this project are extracted.
2. The 16 to 20 words listed above are categorized into three categories. Each word may not be completely separated into a single category. For the purposes of programmatic concept development, each word is supposed to be categorized completely according to what it represents as the most fundamental value.
3. While reviewing each of the three categories, the least important words are removed gradually until we have the top 10 most important words left.
4. Write the first project statement using the remaining 10 words.
5. Take five of the most important phrases from the project statement.
6. Based on the five phrases, write three sentences.
7. Extract one word from each of the three sentences. The extracted three words are keywords and will be placed in the second circle (2).
8. Take a look at all words that have appeared and select three words that are supportive of each keyword. The selected words are strategies and will be placed in the third circle (3).
9. By combining the three keywords, create a symbol representing the project's goal, which can be achieved when the project meets all the needs of the client. It will be placed in the first circle (1).

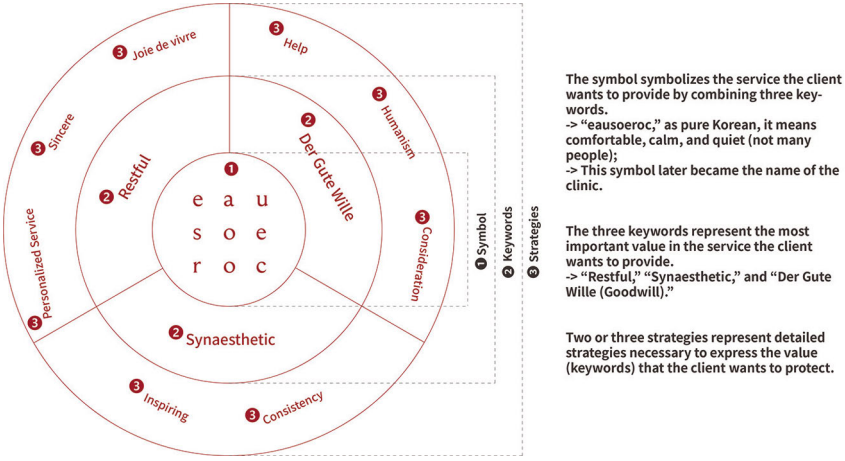


Figure 1: Programmatic concept example.
(Graphic: Park & Kim, 2022)

Phase 2: Precedent Study for Possible Design Solutions

According to Robinson (2020), the programmatic concept refers to the functional problems that need to be solved, and the design concept is how you will solve the problem creatively. This phase is to identify possible design solutions per strategies by using a morphological chart. An important application of the morphological chart is to break down a problem into each need, to generate numerous solutions per each need, and to select and combine suitable solutions into alternative overall solutions (Borekci, 2019; Cross, 2000; Magrab et al., 2010; Pahl & Beitz, 1996; Roozenburg & Eekels, 1995; Wright, 1998). To demonstrate how the morphological chart can be used to bridge the programmatic and design concepts, the author developed a step-by-step example. Here is a step-by-step explanation of how to complete this morphological chart:

1. On the morphological chart, copy the strategy words from the third edge circle of the chromatic concept wheel into the leftmost column, "strategies" of the morphological chart. (Fig. 2)
2. In order to come up with possible solutions to each programmatic concept strategy, a precedent study is conducted. There are five possible solutions for each strategy in this example, but this number may vary depending on the operator, for example, 3 or 10 solutions. Furthermore, this process can be carried out on a digital canvas or in a hands-on manner. Hands-on activities were used in this example. (Fig. 3)
3. In the morphological chart, fill in the blanks with the five possible solutions to each strategy identified in the above process, consider the context of the project, and choose the solution that is the best combination among the five possible solutions to each strategy. Instead of selecting a single solution that provides the best performance, it is recommended to select a solution that is the optimal combination with solutions from other strategies. Selection criteria and combinations may vary depending on the context of each project. For example, the selection criteria may differ depending on whether economic optimization or social value should be prioritized. (Fig. 4)

Strategies	Option_01	Option_02	Option_03	Option_04	Option_05
Organized					
Control					
Belonging					
Socializing					
Learning					
Alignment					
Focus					
Comfort					
Productivity					

Figure 2: Programmatic concept wheel (left) and morphological chart (right). (Graphic: Jinoh Park)

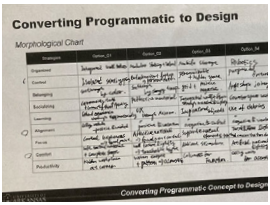
a. Images from precedent studies

b. Cutted individual images

c. Categorized images

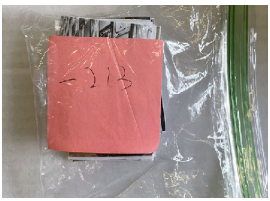
d. Excluded unnecessary images

e. Add categories with one of the nine strategy words



f. Write the category names in the fields of options

g. Reorganizing images and selecting best 3-5 images



h. Continuously excluding less important images

Figure 3, a.-h.: Exploration of precedent and organized possible design solutions. (Graphic: Jinoh Park)

Strategies	Option_01	Option_02	Option_03	Option_04	Option_05
Organized	Shelves integrated into the wall	Shelf modules with mobile storage islands	Mobile Storage	Robotics	Unified Design Language
Control	Isolated seating option	2 Screen = One Monitor + One Laptop	Accessible Hidden Workstation	Purposeful fixtures	Refined finishes
Belonging	Colored see-through	Levels of transparency that are see-through	Positive and negative grid	Joint shaped like an arch	Joint with different segments
Socializing	A community table with a bridging object	Using reflective materials to inform one another	Blurred boundaries	Various counter spaces	Unified design elements for zoning
Learning	Extending experience through tangible and intangible mediums	Extending experience through mirror	Inspirational objects	Use of Debris	Embodying recyclable materials
Alignment	Positive and unified modular ceiling design	Positive modular ceiling design with variation	Negative and unified modular ceiling design	Negative modular ceiling design with variation	Gestalt-based modular ceiling design
Focus	Controlled brightness	Reflective Materials	Supportive Biophilic elements	Zone lighting	Colored Transparency
Comfort	Soft and textured material with complete shape	Touchable height lighting fixture	Ambient stimuli	Natural light artificially created	Complete zone and form to convey certainty
Productivity	Hidden workplace at the corner	Acoustical woven carpet	Function columns	Acoustical ceiling	Stainless Steel for Maintenance

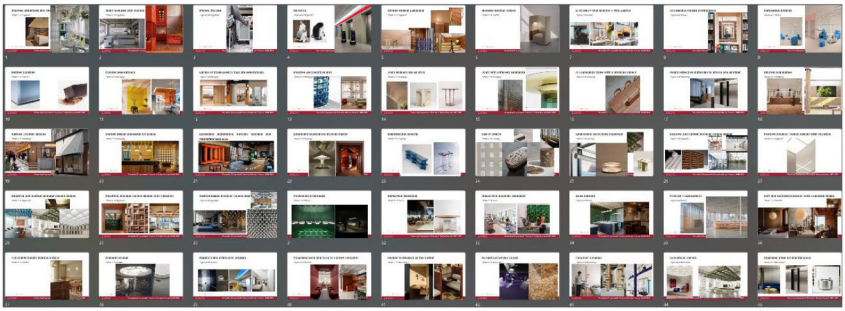


Figure 4: Digitalization and organization of Morphological chart and selected options. (Graphic: Jinoh Park)

Phase 3: Design Concept Development

After dividing a project's goal into individual needs, generating numerous solutions to each need, and selecting and combining suitable solutions into a final optimized solution through the morphological chart, the final step in the implementation of this method is to bottom-up the design concept. The following is a step-by-step explanation of how to develop a design concept.

1. To match the position of the strategy words, copy each option selected through the morphological chart (Fig. 4) into the third circle of the design concept wheel. One of five options for implementing "Organized" among strategies was "Shelf modules with mobile storage islands". Based on the programmatic concept wheel's "Organized" position, this design solution is added to a new concept wheel. Upon completing the above process, all selected design solutions are put into this new design concept wheel. (Fig. 5)
2. For each category with three strategies, the strategies belonging to each category are integrated in order to create a representative word or phrase. This constitutes the keyword for each category in the second circle. By integrating the three keywords created earlier, create a design concept symbol using the same process as above. (Fig. 6)
3. Based on the developed design concept wheel, write the concept statement as shown in this example: The "Water Brick" is the concept for this office design project. It implies a flexible yet organized form of interaction between individuals and groups in a space built on the sea. The Open and Enclosed spaces are realized by: 1) invoking intended actions through fixtures in an open space, 2) conveying a sense of openness even though it is closed while controlling transparency, and 3) creating a structured space although it is an open space with modular units. We and Me space is implemented by: 1) using controlled reflective materials, which serve as a means of identifying each other while maintaining individual privacy, 2) retaining debris to inform the users about the heritage of the land and sustainable development, and 3) utilizing ceiling modules as a means of tying them together. It is intended that all of the above features will be braided through one or more of the following: 1) colored transparency to allow for selective privacy and communication opportunities, 2) ambient stimulation to enhance the feeling of being in touch with nature, which facilitates the healing process, and 3) acoustic materials to minimize noise issues between all components.

As a result of the above process, a design concept has been developed for a workplace project in Boston, USA. As a result of incorporating Boston's brick style into this project, the concept "Water Brick" emphasizes the historicity of the client company. It also emphasizes sustainability by considering the context of the project site, which is at risk of flooding due to rising sea levels.

After the design concept wheel completion, you have one concept word (or phrase), three keywords supporting the concept word (or phrase), and nine strategies supporting three keywords. In accordance with the client's needs, you are going to consider how to apply nine strategies (Figure 6). As soon as you have applied the nine strategies to specific parts of your design, you may need to start considering how to set up an appropriate level of application for each strategy. To clarify, I mean that you may need to apply other options in the morphological chart in order to support your selected option for a specific purpose. For instance, there is a strategy titled "Belonging" that has the option "Levels of transparency that are see-through" in Figure 4. It has been applied to the sidelight of the private office door. The intention was to enhance a sense of belonging within the corporate culture by presenting transparency between manager and player levels. I may wish to implement option_01 "Colored see-through" in a zone for a team in the open office to enhance the feeling of "belonging." In summary, the selected options for strategies will be implemented in the core of the sequences. When you have a specific purpose that enhances a specific meaning, the other options could be used to determine an appropriate level of application for each strategy.

The programmatic concept wheel presented in "programmatic concept development" above illustrates the programmatic concept for a medicalized wellness clinic project in Seoul, Korea. In this project, the design concept is "Les Hétérotopies," emphasizing a clinic that is located in the exact center of the complex Seoul and that paradoxically becomes a sanctuary (Fig. 7, Table 1).

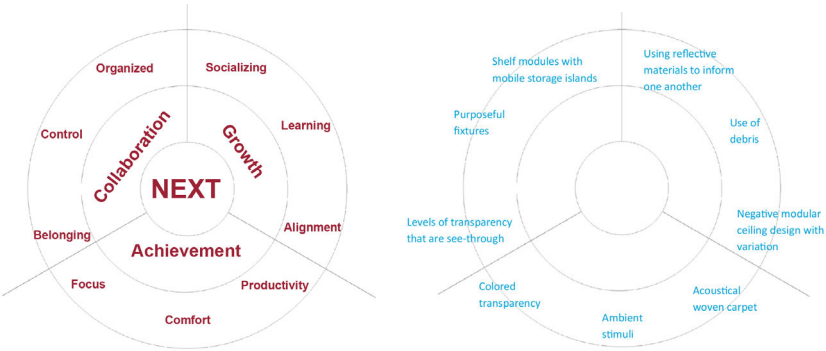


Figure 5: Strategies of design concept. (Graphic: Jinoh Park)

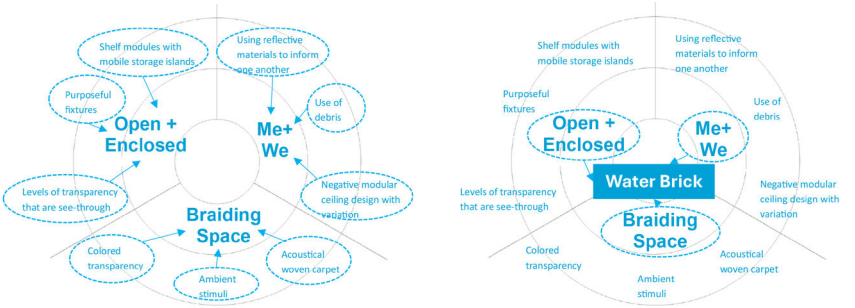


Figure 6: Keywords (left) and symbol (right) of design concept. (Graphic: Jinoh Park)

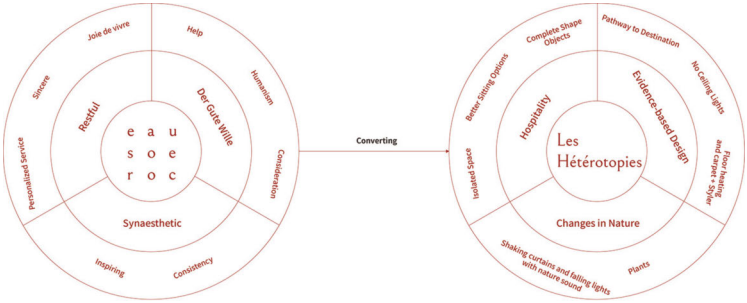


Figure 7: Converting the programmatic concept to a design concept (Graphic: Park & Kim, 2022).

Table 1: Programmatic Concept, Design Development, and Design Concept in Detail using the example of the "Water Brick" project (Park & Kim, 2022)

Programmatic Concept "eau soe roc"		Design Development	Design Concept "Les Hétérotopies"	
Keywords	Strategies	Details	Strategies	Keywords
Restful	Personal-ized Service	At each stage in the provision of the service, the patient stays in an independent space, which is separated by a corridor for the purpose of sound insulation. Furthermore, the fur carpet enhances the absorption of sound.	Isolated space	Hospitality
	Sincere	As the visitor moves through each stage of service provision, the visitor is seated in a more comfortable seat, and when in the presence of a service provider, the visitor feels more welcomed and hosted due to having better seating options than the service provider. For instance, when the visitor sits on a stool, the service provider stands, and when the visitor sits or lies on a recliner chair, the service provider stands or sits on a stool.	Better seating options	
	Joie de vivre	In this clinic space, all the formative elements form a regular angle and all the smaller elements that can be seen at a glance form a circle or arch, providing the aesthetic pleasure of a perfect figure to visitors.	Complete shape objects	
Der gute Wille (Goodwill)	Help	The corridor between each independent space is designed to have only one destination at the end of each direction, so that visitors, regardless of which direction they choose, can arrive at the destination at one time without getting lost. A wall on one side of the hallway is not blocked up to the ceiling, allowing sunlight to enter from any direction and thereby reducing the possibility of symptoms of claustrophobia and panic disorder. In addition, the cushion mat of the fur carpet was installed to prepare for unforeseen circumstances.	Pathway to desti-na-tion	Evidence-based design
	Humanism	Considering the characteristics of obsessive-compulsive disorder, especially control-related obsessive-compulsive disorder, lighting and other devices normally installed on the ceiling were installed on the wall or on a floor. Any installation on a wall should be placed in a position that can be reached with a hand, and thus within 1.8 meters in height, in order to eliminate elements that are considered uncontrollable.	No ceiling lights	
	Conside-ra-tion	In addition to providing a feeling of warmth, radiant heating also improves indoor air quality. A clothes dryer is installed to remove dust and germs on patients' outerwear during their stay, giving the patients' outwear a scent of the clinic as a brand.	Floor heat-ing and carpet + Styler	
Syn-aes-thetic	Inspiring	By using an air purifier and a speaker in each room, each cur-tain moves quietly so that the living light and sound are always in the space.	Shaking curtains and falling lights with nature sound	Changes in nature
	Consis-tency	Through the outdoor landscaping, the elements of the city are concealed, and the sky is visible through the landscaping. As a result, natural light coming through the window allowed the shadow of the landscape to enter the interior space.	Plants	

3 Conclusion

In this chapter, examples were drawn from two case studies that have been developed to bridge the gap between programmatic and design concepts in research. An exploratory case study method was used in each of the case studies, and data from complete and ongoing projects were analyzed through thematic analysis and reconstructed into examples of the case studies. Despite the fact that they are two different projects, they used the same method of a combining two concept wheels and one morphological chart in conjunction with each other. This chapter provided valuable insights about the conversion of programmatic concepts into design concepts, as well as the impact this integration has on the outcome of the design solution as a whole. There is an emphasis in this study on the importance of examining the relationship between programming concepts and design concepts, as well as on the importance of converting programmatic concepts into design concepts. It is through this framework that designers can ensure that their programmatic concepts are aligned with the needs of their clients and stakeholders, as well as that their design solution is in line with their clients' requirements.

4 References

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