

CATALOGUE DRAWING: A FRAMING DEVICE FOR DESIGN THINKING

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Abstract

This paper discusses the role of catalogue drawing as a framing device to aid design thinking in the architectural design process. Catalogue drawing has been largely understood as a representation of the finished and curated design output. However, it is argued that catalogue drawing enables designers to handle, arrange, and process information, assisting them to frame this information for different needs of design discovery. This paper analyses the catalogue drawings produced by first-year Bachelor of Architecture Programme students in Universitas Indonesia in doing their first creative making project. The study highlights four categories of catalogue drawings with various roles, from catalogue drawing intended to capture the relevant information, investigate the particularities, create a bigger picture of the design condition, and outline the design proposition. The study found that each catalogue drawings were often repeated in loops throughout the design process, enabling the students to incrementally generate original design works. This study underlines the role of catalogue drawing in revealing the progression of design thinking that is often hidden throughout the architectural design process.

Keywords: catalogue drawing, framing, design thinking, design process

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Introduction

This paper investigates the significance and roles of catalogue drawing within an architectural design process. The catalogue has been largely discussed as a means to represent the curated, finished output of design (Lending, 2015). This paper is interested to unpack such understanding, particularly with the growing emergence of discourse that values drawing and maps as part of design thinking (Bordeleau & Bresler, 2010). It can be argued that within such discourse, the discussion on catalogue as part of design drawing is particularly limited. This paper aims to reveal another perspective that explores catalogue drawing as a device to trigger and aid design thinking.

Design drawing is an important tool for designers to reflect and pursue their line of thought (Lawson, 2005; Schon, 1984). Design is a 'wicked problem' where there are no clear limits of its subject matter, making it indeterminate and rarely perceived in a linear process (Buchanan, 2009, p. 97). The process of reflection enables designers to examine how they choose to frame design problems (Lawson, 2005), and clarify the "problem setting and solving" (Schon, 1984, p. 41). The framing process requires a need to organise an array of design knowledge (Murray, 2013) into a specific subject matter which can be the basis of exploration and development (Buchanan, 2009). This paper takes particular interest in how catalogue becomes a tool to aid such framing processes. It explores the behind-the-scene process on how catalogue drawings are being made, developed, and utilised by the designer throughout the design process. Such process enables the process of discovery throughout the design process to be conducted in a non-intuitive way, guiding the direction of design framing and the corresponding design outcomes.

Catalogue drawing in architecture: Framing the design intent

In the architectural design process, catalogue drawing has been variably defined as either matrix (Garcia, 2010) or index (Bordeleau & Bresler, 2010). Referring to Eisenman's drawing as a form of index, Allen (2006) argues that such representations demonstrate a series of rigorous operations carried by the designer, constructing a relation between them. In this sense, the action of cataloguing in the architectural design process aims to compile multiple information in a structured way, emphasising the operational relationship between these information. Catalogue drawing is relevant as the activity of drawing in the architectural design process has various objectives, as a record, as an action, and as projection (Bordeleau & Bresler, 2010). As a mind's activity (Tschumi, 2014), drawing facilitates architect in the process of materialising thoughts, gradually catching and translating the architect's abstraction of spatial ideas, and projecting them into the volumetric form (Tschumi, 2014). Seeing that making catalogue drawings allow the designer to emphasise the operational relationship between the variety of relevant information, hence, this act is both constitutive and projective; it raises the performative rather than merely

representational capacity (Vidler, 2000). Different kinds of drawings are being produced throughout the design process, thus allowing the design idea to be developed gradually, before being projected into realisation. It is argued that cataloguing as the process of arrangements, compilation, and inventory of different architectural drawings itself is an essential activity in the design process.

Cataloguing their design thinking and creative works enables designers to navigate the design process. Design could be understood as an activity of processing information in search for a framework of ideas that are constructed through making (Lawson, 2005; Powers, 2007; Schon, 1984). Further understanding and knowledge are being revealed (Verberke, 2013) throughout the design process, instead of fixated in the beginning. As a discoverer (Verbeke, 2013), designers perform activities and produce outputs that allow them to implement design thinking. Design suggests the importance of going back and forth on examining their design ideas, therefore producing the escalation of understanding bit by bit, and the process of cataloguing significantly assists such process (Hawley, 2014). Catalogue drawing supports the designer in reading the pattern and produces some findings that frames the design intent and enables the design works to become more explicit (Powers, 2007).

Diagram Diaries—a book by Eisenmann (1999)—critically demonstrates how design processes are continuously developed through different kinds of diagram drawings and models that are not just showcased, but arranged in a certain way using the matrix of position. Eisenmann (1999) catalogues his drawings by seeing patterns of their role, creating comparison from similarity or difference, then identifying the keywords driven by these patterns. From here, the outputs are being classified and clustered on their role of performance, thus clarifying his design frameworks and enabling him to both read the bigger picture of his ideas as well as understand the detailed operation of the design. The act of collecting, identifying patterns, arranging, and classifying drawings in *Diagram Diaries* demonstrates how cataloguing the drawings adds value to the design process. The catalogue enables the designers to frame their field of investigation in the design process (Fraser, 2014), enabling designers to explore their design from both macro and micro perspective.

As a drawing that gathers a series of information, catalogue allows designers to compare between the displayed information and address its evolution within the design process (Lending, 2015). This may happen within the project itself, such as the catalogue drawings in *Learning from Las Vegas* (Venturi, 1977) and *Manhattan Transcript* (Tschumi, 1981). Tschumi and Venturi both collect and compile the observed information in forms of drawings, then classify and arrange them in certain ways; whilst gradually suggesting some important progression of design ideas throughout the process. Catalogue drawings can also span across multiple architectural projects as demonstrated in the digital version of *Archigram Archival Project*, managed by

Frasser and Rattenbury (2010). The archival project showcases the collection of architectural projects which are arranged and categorised in a detailed way. The archival project shows how cataloguing across projects may potentially demonstrate how designers organise their accumulated knowledge as a record (Bordeleau & Bresler, 2010; Murray, 2013) of which they may draw upon in their own design process. Such various roles and scale of catalogues reveal catalogue drawing as a tool that assists the designer in discovering, collecting, reading, and operating things clearly within the design process.

The discussion above suggests catalogue drawing as the framing device that allows design thinking throughout the process of making them. It helps the designer in recognising and navigating the design idea (Hawley, 2014; Lawson, 2005). In particular, it triggers the designer to analyse and think reflectively while he is going back and forth between the collected information and arranging them. Catalogue drawing assists the design process through comprehensive processing of information; sorting and classifying them, and eventually includes making connections across information (Lawson, 2005; Schon, 1984). Catalogue drawings are not merely representing straightforward information, but assist the process of discovery during designing by providing different means of seeing the design ideas.

The following section explores more on such processes through an examination of the use of catalogue drawings, produced by the first-year Bachelor of Architecture Programme students in Universitas Indonesia in developing their first creative making project. This project lasts for five weeks, as one of the learning activities in Basic Design 1 Studio. The students are being asked to develop their ideas to create a two or three-dimensional work, based on their sensitivity and critical thinking towards the overlooked aspects of their chosen everyday occurrence, as their object of study. Throughout this project, some form of the catalogue drawings are being made by the students to assist their process of inquiry; from the preliminary observation, to exploration and analysis, then arguing the design framework, process of developing ideas, until generating the design proposal. The following sections are divided into exploration of different types of catalogue drawing in the process of design, and further inquiry on how these different types are produced alternately throughout the design process.

Different forms and techniques of catalogue drawings in architectural design

This paper discusses catalogue drawings as the framing device in bridging the designers' idea and observations, narrowing the design intent and navigating the realisation process of design works. The discussion below emphasises how catalogue drawings clarify the students' design intent through its existence as a compilation of design knowledge. In their creative making project, the students are being asked to observe, draw, and gradually compile the overlooked aspects

of an everyday occurrence. The output from such cataloguing activities then becomes the basis of generating their creative making design proposals. The catalogue drawings were made gradually during the observational stage until the development of the design proposal; and in doing so gradually trigger design thinking. The catalogue frames and translates potential design ideas, and therefore creates a clear basis for the students to move forward in an informed way instead of in an entirely intuitive way of designing. The discussion below exposes the different type of catalogue drawing that corresponds towards design activities, from collecting to sorting information during observation, until arranging and rearranging the observed information, setting limitation and scope, and generating a design proposition (Lawson, 2005). The discussion is divided based on four categories of catalogue drawings, produced in the design process. Each category applies a particular technique and tool in producing catalogue drawings, depending on the particular goal of design intent and the types of observed data. The production of catalogue drawings in gradual, collected ways enable the student to make sense of the data as well as filtering the irrelevant ones, creating a stronger design intent of the students.

Category A: Catalogue drawings as a frame for relevant information

This category of catalogue drawings mostly happened in the very early stage of design to have a preliminary understanding of a thing when needed. What becomes important is to gather and look on the relevant information of the observed context. Here, having a collection of information enables the student to identify significant things that are involved. In this category of catalogue drawing, the collected information was arranged as they are, and are performed only on case by case basis. This preliminary searching-mode draws the student to capture information through following the nature of the information embedded within the observed things; whilst exploring ways of representing information appropriately as catalogue, to support a clearer identification. Furthermore, most students collected other information that might be significant, while some others tried to compare the observed things on different conditions or context, or arranged them into a very rough classification. Below are some examples of catalogue drawings in this category.

From the examples, it can be seen that the form of catalogue drawings in this category might come in various techniques of representation—e.g., a collection of photographs, footages, simple tracings, and sometimes accompanied with keywords—which was also collected in various scales of representation, to make them become more visible. The unclear hierarchy of the information and the lack of consistency on the layout are very common in this first stage of catalogue drawings. This category of catalogue drawing might still contain some irrelevant

information, that is a common occurrence for a preliminary observation within a design process.

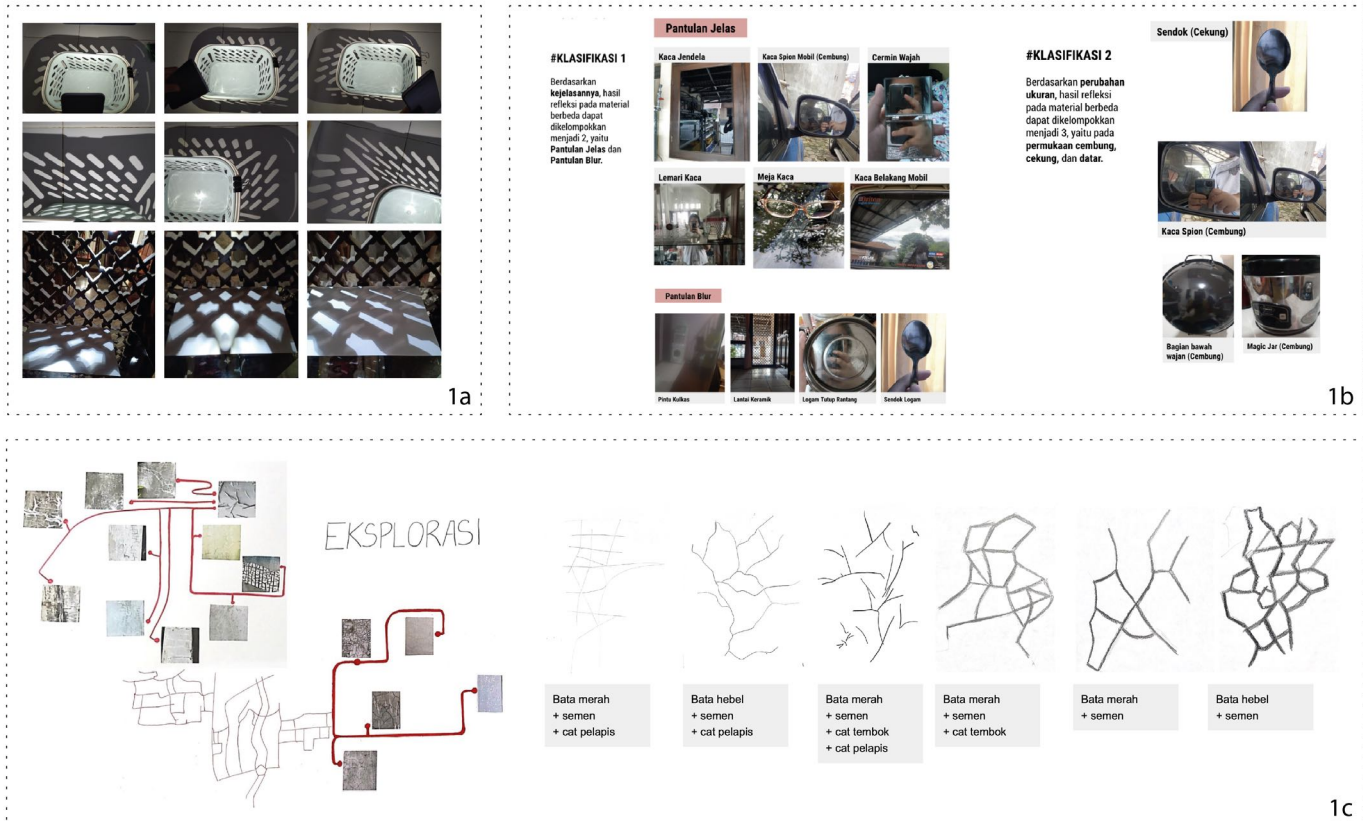


Figure 1. Catalogue drawing that collects the relevant, yet still unfiltered information (Images provided by Halomoan & Syahrani, Dewi & Christine, also Cisha & Pramudhita, created in 2020)

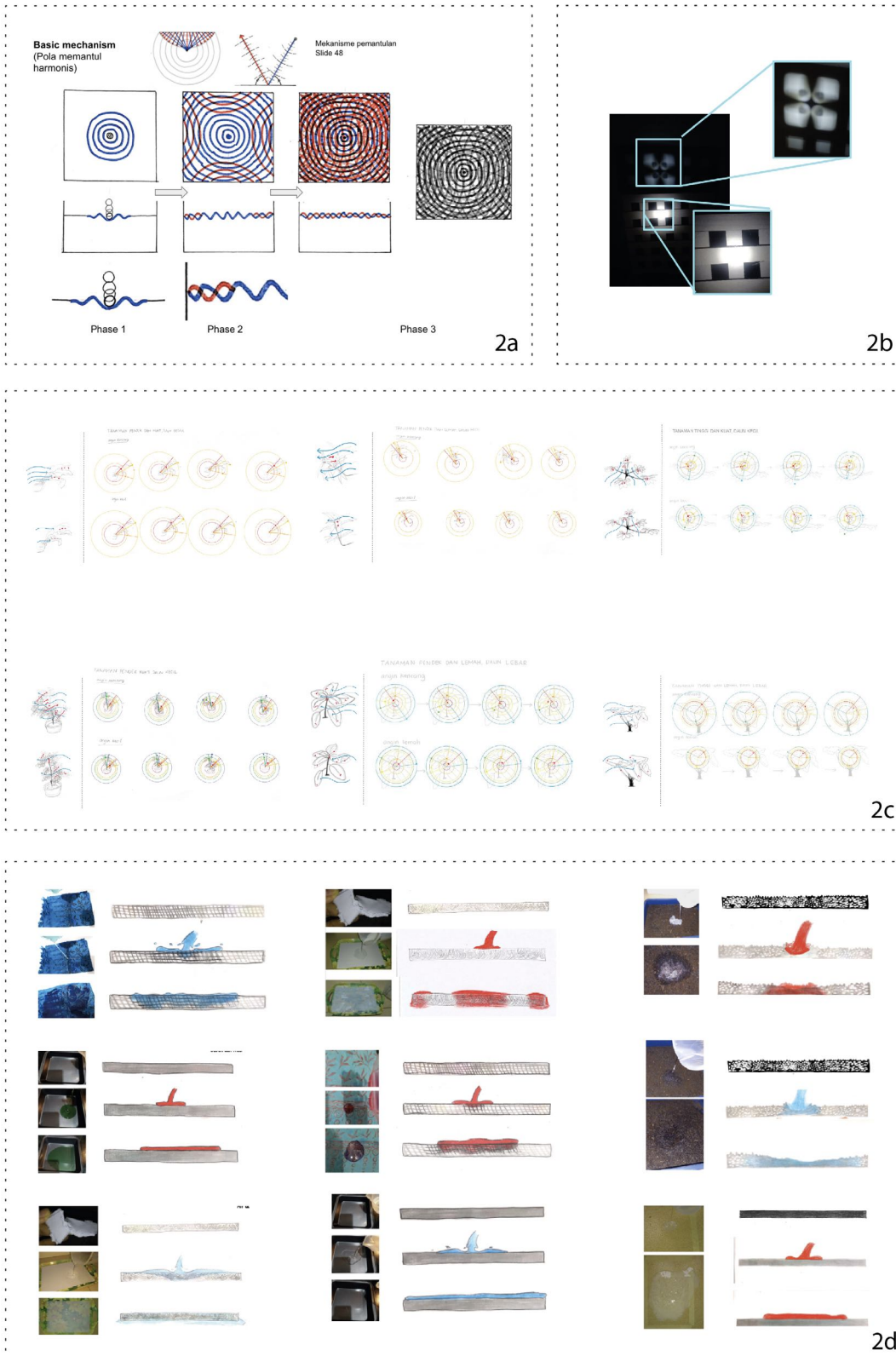
Category B: Catalogue drawings as a frame to investigate some particular informations

Beyond just collecting any information, catalogue drawing has been further utilised to investigate a specific information. Here, things that are considered as significant are being unraveled throughout the making of catalogue drawings. The content of these catalogue drawings consist of a narrowed down information with a deeper understanding. The catalogue exposes a particular information in a closer look, investigating them by rearranging the particular information, breaking the components, or enlarging some parts of the observed elements to extract their hidden information. In terms of investigation, the catalogue drawings in this category often compile the annotated tracings or other visualisation that are redrawn from the observed elements (see Figure 2).

The techniques and arrangements in making the catalogue drawings as seen in Figure 2 enable the designer to reveal the layers of knowledge; going beyond presenting the information superficially. Such catalogue utilises a text, a graph-based matrix, or a combination of both that are presented in various scales and forms, since the designer utilises catalogue drawings to variably expose the degree of things. The process of making this category of catalogue drawings enables the designer to

understand the different parts of each information, creating the groups, sub-groups, and their components. Drawing and rearranging these parts of information in parallel enables the designer to compare and discover the relations between different information throughout the process.

Figure 2. Catalogue depicting the process of unravelling information (Images provided by Raihan & Nafi, Halomoan & Syahrani, Amyra & Nugroho, and Darma & Adityaningsih; created in 2020)

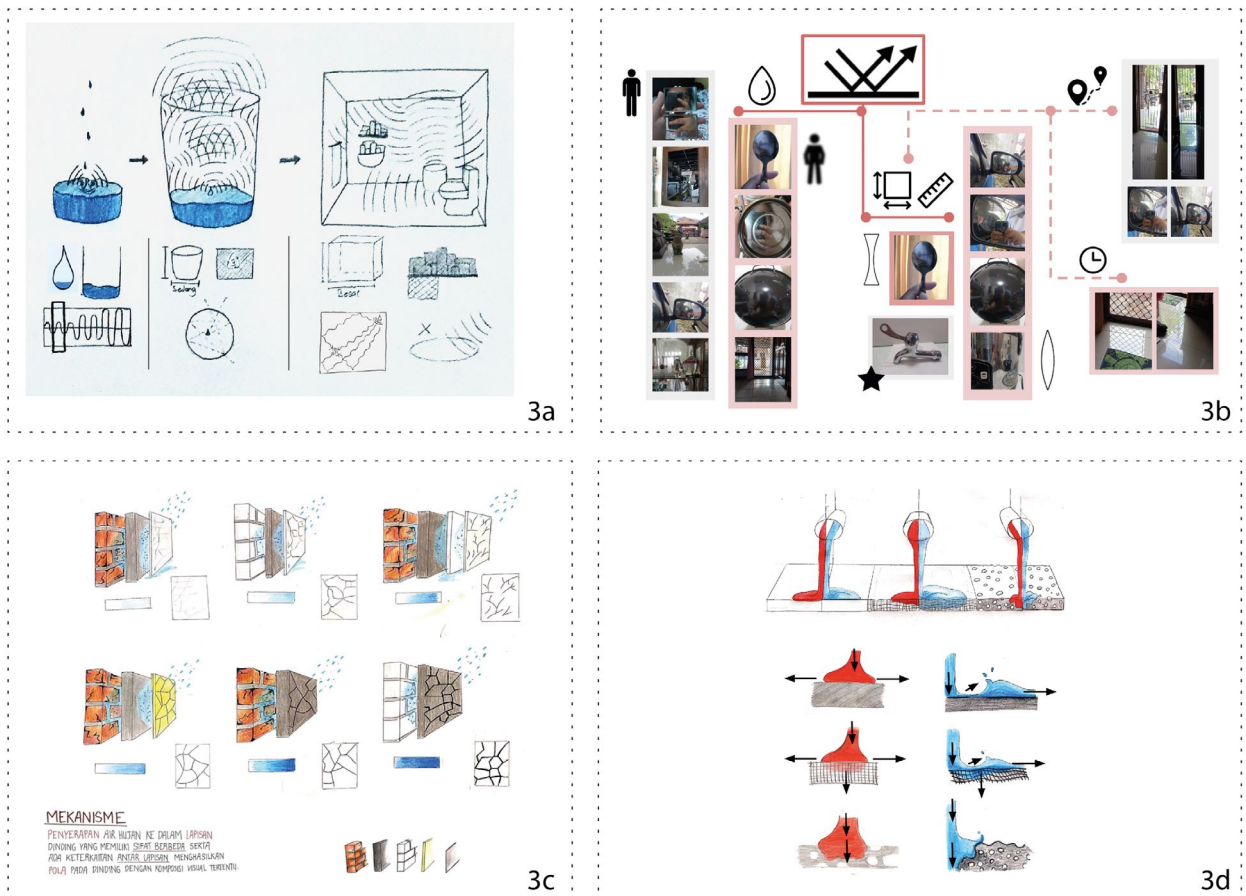


Category C: Catalogue drawing as a frame that set the bigger picture of the design condition

Catalogue drawings can be utilised for both arguing and revealing the bigger picture of the accumulated and investigated information; communicated towards the designers themselves or towards the others. The catalogue drawings perform as a representation that display the scope and limitation of these information as a design condition which lead to a possible design proposition, as can be seen in the following examples of catalogue drawings in Figure 3.

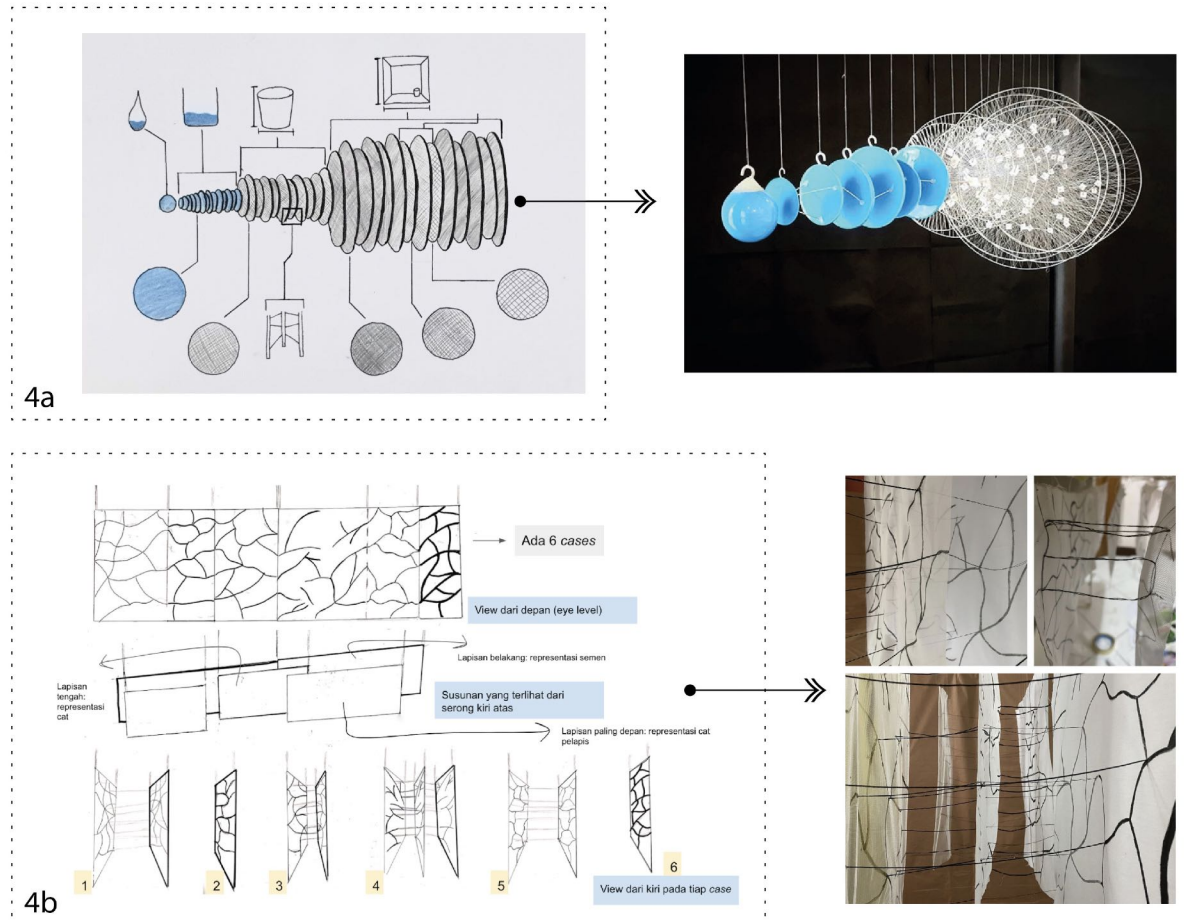
This catalogue drawing demonstrates the bigger picture of the design condition through arranging the findings into a rich but filtered matrix, which includes the process of selecting, trimming, arranging, and reproducing the findings. The contents that are being arranged here are the findings, means, the knowledge that are produced through a process conducted by the designers which are not presented in their raw form. Instead, the contents of such catalogue has already been extracted and translated into another form. The catalogue demonstrates some arrangements that clarifies the connections of each information toward another. Information is no longer simply being arranged row by row; it is arranged by placing each of them into a certain position toward the other things around. Arguably, this category of catalogue drawings could only be constructed if the designer had already specified their design intent.

Figure 3. The matrix of relevant findings, arranged to form the bigger picture of the information (Images provided by Abdurrahman & Fadilah, Dewi & Christine, Pramudhita, and Darma & Adityaningsih; created in 2020)



Category D: Catalogue drawings as a frame that outlines design proposition

This paper argues that this kind of catalogue drawing could only be made after the designer has performed a sufficient process of investigation, produced some findings, and demonstrated a clear understanding of the findings' position towards each other. Such catalogue drawing represents a materialisation of design propositions with a clear design intent.



The above example of catalogue drawings demonstrate how the designer had manifested his design intent and the findings altogether, moving toward the process of design realisation. Through such drawing, the designer might propose the material compilation of the design, while at the same time signifies the micro parts of the design that need to be paid attention to base on the previous findings. Having this catalogue drawings permit the designers to embark further into the realisation process of their design object.

The utilisation of different catalogue drawings throughout the design process

The discussion above has elaborated on the different forms of catalogue drawings that assist the designers in handling their design inputs and framing the information to further navigate the design process. The catalogue drawing significantly triggers

Figure 4. Catalogues of design propositions: Details and materialisations [left] (Images provided by Abdurrahman & Pramudhita; created in 2020)

and aids design thinking, specifying the design intent gradually to create original design propositions. Each catalogue drawing brings a specific role towards the design intent and works, and also applies particular technique and tools in creating them. Catalogue drawings category A assist the designer to collect and identify the relevant things that are involved, while category B conduct a deeper investigation of particular information. Furthermore, catalogue drawing category C supports the designer in setting the bigger picture of the project that triggers design propositions. Lastly, catalogue drawing category D compiles the principles of design materialisation, thus shifting the design process into the stage of design realisation.

This section examines the utilisation of such different catalogue drawings within the design process. It is found that the catalogue drawings are not necessarily utilised in chronological sequences, but can be performed repeatedly, going back and forth on one category to another. This is done when one of the catalogue drawings is not strong or accomplished enough, and therefore leads to multiple loops of catalogue creations throughout the design journey.

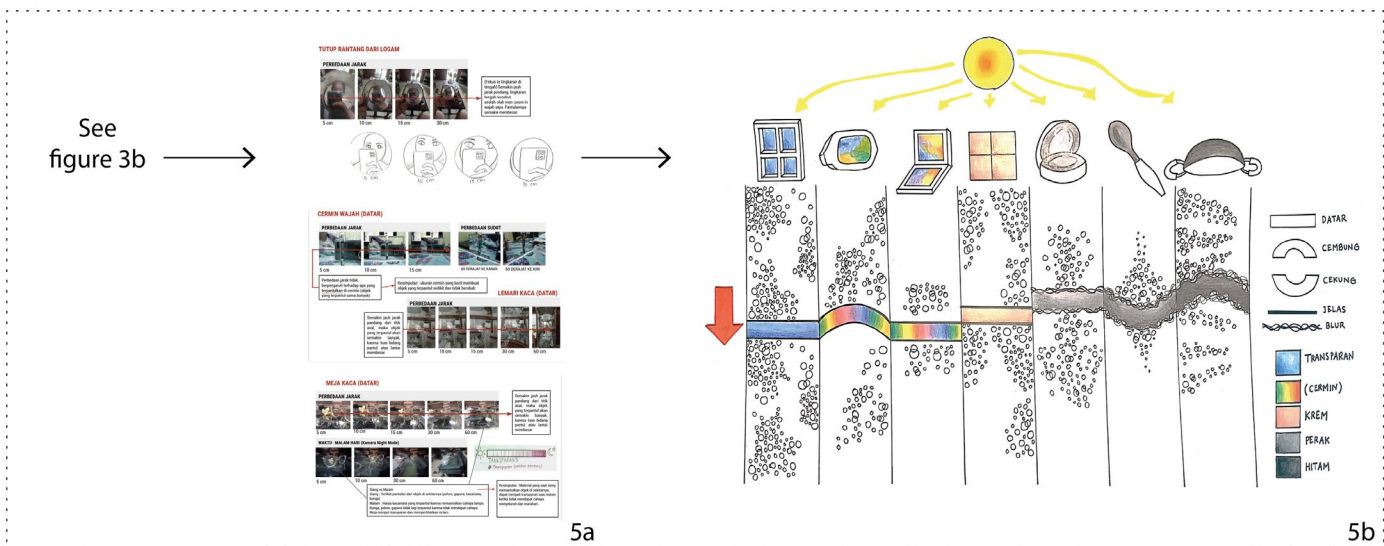


Figure 5. A loop of going back and forth, by creating catalogue drawings C which is then followed by catalogue drawings B (Images provided by Dewi & Christine; created in 2020)

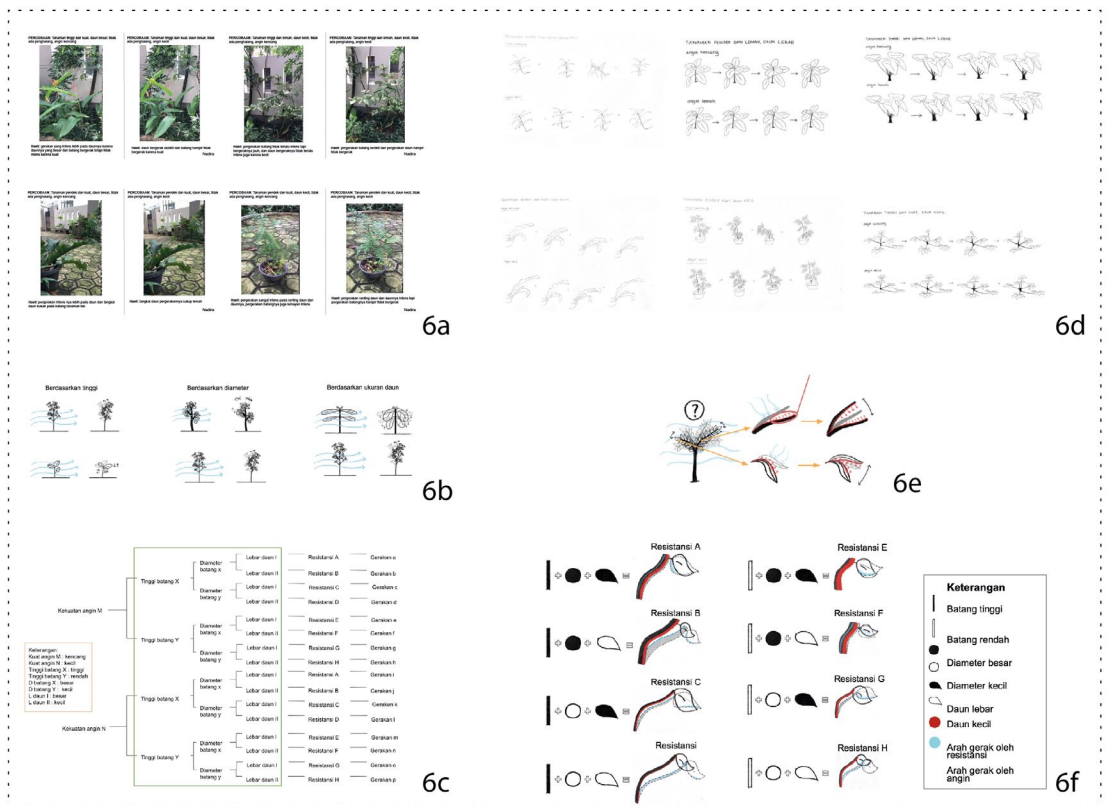
For example, the above drawings demonstrate a student's attempt to state a mature design framework after investigation through catalogue drawings category C (Figure 3b up above). Such drawing is meant to provide the general big picture of their design works, but it wasn't mature enough yet. The students then move backwards and create a set of catalogue drawings category B (Figure 5a) to gain more specific findings. Such drawings then enable them to generate another arrangement of catalogue drawing category C (Figure 5b), arguing towards the big pictures of design condition that are stronger and more mature.

A strong design work may be constructed from not only one loop of the going back and forth process, but on several loops in entirety. One of the examples can be seen in (Figure

6a), where these students redid their catalogue drawings category A, in the form of footage collection and a text-based matrix. These students decided to deepen the investigation by creating catalogue drawings category B, C, C, B, B, and B again (Figure 6b–6f and Figure 2c up above). Such a process enables a thorough identification and investigation, while at the same time generates an elaborated arrangement of the catalogue with sufficient information, thus constructing a strong argument of design thinking.

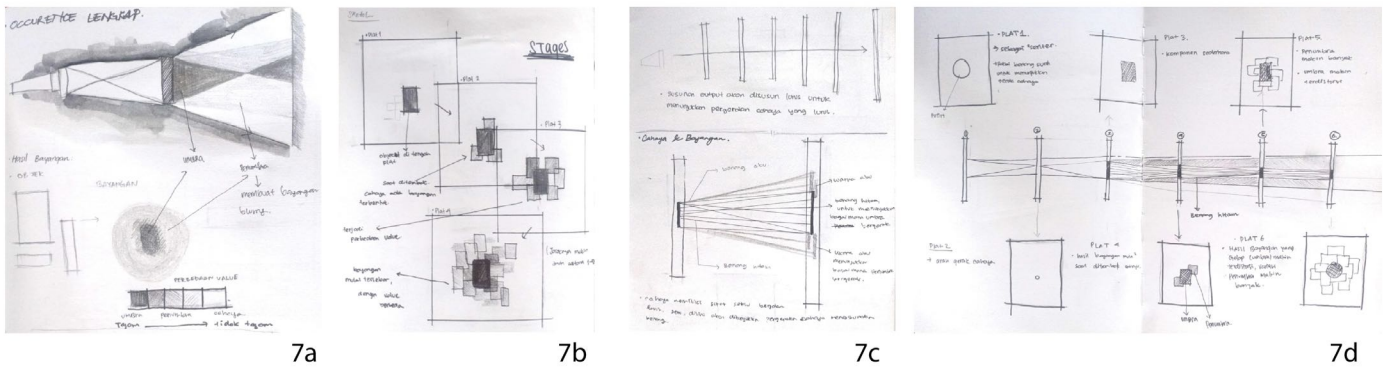
The paragraphs above explain how catalogue drawings significantly assist the process of design thinking, particularly by handling information while the designer is going back and forth throughout the process of observation and making. Creating the catalogue over and over becomes more relevant in the stages where the process of handling information becomes more intense to support the process of decision making that takes place more often and involve more information, in comparison to the earlier design stages.

Figure 6. Several loops of going back and forth, assisted by creating categories of catalogue drawings (Images provided by Amyra & Nugroho; created in 2020)



In this phase, catalogue drawings in different categories are made in a continuous shift. It allows the process of decision making throughout design activities (Lawson, 2005) to pass on from one to another in a collected way. As shown from the example (Figure 7), the realisation of design becomes gradually more explicit, as the designer creates multiples catalogue drawings. The catalogue drawings assist the process of recalling, sweeping, or rearranging the important findings; whilst constructing them toward the design materialisation.

Such constitutive and projective roles (Vidler, 2000) of catalogue drawings allow a different way of framing the information, analysing them further into findings that drives a clear narrative of design strategy and the design realisation.



Conclusion

This paper has demonstrated the role of catalogue drawings as the framing device within an architectural design process. It demonstrates how catalogue is much more than a representation of a finished output, it is instead a device for handling design information—either in collecting, investigating, and arranging them—creating a design intent that drives the design strategy and navigates the design process towards further realisation. Considering these roles, it can be understood that catalogue drawing has a performative capacity (Vidler, 2000) that assists the designer throughout the design journey.

The paper exposes the behind the scene process on how catalogue drawings have different roles in triggering and aiding design thinking throughout the design journey. Creating catalogue drawings enable the designers to design in an informed way; as the catalogue drawing constructs the design arguments in a way that are non-intuitive and research-driven.

The study determines four categories of catalogue drawings; each trigger and aid design thinking within a particular stage of design. Each category of catalogue drawing applies a particular technique and tools in producing catalogue drawings, creating different ways of compiling and seeing the information. Based on the case study, amongst four categories, the most critical process is when the students try to argue the big picture of their design works, through making catalogue drawings category C. It involves an intense decision making during a massive process that are often conducted in a back-and-forth way—i.e., sorting and sweeping information, arranging and rearranging them, and setting limitations and scope—that happen simultaneously. Such a critical process often requires the designer to strategically perform design synthesis and move beyond the previously analytical design stages.

Figure 7. The process of going back and forth might happen within a set of catalogue drawing (Images provided by Halomoan; created in 2020)

This study has demonstrated how catalogue drawings assist the process of recognising, wrapping up, and bringing only the significant information to be involved; either during the process of observation and gathering the relevant data, or in the process of conducting investigation and reading the possible patterns across the data. The study also demonstrates how some catalogues enable the macro perspective of the design inquiry, thus creating the bigger picture that specifies the urgency or needs of the design, while some others assist in the process of design materialisation. Throughout the design journey, categories of catalogue drawings are not utilised in a chronological way, but may happen in a repetitive loop towards one another, based on the different needs of design discovery. Such repetition demonstrates the often nonlinear and incremental process of design, of which the idea becomes stronger with further development.

This study emphasises the role of catalogue drawings in enabling and revelation of the design process; not only for displaying the final output. Such findings are particularly essential as it provides a clearer account of the progression of design thinking that is often hidden within the design process. This study contributes to the knowledge of design through providing insight into the different frames the designer requires to allow the compilation of design knowledge and to trigger design thinking throughout the design journey. Knowledge about catalogue drawing also provide implication for design pedagogy in architectural design studios. The produced catalogue drawings enable other students to learn from each other on how their peers progressively conduct their design process, while providing the basis for the facilitators in giving constructive feedback based on the progression of design thinking that has been performed. Future studies might explore how catalogue drawings assist such thinking processes in a different context of design projects with more complexities.

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