CHAPTER III
RESEARCH HYPOTHESES AND METHODOLOGY

1. Research Framework and Question

This research aims to understand and reconstruct reality of the design nature collaborating with research so as to enact reciprocal integration in design inquiry. Its framework is therefore based upon *constructivism*, whose methodology lies in interpretative modes and a dialectical transaction to compare and contrast constructed reality. Constructivist approach allows for interactions between a researcher and subject matters, according to Guba and Lincoln.[1] Constructivist stance intends to make a synthesis of meanings through interpretation and comparing and contrasting divergent constructions. The inquiry embarks on investigated issues and participations and reveals their joint construction of findings by means of dialectic of iteration, analysis, and critique. The joint constructions can be assessed by data provided for understanding, relevance, and modifiable ability.[2]

This research is to argue that the architectural-design process and design research can be integrated through establishing design problems in reflective form of generative future images. Its assumption is drawn from that a series of design processes are varying and rely upon design problems as design research acting as investigative modes insightfully shapes design solutions through specific knowledge for design decisions. Design solutions, in turn, refine problems and issues, which drive design procedures leading to a design proposal. The main research question is thus: *what forms of design dialogues do make research in conjunction with the design process?*

2. Research Hypotheses

Two hypotheses are mainly concerned in this research. The major goal of this research aims to explore design frameworks and dialogues in which enable to integrate the roles of design research with codification in the complex design process for architectural creativity. The study will determine whether patterns of the cooperation between the architectural-design process and research exist for environmental creativity, and diverge among different groups of designers standing for different periods of design experience. Two hypotheses are thus framed and delineated as follows.

2.1 The First Hypothesis

The first hypothesis is established to investigate what possible frameworks for the architectural-design process present for research driving problem-solving in design thinking. Architectural design is the collective operation so as to generate the physical solution. If the architectural-design process is an inquiry of the creative formal solution, then it requires collaborative research strategies and techniques for investigating an appropriately figural solution responsive for key problems. *The architectural-design process can therefore integrate with design research in terms of the co-development between problems-solutions as dialectical design dialogues of environmental-making.*

2.2 The Second Hypothesis

The second hypothesis is created to determine what possible design dialogues enable designers to connect research within environmental-design inquiries. Architectural design manifests itself as formal integration through abductive thinking. Its processes encompass dialectical acts and thinking of synthesis and analysis. Synthesizing modes of designing generate figural responses and design conjectures, namely an initial scope of design concepts and questions while analytical modes refine design problems, criteria, figural developments through factual research. *With integrative design thinking, architectural design and research need complex layers as principal agendas as design dialogues enable to make the environmental creative process and research cooperative.*

3. Subjects of Study

To conduct two previous hypotheses, the research includes three different groups of designer participants: third-year architecture students, fifth-year architecture students, and professional architects. Samples of design students follows the curriculum of Faculty of Architecture, Kasetsart University as professional participants in architecture integrated their practices with research. The first group of eight third-year students is initially trained for integration between design and research. The second group of six fifth-year students initiates and develops their design programs and theses for completing the professional degree. And, the third group is consisted of five architectural practitioners who have collected more experience in design inquiry than the other previous groups.

4. Research Methods

This research is solely involved with examining the nature of architectural-design thinking and meaningful phenomena occurring in investigative processes of design activity. Thus, it employs qualitative strategies for data gathering and content analysis. The study undertakes data coding from various groups of participants operating design research into the process of design for generalization of theory conception.[3] The explanatory ability of the collaboration between the design process and research arises from "building a logical chain of evidence," as Miles and Huberman note.[4]

4.1 Data Collection

Data gathering encompasses a variety of resources of the design nature and research activity. Four tactical methods are used to collect data relevant to examine mentioned hypotheses: 1) interviews about the design process and investigative methods, 2) participant observations of the design students' processes of design, 3) figural mediums and visual data collections such as sketches describing the process development as well as research application, and 4) gathering analytical diagrams of design processes.

As an architectural research on the design process, participant observations regarding design activity are first to determine relevance to continuity of the process of design inquiry, especially for design student subjects. Second, the problem and design development taking place in design inquiry is recorded in visual forms of photographs to describe the progress of solution-finding. Third, interviews of design problem-solution interactions and collaborative processes are collected so as to investigate what possible design dialogues act as junctions between design and research. Fourth, analytical diagrams of design processes are gathered in order to assess whether any form of design inquiry and research are revealed within the process of design. These data are utilized for analyzing cooperation between the design process and research as integrative inquiry of design.

4.2 Analysis and Interpretation

The data analysis will generally rely upon theoretical propositions[5] that architectural design and research can be collaborated if the design process is considered as an inquiry developing the problem-solution relationship as well as manifesting design dialogues to join two different modes of thinking. These propositions help to focus on data reduction and determine relevant data. An explanation-building technique is

dominantly employed for an analytic strategy.[6] Analytical methods of "unitizing and categorizing" processes are conducted according to Guba and Lincoln. During the unitizing process, units of meaning information that will later construct categories are retrieved from visual documents, interview transcripts, and observational records and compiled in index cards. Meanwhile, the categorizing process is to assemble units relating to the same content into category sets and to overlap relationships between categories.[7] Sorting and categorizing processes are repeated and the replicability of categories is contrasting and comparing via other collaborative processes and research methods.

These processes of data analysis are conducted in line with two mentioned hypotheses. Due to unique objectives, determinations, and data accounts on hypotheses, decoded units from each hypothesis will lead to distinct category-buildings, as shown in Table 3.1. As to the design process as inquiry, units are determined to sort out into matters of the relationship between problems-solutions, thereby resulting in categories on what framework manifest as design inquiry collaborating with research. Meanwhile, accounts on design development through dialectical ways of thinking are deduced in thematic contents of design conjectures, problems, and refinement in the process of design. This contributes categories to emerge and describe design dialogues that make design and research cooperative. Design ability implementing research into the process is launched into the themes of methodological advances in design that elucidate categories of the patterns and nature of design research and techniques.

Table 3.1: Analytical processes of data reduction.

Data	Unitizing	Categorizing Analysis
Hypothesis 1		
Accounts on design activity in relation to the framework of the co-development between problems-solutions	Meaning units/themes on design inquiry related to problem-solving	Categories on what a possible framework of the process of design collaborating with research
Hypothesis 2		
Accounts on design agendas, issues, and development through synthesizing and analytical modes of thinking	Meaning units/ themes on design conjectures and problems toward development	Categories on design dialogues possible to make design and research cooperative

5. Validity

In naturalistic inquiry, validity is equivalent to "trustworthiness". As to Lincoln and Guba, the criteria to assess trustworthiness are credibility, transferability, dependability, and confirmability.[8]

The idea behind credibility is to constitute truth value; two ways to demonstrate truth value are triangulation and member checks. This research establishes credibility by using a triangulation of a diversity of data from different groups of subjects and a combination of data gathering techniques for evaluation. For establishing transferability, which conclusion of the inquiry can be implemented to other design situations, the particularities of the design inquiry and processes are explanatory enough to be assessed to other architectural-design activities. According to Lincoln and Guba, dependability is founded by an "audit trial."[9] The inquiry documents research processes: data gathering and content analysis, including figural design development, sketches, and diagrams that track design situations in relation to the process of design and research activity. Finally, confirmability is set up by means of a triangulation of research findings retrieved from three groups of subjects at concrete levels.

6. Notes

1. Egon Guba and Yvonna Lincoln, "Competing Paradigms in Qualitative Research," in *Handbook of Qualitative Research*, ed. Norman Denzin and Yvonna Lincoln (US: Sage Publications, 1994), pp. 105-117.
2. See Thomas Schwandt, "Constructivist, Interpretivist Approaches to Human Inquiry" in *Handbook of Qualitative Research*, edited by Norman Dezin and Yvonna Lincoln (US: Sage, 1994), pp. 118-137.
3. Linda Groat and David Wang, *Architectural Research Methods* (US: John Wiley & Sons, 2002), p. 193.
4. Ibid., p. 195.
5. See Robert Yin, *Case Study Research: Design and Method*, 2nd ed. (California: Sage, 1994), pp. 102-04.
6. Ibid., pp. 110-13.
7. Yvonna Lincoln and Egon Guba, *Naturalistic Inquiry* (Thousand Osks: Sage, 1985), pp. 344-51.
8. Ibid., pp. 301-31.
9. Ibid., pp. 317-19.