論文の内容の要旨

論文題目　Visual Analysis of Katsura Rikyu Formal Elements in Relation to Tobiishi Pattern

（桂離宮庭園における飛び石パターンの視覚的分析）

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Background

Thesis study is based on *in situ* stepping activity pursued along Katsura Rikyu Imperial Pathway. It is conducted along exactly constructed *tobiishi* pathway that spreads through exactly assembled environment consisted of natural and artificial physical forms. Thus, exact visual experience about those forms acquired in stepping stones serves as an introduction one is exposed before entering garden tea houses. Hence, it becomes important to empirically discover how this method is applied with final aim to assemble different environments while preserving equal esthetic values of the garden.

Purposes

There has not been conducted empirical research on design methods according to which garden physical forms are dependently assembled in terms of their visual experiences in *tobiishi* coordinates. This study attempts to investigate how these experiences progress along the Imperial Pathway.

Thence, garden physical forms exist in four forms of definitions: '*the physical*- garden, *the logical*- design method, *and the perceptible*- visual experience [*and thus the apprehensible*- cognitive impressions that succeed each of visual images]' [Kwinter, 1998, Assemblage 36: p.36].

These four definitions are followed in order to reach empirical conclusion about Katsura Rikyu design method – the apprehensible definition. According to this, thesis content results in four research aims of choosing Katsura Rikyu as an object of empirical research:

1. *In situ* captions of the garden physical forms recorded in stepping stones are juxtaposed to the garden plans and sections in those coordinates. This juxtaposition results in diagrams that explain how garden physical forms mutually develop in their attributes in order to result in certain logic of visual and according cognitive comprehension;
2. These changes in their attributes are classified in table and chart system. Hereby physical forms are measured in amount of application of their attributes and kinds of visual experiences they evoke.

3. The most dominant forms of garden physical forms are compared in mostly applied visual experiences they initiate. They are further classified in new single tables;
4. Physical forms that initiate equal or similar visual experiences can be differently combined and create different kinds of gardens in terms of their physical forms;

Contents

Thesis study includes seven chapters.
Chapter 1 concentrates on introduction to: the research objective, instance and purpose.
Chapter 2 exposes research hypothesis with problematic questions it resolves, whereas
Chapter 3 deals with theoretical frameworks implicated by research hypothesis.
Chapter 4 exposes further influence of theoretical frameworks onto the research methodology, whilst Chapter 5 presents introduction and exposé to the research methodology.
Chapter 6 derives theoretical and graphical research results in application of research methodology.
Chapter 7 exposes conclusions on research results in forms of classification of preliminary research results and their further comparison toward new method of architectural design.
Chapter 1 offers general background on creation of Katsura Rikyu garden as composure of natural and artificial physical forms. It consists of introductions to research objective, instance and purpose:
-Introduction to the research objective provides direction of research investigation. It is discussed how natural and artificial physical forms are assembled in form of a garden and how they are intended to be empirically measured in order to decipher immeasurable visual and cognitive experiences they evoke.
-Introduction to the research instance describes stepping stones' coordinates as points of research measurements of field of view captions and garden drawings.
-Research purpose is undoubtedly based on research instance. Understanding of its measures is intended to empirically represent cognitive understanding of the garden environment.
Chapter 2 develops research hypothesis with an introduction to problematic questions it involves.
It is divided in two parts:
-First part consists of an introduction to declaration of research hypothesis. Visual experience is suggested to be divided in Imperial Pathway independent but succeeding stepping sub-paths.
-Second part expresses research hypothesis. It is based on mutual coordination in visual and physical juxtaposition of physical attributes of the garden physical forms: stepping stones, physical forms along stepping paths [greenery, landscape, tea houses] and *tobiishi* fields of view.
Chapter 3 is a theoretical framework that supports research hypothesis in various discourses discussed in 6 separate chapters. These chapters are based on research hypothesis research aim to measure immeasurable instance of visual experience.
Chapter 3.1 reveals religious, esthetical and historical dichotomies applied in physical forms of Katsura

Rikyu physical forms: greenery, landscape, stones and tea houses.

These discourses on dichotomies involve the subject of material [measurable] and immaterial [immeasurable] aspects both carried by the garden physical forms. They deepen research aim to decipher immeasurable cognitive impression of the garden physical forms based on visual experience.

Chapter 3.2 discusses on visual experience development in terms of tea ceremony whereas visitor is taken from outside stepping coordinates to the point of *nijiriguchi* entrance to inner tea room.

Chapter 3.3 and 3.4 expose garden as an artificially created wilderness since it dominantly consists of natural physical forms composed in an artificial environment. It is further revealed how this discourse supports research hypothesis and enhances expected results in research methodology application.

In chapter 3.5 and 3.6 are discussed natural growth and artificial design methods as intangible cultural values. Furthermore, it is discussed how they are visually recognizable in garden physical forms.

Chapter 4 offers insight on further implications on research hypothesis by theoretical frameworks. They are specifically discussed in their application in research methodology. It is indicated how disposition of the garden physical forms and stepping coordinates are intentionally choreographed according to esthetic values inherited from Zennism with *kekkai* and *ikidori* design methods.

Chapter 5 explains methodology of analysis of content of visual experiences obtained in *tobiishi* coordinates and relevant garden drawings. It is divided in four parts.

-First part introduces research method approach that assures empirical application of research method intended to be used to reveal garden design method in qualitative and quantitative results. Measurement method uses field of view *in situ* recorded content and relevant plans and sections in these points.

-In second part are compared cognitive representations of garden physical forms. They become after their visual experience and their objective existence, without being visually observed, following cerebral processes in Rolandic area based on Henri Bergson published scientific findings.

-In third and fourth part there are presented selection, explanation and application of intended research methods in measurement of the garden physical forms.

Plans and field of view captions, as research method instances, are measured and compared in equal stepping coordinates. Their comparison in all stepping coordinates results in successive development of the garden physical forms, whose dependencies are intended to be revealed in research findings.

Chapter 6 presents graphical findings structured according to application of research methodology. There are twelve characteristic research cases of stepping paths applied with repetitive research method. Hence, garden physical forms are disintegrated in their physical attributes in order to present and understand their development observed from stepping stones' coordinates. These graphical findings are followed with explanations on how physical forms are correlated in development of their attributes.

Chapter 7 presents research findings on visual development of garden physical forms classified in order to reveal garden design method. Their further comparison in terms of equal visual experiences they create result in new possibility of their application.

-First part presents new theoretical frames of poly-rhythmia. Physical forms in garden and *tobiishi* stones are proven to be mutually and instantaneously visually correlated in their attributes.
-Second part of the chapter is divided in three parts. It deals with further classification of research results with bringing up new conclusions and design method in architecture:
--In first part physical forms are divided in their attributes whereas each attribute is given a table and chart classification. In each of these classification attributes are presented through their measures that describe variety of their application. Each measure is counted in quantity of its application. Each measure is given a separate explanation on kind of visual experience they create. According to quantity of their application in percentages there are distinguished the most dominant in Katsura Rikyu garden.
--Second part separates the most dominant measures applied according to previous classification. It is created a new table that classifies those measures and visual experience attached to their application.
--Third part consists of new tables that classify those most dominant visual experiences. Each visual experience is given a single table. Each table has a list of attributes of the garden physical forms and their measures that result in those visual experiences. Therefore, those measures can be combined in different physical environments with equal descriptions of their visual experiences.

Evaluation

Research conclusion stands in new method of architectural design that is evaluated and assessed according to users' physiology. That method is evaluated and applied solely upon what kind of visual experience and following cognitive impression it creates.
It suggests new understanding of modeling an environment by introducing the physiological concept of eye sight. Moreover, it implicates parametric modeling software that would integrate multiple manipulations of physical forms in order to create a single form of architecture.

Professor's comments:

-Prof. Kuma Kengo suggested to classify and compare research results in tables They would eventually lead to a new kind of design methodology in architecture;
-Prof. Chiba Manabu demanded to explore if field of view stepping captions and garden drawings occur in equal time lapses;
-Prof. Fujii Keisuke demanded to provide all sources I used in list of literature and captions as strictly important to understand how I created new layout of the garden according to past century surveys;
-Prof. Darko Radovic [Keio University] suggested a method on how to empirically decipher field of view development toward new understanding of progression of greenery along garden *tobiishi* paths;
-Prof. Kobayashi Masami [Meiji University] suggested to explore more on how visual experiences depend on changes in garden physical forms as a point of new design method.