

Re-interpreting the case study approach in architectural research

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Received January 13, 2024 Received in revised form Feb. 22, 2024 Accepted March 17, 2024 Available online April 01, 2024</p> <p><i>Keywords:</i> Architecture research, case study approach, form, function, meaning</p> <p>*Corresponding author: Purnama Salura Department of Architecture, Faculty of Engineering, Universitas Katolik Parahyangan, Bandung, Indonesia Email: purnama.salura@unpar.ac.id ORCID: https://orcid.org/0000-0002-3652-7192</p>	<p><i>The case study is a research approach carried out in a natural, holistic, and in-depth setting about a unique, best practice, and bounded phenomenon. Even though it was rooted in social sciences, the case study has characteristics that are almost the same as a process of studying past architectural works (precedent studies) that have long been carried out in architecture. Unfortunately, precedent studies are sometimes only limited to documentation and descriptions of architectural works as physical objects, without critical, in-depth and holistic analysis of the decisions behind the design decisions of a precedent. On the other hand, previous research that discussed the case study approach in architecture tended to understand this approach as just a social research method that was simply applied in architectural research. Therefore, it is crucial to understand the terms of the 'case' itself. This research aims to provide a complete and in-depth understanding of the case study approach, to filter and elaborate this approach for architectural research. This research examines and elaborates on credible and recent literature on case study, both in social and architectural research. Elaboration from the literature review is used to formulate an operational framework based on architectural function-form-meaning. It is hoped that the results of this research will enrich architectural knowledge. The in-depth understanding is ultimately beneficial for improving existing architectural practices and becoming a source of knowledge for the general public.</i></p>

Introduction

Architectural creation was deeply rooted in the basic human need for a space to accommodate activities (Salura 2001). In line with the fulfilment of this basic need, architectural research was born through observations of other existing buildings. It includes a trial-and-error process in order to create a building that is more suitable than the existing buildings (Parcell 2012). This kind of research method only involves documenting structural and non-structural elements and then attempting to modify those elements. Thus, what is obtained is only a different quality of space, in line with the designer's intention.

Architectural research that goes beyond the boundaries of structure and construction is a relatively new phenomenon (Groat and Wang 2013; Martindale 2021). Since the 1960s, architectural academics have realized that structural and constructional sophistication alone is not enough to create buildings that perform well. As a result, several architectural issues have been considered capable of enriching architectural knowledge. These issues range from those motivated by a positivist paradigm, such as the influence of climate on buildings, to those related to socio-cultural conditions, such as the human perceptions towards architecture.

Literature on social research methods, generally begins with the differences in

philosophical assumptions between the qualitative and quantitative research. By the 1960s, it had become a convention among sociologists that quantitative research, which was dominated by statistical methods alone, was insufficient to understand the life-world (*Lebenswelt*). Therefore, qualitative research becomes the primary choice in conducting social research. At the same time, architectural academics were criticizing Modern architecture. Modernism, along with technological advances and the positivist paradigm that was assumed lies behind it, were being abandoned. Architectural researchers were eager to turn to the qualitative method. This method is considered to provide a holistic picture of the world lived by laypeople, as well as how they interpret architecture. In other words, qualitative research is used to challenge the domination of Modernist master-builders by reinstating the role of laypeople as building users.

The dominance of qualitative over quantitative research is seen in the literature on architectural research methods. Almost all of the literature presented is dominated by qualitative research methods. For example, Linda Groat and David Wang's *Architectural Research Methods* presents seven strategies to conduct architectural research, namely historical research, qualitative research, correlational research, experimental and quasi-experimental research, simulation research, logical argumentation, and case study strategies (Groat and Wang 2013). Likewise, Ray Lucas' *Research Methods for Architecture* explicitly states that the book aims to examine research methods appropriate to architectural humanities (Lucas 2016). Therefore, this book also emphasizes the role of architecture as a form of material culture. Meanwhile, material culture is considered a branch of anthropology, environmental psychology, architectural historiography, phenomenology, and ethnography.

Of all the social research methods put forward by these books, there is one method that actually has a similar basis to architecture, and has actually been used in architecture for a long time. The method in question is the case study approach. Interestingly, while Groat-Wang and Lucas' books put forward the notion of the case study, both tend to misunderstand the case study as simply a method for studying work in the past, which is generally known as precedent study. An article by Ratnasari et. al, published in 2024 on case study approach in architecture, still tends to

only adhere to the writings of social science expert John Creswell, without significant elaboration. This resulted in a research method that remains the same as social research method, which unfortunately misses the very essence of architectural knowledge (Ratnasari and Sudradjat 2023). In general, although the use of the term case study is prevalent in architectural research, scientific efforts to develop a set of guidelines that can be used to evaluate the appropriateness of its application are apparently very limited (Kalua 2023).

Methods

In line with the objective, this research examined purposively selected works of literature. The case study approach is not an approach that comes from architectural science but has its roots in sociology and psychology. Therefore, to gain an in-depth understanding of this method and its possible applications in architecture, all the literature reviewed was classified into three:

Firstly, literature that discusses the case study method at the beginning of its emergence in sociology and psychology, as put forward by Yin (2018) and Stake (1995). As two of the leading thinkers on the case study approach, their writings is most widely cited by experts in qualitative research methods, such as John Creswell. The literature is not limited only to the writings of these two experts, but to reviews of the history and development of case studies before they were put forward by Yin and Stake, such as Hamel, Dufour, and Fortin (1993), criticism of the case study method such as (Flyvbjerg 2006; Flyvbjerg 2011), as well as recent literature that discusses the history and criticism of case studies in sociology such as Sena (2023).

Secondly, literature that discusses the case study approach in architectural research, namely Kalua (2023), which discusses the epistemological foundations of applying case study approach in architectural research, as well as Battisto and Franqui (2013) and Nnaemeka (2015) which discusses the operational steps of the case study approach in architecture.

Thirdly, literature that discusses the nature of architecture and architectural knowledge. The literature used is Salura (2015), which discusses formal and material objects of architecture. The analytical steps were formulated as follows:

The first step was to explore the definitions of the 'case study' approach, a 'case' and the history and development of case study research. Based on the analysis, the fundamental characteristics of the case study was determined, whether it is simply a qualitative research method similar to other qualitative research, or a particular research approach with specific requirements.

The second step was to discuss the application of case study approach in architectural research. This section begins by discussing the differences in the formal cause between architectural and social science. This understanding is critical for determining important aspects in formulating a case study approach that is in accordance with the essence of architectural knowledge itself.

The third step was to distinguish the meaning of the case study approach from the research case study (object of research or object of study), as well as precedent study that have been carried out in architectural research for a long time.

Results and discussion

Case study as a research approach

The word "case" can be defined as: 1) an example of an event; 2) the actual conditions of the state or situation; and 3) certain environments or conditions regarding specific people or events ([Hornby 1989](#)). Recent research on case study approach stated that the case study was the first approach used in sociological research ([Priya 2021](#); [Sena 2023](#)). Case study approach was pioneered in the 19th century by sociologist Pierre Guillaume Frédéric Le Play (1806–1882) in France. Le Play was the first researcher to apply inductive methods in social research. He studied society using an empirical approach using questionnaires, quantitative data analysis and observations. These methods were indeed new methods in sociological research at that time. However, the essence of Le Play's case study approach was neither the inductive nature nor the utilization of qualitative-quantitative methods. The essence of his case study approach lies in the selection of a particular unit of analysis that is considered best able to represent an issue that is unique and significant to social science at that time ([Hamel, Dufour, and Fortin 1993](#)).

Le Play's research was motivated by social changes in France: people who were initially satisfied with living in the villages are now

moving to big cities. If human interaction in villages is no longer relevant, then what should be studied about urban society, which can provide a holistic view of modern social life? The question of 'What should be studied from urban society' is considered a case.

Le Play's understanding differs from the understanding put forward by sociologists from the Chicago School in the United States. The case study method in the Chicago School belongs to a criticism of 'case history' or 'case work' about social workers in the United States, which was often considered the primary source of information for sociologists at that time. Case history refers to recorded information about particular individuals or groups of people. These records consist of statistical data provided by health services and various types of written documents. However, analysis of these materials rarely confronts an actual image of the condition of society itself.

Through the initiative of sociologists William I. Thomas and Robert Park, a program of field study was established in 1916 by the Department of Sociology at the University of Chicago, which has been in existence since 1892. Robert Park strongly encouraged his students not only to research based on official documents alone but also to go straight into the field to understand the problem in depth. He also asked his students to interview the immigrants and analyze their letters to find out how these people viewed progress and the obstacles they encountered in their new place, as well as their retrospective view of the lives they left behind in their homeland. This method of collecting data through field studies, interviews, and written documents is called the case study method.

The case study method of Chicago School was quite popular before World War II but was outdated in the 1950s ([Sena 2023](#)). In this period, the case study were replaced with quantitative research methods. The case study method only reappeared in the 1980s and gained a new understanding originating from non-sociological science. The most widely cited case study method author in the 1980s was Robert Yin, an American psychologist. Even though he is an expert in non-sociological fields, his writings are cited by experts in qualitative research methods such as John Creswell, and even by Linda Groat in the *Architectural Research Methods*. Therefore, it is essential to start our understanding by studying Yin's notion of the case study.

Yin was the first author to completely separate the idea of case study method from participant observation or other qualitative (Chicago School) research traditions. Yin understands a 'case' as 'a contemporary phenomenon in a real-life context, especially when there are no clear boundaries between a phenomenon and its context, and the researcher has no control over either the phenomenon or the context' (Yin 2018). Meanwhile, a case study approach is understood as an empirical investigation of one or several cases to answer the question "how" or "why" the case occurred. This definition implies that: Firstly, what is meant by 'case' is a phenomenon that is 'non-artificial' and 'not originating from the past', which is always related to the concrete (real) context surrounding it. Secondly, the case study approach is an intensive and in-depth investigation into the case itself. These two essential aspects that determine a case study approach are the distinguishing characteristics between the case study and experimental research (where phenomena are created in laboratory experiments), and also differentiate between case study approach and historical approach, which examine phenomena originating from the past.

Yin is an expert trained in experimental psychology; therefore, many classify his case study approach as a positivistic case study (Yazan 2015). Departing from the opposite epistemological side, namely interpretivism, several authors express their views regarding case study research. Among those most cited in the literature is Robert Stake (1995), a professor of educational psychology at the University of Illinois. Stake defines case study approach as the study of the particularity and complexity of a case, in order to understand its important aspects in depth in its context.

Stake focuses on qualitative research of individual cases, but he also emphasizes that the case study approach should not be considered the same as qualitative research techniques and procedures alone. The uniqueness (singularity) of the issues being studied differentiates case study from other qualitative research. Stake explicitly states that the case study is not about methodological choice but a choice of what is to be studied. Thus, even though the methods (procedures and techniques) are similar to qualitative research in general, the issue that becomes the 'case' must be unique. On the other hand, the issues raised in qualitative research could be anything based on the researcher's

interest. Several guidelines for determining the uniqueness of a case, namely: the essence or nature of the case itself; the background of the case; the context surrounding it; other cases that can explain the selected case, and the informants who control the case studied (Stake 1995). Apart from being unique, a 'case' is also intended as a "bounded system" or a system that does not stand alone.

The importance of the uniqueness of a case is also put forward in recent research on case study approach (Alpi and Evans 2019; Sena 2023). For example, the issue of the composition of wards in a hospital could be an issue for qualitative research in general. Ethnographic researchers can explore how a group of people with the same collective culture interpret the hospital ward; grounded theory researchers can explore how a group of patients felt about the atmosphere of the ward for them. However, the issue of ward composition in a hospital alone is not enough to be a 'case' in the case study research. To be an adequate case, the ward must be unique. For example, all the patients who occupied the ward recovered from terminal illnesses, and it is suspected that the composition of the ward influenced the patient's recovery. So, the 'case' that is worth studying is the success of the hospital ward, which influences the patient's recovery. The case study approach can be carried out by exploring the concepts that underlie the choice of ward composition, how the ward was designed, and why this ward succeeded in influencing the recovery of patients while the design of other wards did not. This is what differentiates a case study as a research approach from simply as a qualitative research method that uses various sources of data (ranging from literature reviews and interviews to participant observation).

Based on this literature review, it can be seen that there have been two understandings of the case study: Firstly, case study as a research approach that requires the selection of a case that is unique, considered as best practice, and represents significant issues for specific science. This understanding was pioneered by Le Play, and put forward again by Yin (although not explicitly), Stake, and Sena.

Secondly, case study is understood only as a qualitative research method, which allows data collection from various sources, involving interviews, observations and written documents. This understanding was pioneered by the Chicago School. Although Yin also emphasizes the

importance of the uniqueness of an issue in order to be called a 'case', Yin's discussion, which is dominated by research methods, often leads to a misunderstanding that case study is merely a research method. This misunderstanding was also induced by one of the three types of case studies put forward by Stake, namely the Instrumental case study. It is as if the case study approach only aims to provide general insight into a problem; or even considered just to generalize about repeatedly occurring issues. This is what sociologist Asmussen-Creswell (Creswell and Poth 2016) had in mind when they researched a shooting incident on a campus. Explicitly, the two researchers revealed that incidents of violence and shootings on campuses, especially in America, are not unique events. It was also not disclosed whether the campus' response to the shooting was unique or considered best practice. Thus, the case study approach is only used as a research method, to understand more deeply about what happened in the shooting incident and its aftermaths. Years later, when Creswell positioned case study as a research approach but only emphasized the aspect of research method (Creswell and Poth 2024), the understanding of case study approach was reduced to just a qualitative research method. It was reduced to qualitative research similar to ethnography, grounded theory, phenomenology, and narrative research.

In contrast to Asmussen-Creswell, this study views the case study as a holistic research approach. As a research approach, case study research must begin with selecting unique issues, considered as best practice, and significant for the development of a particular discipline.

The case study approach is not free from criticism, which results from misunderstandings regarding the purpose of the case study itself (Flyvbjerg 2006; 2011). Criticism and its solutions could be formulated as follows:

Firstly, the problem of generalization (statistical or analytical), which, according to critics, cannot be obtained from research using a case study approach. Although they can be used for quantitative research, most case study approach is used in qualitative research. Therefore, this criticism of generalization is actually rooted in the differing nature of quantitative vs. qualitative research. Hence, if we start from a correct understanding of a case, i.e., unique and considered as best practice, generalization is not only impossible but also unnecessary. When an issue is considered unique,

it means that the issue is the only issue that exists in a specific system. Because of its singularity, research result on unique and best practice issue are impossible to generalize. What is possible is to try to apply (transfer) the operational steps to other issues with similar characteristics.

Secondly, the problem of the objectivity of scientific knowledge, which, according to critics, cannot be produced through a case study approach because the case study approach is one qualitative research that depends on the context and subjectivity of the researcher. The problem of objectivity of knowledge basically targets the reliability and validity of the case study as a research method. This problem can be overcome by applying multiple sources of data, as well as data testing and triangulation (Yin 2018; Stake 1995; Burnard 2024; Vogl, Schmidt, and Zartler 2019; Johnson, Adkins, and Chauvin 2020; Döringer 2021; Alam 2020). Yin specifically puts forward testing requirements in case study research, which include construct validity (through triangulation of various sources of data and evidence, as well as member checking), internal validity (through analytical techniques such as pattern matching) and reliability (through case study protocols). Stake also puts forward four strategies for triangulation, which include triangulation of data sources, researchers, theories, and methodological triangulation.

Thirdly, the problem of explanation or hypothesis verification, which, according to critics, is impossible to provide through case study. Case study approach is considered to only be able to carry out exploratory and descriptive functions regarding the phenomenon. However, Yin emphasized that a case study approach aims to answer not only "what" (descriptive) and "how" (exploratory) questions but also "why" (explanatory). Therefore, this criticism seems more appropriate if it is directed at other qualitative research methods, such as narrative or biographical research, rather than at the case study approach.

Function form meaning as a foundation for architecture case study

As mentioned in the introduction, architecture was initially created to fulfil the need for space to accommodate human activities. Thus, ontologically, architecture is a physical object created by humans. The ultimate achievement (*causa finalis*) of architecture is to create space and building elements so that humans can carry

out their activities safely, comfortably and efficiently. Architecture is not only an image inside our minds, nor a drawing. Architecture is also not a design concept that exists in the designer's mind, nor is it the user's or observer's interpretation of the building. Because architecture was first created to accommodate human activities, the formal cause of architecture has its efficiency characteristics (Salura 2015).

This formal cause of architecture is different from sociology. Sociology departs from the assumption that humans are social creatures where they will continue to interact. Therefore, the formal cause of sociology is the relationships between humans and processes that arise from human relationships in society. All theories in social science never aim to create physical objects that humans can use. Thus, the formal cause of sociology is rather descriptive.

Starting from the understanding that the formal cause of architecture has its efficient characters, its material cause is the space and building elements that can protect humans from surrounding disturbances. On the other hand, the material cause of sociology are feelings, perceptions, thoughts, and behaviour that are created from relationships between humans. Unlike the material cause of architecture, which is tangible (must be able to be felt physically), the material cause of social relationships is intangible. The differences in formal and material in architecture and sociology provide the background to the emergence of different significant issues for the development of these two sciences. This is what architectural researchers must understand before adopting the research methods from social science.

It is understood that architecture is created because of human activity; while human activities can never be separated from interaction between humans. However, equating architecture with social science means that we only recognize that architecture is the same as any interpretation (meaning) given by humans. Reducing architecture to a mere abstraction will undoubtedly lead us to the same failure as Modern architecture. If we want to look deeper than what critics generally write, the failure of Modern architecture is not caused by the positivist ideology, which is considered to be behind modernism. What is considered Universalism by the modernist master-builders was not grounded in the universal human needs obtained through biological analysis of the human body, but rather

departs from whatever concept the designer desires and then labels it "universal" (Millais 2009; 2018). This desire of the master builder may indeed be supported by technological progress; however, it is not technological progress that causes these buildings to exist. Without a fundamental understanding of why architecture was created, the application of social methods only shifts the focus from the architect's individual meaning to the collective meaning of building users and observers. However, both are in the same position, not starting from the ultimate purpose of architecture itself.

For example, when we want to study a corridor in an apartment that residents then use as a gathering place, social researchers may reveal what kind of human interactions occur in that corridor. However, if we start from the understanding that each space has a different specific function, architectural researchers should know that the function of the corridor should be different from the function of the living room, terrace or children's play area. Corridors were initially created as circulation paths. In public residential buildings, such as apartments, the corridor functions as public circulation. As a circulation path, especially public circulation, using the corridor as a gathering place actually disturbs other users who want to use the corridor as a circulation path. This initial function of the corridor cannot be explained when architectural research simply adopts social methods. The grounded theory method can reveal the categories of feelings of corridor users in detail, phenomenology can reveal the essence of corridor users' feelings, and narrative research can tell us in detail how the corridor changes into a gathering place from the views of the people who use it; If the apartment is inhabited by a group of people who have the same collective culture, ethnographic research can also reveal what cultural themes cause users to use the corridor as a gathering place. Social research methods could be applied to reveal the perceptions of users who use the corridor as a gathering place. However, it still cannot explain that the corridor was not initially created as a gathering place. Social research methods also cannot explain that corridor as gathering place are actually a deviation or misuse of the public circulation function.

In this context, the case study approach plays a significant role in architectural research and improves current architectural practice. This role lies in the requirement that the case study

approach must begin with the selection of an issue that is unique and best practice. The architectural case must be significant for the development of architectural science itself, not for social, psychological, or cultural science. For example, based on the requirement of the case study approach, selection of the issue of the corridor must go through a series of questions, such as: "Is the issue of corridors which are also used as gathering places considered as unique?"; "Is the use of corridors as gathering places considered as

best-practice in architecture?"; "Is the size of the corridor itself sufficient to serve as an object of study in architectural research? If the answer to these three is "No", then the corridor is not significant for architectural science or practice, and is not suitable to be a case. Likewise, the research about this issue cannot be classified as research that uses the case study approach.

In line with this understanding, the four stages of architectural case study approach (figure 1) can be formulated as follows:

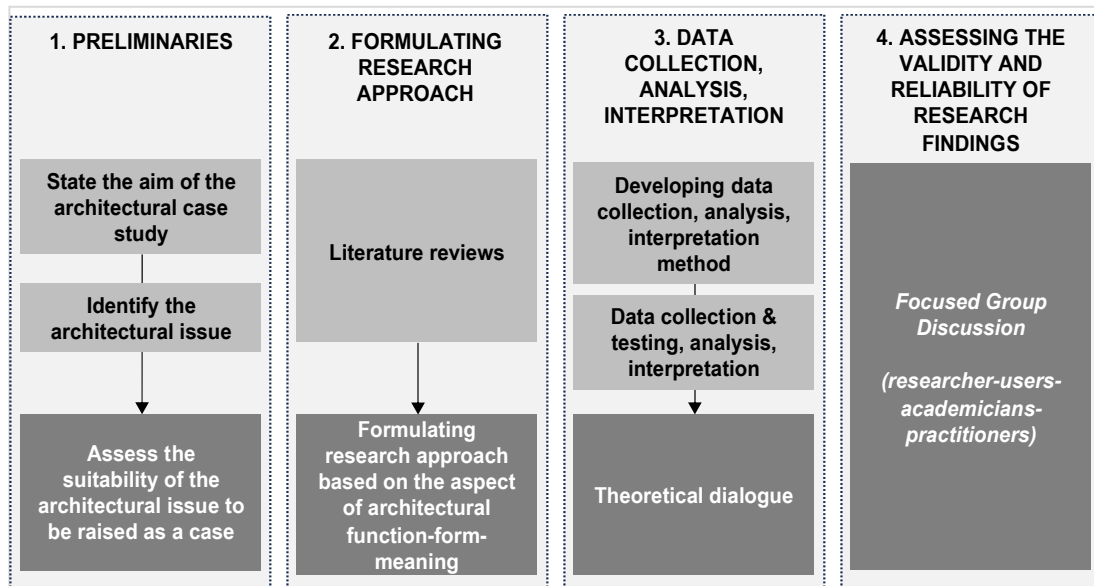


Figure 1. Operation steps of architecture case study

1) Preliminaries

The preparation stage is divided into three steps: prioritizing the purpose of using the case study method in architectural research, identifying the architectural phenomenon and issue, and assessing whether the architectural issue is suitable for use as a case. The main objective of the preliminaries is to select an adequate architectural issue to be used as a case.

Because the case study approach itself requires the uniqueness of a specific issue to be called a case, the first step that must be taken is to determine the architectural issue. To be considered adequate as an architectural case, this architectural issue must be unique and best practice, so that it can be useful for the development of architectural science itself. For example, architectural inculturation may be an interesting issue for researchers, but it is not a unique issue (because it is a phenomenon that occurs worldwide), nor is it necessarily

considered a best practice. On the other hand, preserving a historic temple that are carried out architecturally could be a case. It is unique, because hitherto there are very few efforts to preserve temples that are carried out architecturally, namely by designing a building to surround the temple. Since this particular practice successfully protect the historical temple from harsh climate and make it easier for visitors to appreciate the temple, it also can be considered as best practice in the science of preservation.

2) Formulating research approach

This stage is divided into two steps: conducting a literature review to understand important concepts related to the case and formulating a framework for studying the case. Unlike other qualitative research such as Grounded Theory, the case study approach requires researchers to study past theories related to the case. The case study researcher is expected

to be well-informed and have enough knowledge before doing a field study.

The literature review is followed by formulating a framework for studying the case. This framework should include key design attributes, outcome areas and corresponding metrics (Battisto and Franqui 2013; Nnaemeka 2015). Design attributes are the elements that define the physical environment and could range from quantitative attributes, such as the size of a room for activities, to qualitative design attributes, which could vary from design strategies and concepts. Outcomes are the final result or consequence of the particular design attributes. Metrics are ways to measure the relationship between design attributes and

outcome areas. As shown in figure 2, these three aspects are actually equivalent to the function - form - meaning aspects in architecture (Salura 2015; Salura et al. 2023): because the aspect of function in architecture also focuses on identifying the aspects of basic needs (purpose-function-use) as well as cultural-ideological concept that influenced design decisions; outcomes are equivalent to form, namely the results of the composition of space and building elements created through design decisions; while meaning is equivalent to corresponding metrics, namely an interpretation of the relationship between function and form.

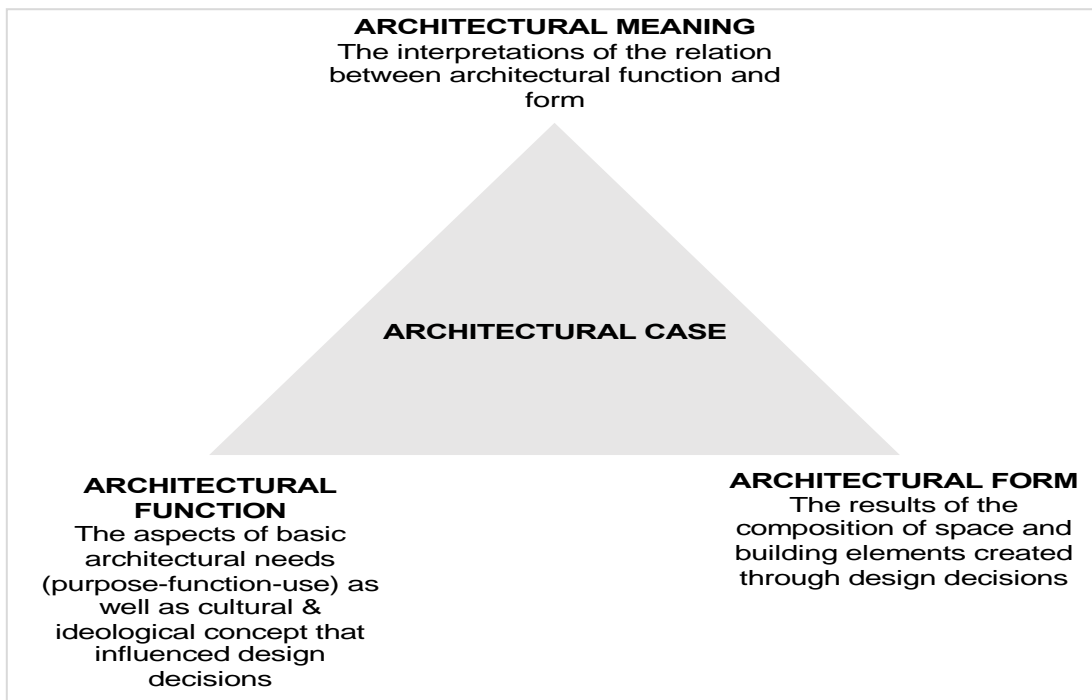


Figure 2. Architectural function-form-meaning as a foundation for architectural case study

3) Data collection, analysis and interpretation

Developing methods to determine what kind of data should be collected and how to collect that data; collecting and organizing the data; and analyzing the data.

4) Assessing the validity and reliability of research result

Even though the data collected has an adequate level of validity, this does not guarantee that the interpretation of the analysis results is utterly free from researcher bias and subjectivity

(Johnson, Adkins, and Chauvin 2020). Therefore, the testing process is not only carried out on the data but also on the research findings. At this stage, the validity and reliability can be assessed by conducting a focused group discussion (FGD) with the building users, architectural experts, architectural academics and researchers. In this way, the similarity and diversity of the results of the research findings can be mapped to form a new understanding more appropriate to the concrete context surrounding it.

Differences between case study approach, object of study, precedent study

Previous research shows that the case study approach was often confused with object of study or case study (*studi kasus*) and precedent study. However, the difference between the case study approach and the object of the study lies in two critical points.

It was, firstly, related to the selection of architectural issues. As mentioned in the previous section, the case study is a research approach with the main requirement of selecting an issue that is unique or considered best practice. Thus, applying a case study approach will provide significant benefits for the development of architectural science. In contrast to the case study approach, an object of study (case study) only meant 'the specific thing that is being researched or analyzed'. An object of study (case study) does not require a research issue to meet the criteria of uniqueness or best practice that must be present in the case study approach.

Secondly, relating to the final purpose of the case study approach itself. The case study approach aims to provide an in-depth understanding of a case. This deep understanding is realized through answering the questions of 'how' and 'why', not just 'what' and 'how many'. The 'what' questions are intended to elicit descriptive knowledge; 'how' questions ask about the process of an event occurring (explanatory knowledge), while 'why' questions look for reasons why certain unique events (cases) can occur (exploratory knowledge). Meanwhile, the purpose of using an object of study in particular research depends on that particular research approach. When used in narrative or ethnomethodological research, an explication of an object of study is only carried out to answer descriptive questions.

Yin missed these two critical points when he proposed Jane Jacobs' work as an example of a case study approach. Jacobs' work, *The Death and Life of Great American Cities*, critiques the design of modern urban areas. However, this is a common issue. Around the end of the 1950s, especially in architecture, many experts already criticized the failure of modern architecture. In 1960, one year before Jacobs published her book, Kevin Lynch published the research results he had been working on since 1954 with the title *The Image of the City* (Lynch 1960). Even if the case study approach is merely understood as an empirical research, Jacobs' work was based on

something other than empirical research. This work is more suitable to be described as a narration of Jacobs' personal experiences rather than empirical research. Groat-Wang adopted this fallacy; in the *Research Methods for Architecture*, Jacobs' work was put forward as an example of a case study method in architecture (Jacobs 1961).

It is also important to mention that architectural practice itself has always started with studying the physical form of existing architectural works. This method is known as a 'precedent study'. Unfortunately, precedent studies in architecture are only limited to documentation and descriptions of architectural works as physical objects. It lacks critical, in-depth and holistic analysis of the decisions behind a precedent's success or design decisions—for example, the *Precedents in Architecture* documents 104 architectural works from 31 expert architects. This book aims to explore the formal and spatial characteristics of each work to understand the design elements or concepts that determine architectural form (Clark and Pause 2012). This kind of precedent study is entirely different from the case study approach discussed in the previous section. The 'precedent' referred to here is not a 'case' but only an 'object to be studied'. There is no explanation for why these 104 architectural works were chosen for discussion. Likewise, the discussions that were focused on the aspect of architectural form alone, without discussing the activities accommodated by these forms, are not significant for the development of architectural science. It was a study of several case studies rather than a case study approach.

Conclusions

Based on the results of the analysis, it can be concluded that:

Firstly, the case study must be understood as a research approach, not as a data collection method alone. As a research approach, the case study approach has different 'case' selection requirements from other qualitative research approaches because the 'case' will determine philosophical assumptions, procedures and research methods. Issues worthy of being appointed as cases are issues that are unique and considered best practices for a specific scientific field. Moreover, the case study approach aims to

answer exploratory questions, not just descriptive and explanatory questions. Thus, the case study is a research approach that allows research to be carried out naturally, holistically and in-depth.

Secondly, the case study approach differs from the object of study. The case study is a research approach with specific requirements, namely selecting an issue that is unique or considered as best practice so that it is significant for developing a specific scientific domain. Meanwhile, an object of study cannot "dictate" a research issue to meet the uniqueness or best practice requirements that must be present in the case study approach. The research issue can be anything, and the object of study can be used in any qualitative research, including ethnography, grounded theory, narrative, biography, or other qualitative research. Research that does not begin by selecting unique issues and best practices but only applies the case study as a data collection method is not adequate to be called a case study approach. Hence, it is not a case study research at all.

Thirdly, there are four operational steps of architectural case study approach: The preparation stage is the most critical because the essence of this stage is the selection of architectural issues that are unique and considered as best practice to be worthy of being chosen as a case. The preparation stage is followed by the formulation of a research approach, namely reviewing relevant literature and identifying design attributes (function) - outcomes (form) - corresponding metrics (meaning) to build a framework for studying specific architectural case. The next stage is data collection, analysis and interpretation. This stage ends with a theoretical dialogue. Lastly, a focused group discussion were carried out in order to assess the validity and reliability of the research result.

Fourthly, the case study approach has some characteristics that resemble research methods that have been used for a long time in architecture, namely precedent studies. An in-depth understanding of the case study approach from its emergence in the social sciences can rectify the shallowness of architectural precedent studies (where the focus is only limited to documentation and description). The understanding of the 'case' does not only focus on architectural works as physical objects to be observed and copied but also on 'important aspects that could be learned from the architectural work'. The architectural case study approach is not only positioned to

answer what influences these important aspects but also to explicate how these important aspects are produced. It could also explain why these aspects can produce successful architectural works. Thus, an in-depth understanding of architectural case study approach could also improve architectural practice in the future.

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Author(s) contribution

Purnama Salura contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

Stephanie Clarissa contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation