ASSESSMENT OF ARCHITECTURAL RESEARCH DOMAINS AMONG STUDENTS IN MASTER OF ARCHITECTURE PROGRAM

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Abstract

Throughout the study duration of an architect-to-be, undertaking research has been one of the essential methods of students' architectural knowledge seeking. Architectural schools all around the globe necessitate research competency as part of the graduation requirement both for undergraduate and post-graduate students. The importance of research and writing in architectural education is apparent because having the competency to do research and writing could develop students' analytical thinking. Research competency is also essential for architectural students to improve their problem-solving proficiency. Students often choose and embark on research without much prior knowledge of the selected research subject. Hence, the vast scope of architectural research domains is mostly not well-known. Students also have difficulty understanding and choosing appropriate research methodology for their research. This situation often results in hardship for them to complete their research on time. Therefore, this study had the objective to identify the domains of architectural research among Master of Architecture students in International Islamic University Malaysia. The second objective of this research was to examine the trend of students' research methods in completing their master's degrees. This research used both qualitative and quantitative approaches to achieve the objectives. Content analysis was used to analyse the relevant subject literature and examine students' submitted dissertations. Meanwhile, this research employed descriptive analysis of quantitative data to illustrate the findings in diagrammatic forms. This research found that architectural research is unique because it has a wide breadth of relevant knowledge that encompasses various disciplines related to almost all aspects of human life. This research also found that students had minimal understanding of the availability of various research methods. Most of the students used the most common methods they were familiar with, such as simulation and case study methodologies. Hopefully, the findings could guide future students to explore other research methods and have accurate preparation before embarking on architectural research.

Keywords: Architectural research, Research methodology, Research Trend, Architectural Education.

1 INTRODUCTION

In architectural education, research has been one of the essential methods of students' architectural knowledge seeking. Architectural schools all around the globe necessitate research competency as part of

the graduation requirement. Thus, students embark on research without prior knowledge of the research subject. Usually, every research done during the study period should follow with submitting a written report. In this instance, architecture students are generally given the freedom to explore their writing style with minimum guidance from their lecturers.

Recently, research-based education has been emphasised to provide better learning for the development of dedicated professionals. Rawat and Karmakar (2021) view that incorporating research elements in the theory and practice of architecture can help inculcate the research orientation in today's architects. The importance of research and writing in architectural education is apparent because having the competency to do research and writing could develop students' analytical thinking. This capability is essential for architectural students to solve problems raised while studying and later while practising architecture. This fact conforms with a clause in RIBA's Charter 1837. It states that "the advancement of architecture and the promotion of the acquirement of the knowledge of the various arts and sciences connected therewith" (RIBA, 1837; cited in RIBA, 2009). The clause implies that the "advancement of architecture inextricably links to the acquirement of knowledge" (Till, 2004). In addition, research for architecture is "extremely important" in social, economic, cultural and environmental aspects because it impacts the quality of life (Jerkins, 2005).

To do research, students need to acquire the skill of reading. However, architectural students are known to read less than students from other tertiary education disciplines. Architectural students prefer to view photographs and look at diagrams as a mode of their knowledge-seeking. Such preference is due to their extra exposure to graphic and verbal communication rather than the textual communication format. Thus, this scenario results in a low writing competency among architectural students.

As writing is inevitable, architectural students must try hard to write, especially those who embark on master's degree study. Students' lack of exposure to reading during the study for first degree may have taken the toll that writing becomes a big hurdle throughout their study duration. Architecture students' less-reading-trend results in inadequate exposure to numerous established research methodologies. Therefore, in International Islamic University Malaysia (IIUM) particularly, architectural students are expected to embark on an extensive reading endeavour to develop their writing skills and analytical thinking. Although there are courses dedicated to enhancing students' skills, students are expected to manage their learning independently outside the class most of the time.

Therefore, this study had the objective to identify the domains of architectural research among Master of Architecture students in International Islamic University Malaysia. The second objective of this research was to examine the trend of students' research methods in completing their master's degrees. This research used both qualitative and quantitative approaches to achieve the objectives. Content analysis was used to analyse the relevant subject literature and examine students' submitted dissertations. Meanwhile, descriptive quantitative data analysis was employed to illustrate the findings in diagrammatic forms. Identifying the domains of students' research would enlighten the researcher's understanding of how far students champion the knowledge and skills of doing research. Examining students' trends in selecting research methods could help researchers identify the appropriate emphasis for future research method teaching. The researcher hopes that the finding of this research will enable the faculty to improve the course outline better to equip the students with writing and analytical thinking skills.

1.1 Research Background

The course MAAR 7271: Dissertation aims to broaden students' perspectives on architectural design issues in critical and analytical manners. It also intends to train students to conduct research in areas of their interest and facilitate students to present their research findings systematically in written format (DoA, 2018). Students are expected to select a research topic on architectural design issues of their interest in this course. Each student would have a supervisor, chosen among the faculty's academics, assigned to monitor students' research and writing progress. Students would have to conduct research using appropriate methodology and present their findings in a written report. Students would have a series of consultations with their supervisors to assist them throughout the research process. Thus, students would engage with their supervisor throughout the research process for approximately seven (8) months duration, dwelling in two (2) consecutive semesters.

Students are also expected to seek appointments of their supervisors once every fortnight. In addition, students have staggered submissions based on the completion of chapters. The writing structure is standardised, based on ordinary scholars' writing format with five (5) main chapters. They are namely Introduction, Literature Review, Methodology, Research Analysis, and Conclusion. However, students could creatively design their writing outline as they think appropriate.

2 LITERATURE REVIEW

2.1 Students' Writing Skill

Typically, architectural students are not very good at writing, especially in the current era where students hardly read. When they do not read, they will not have the capability to develop their analytical thinking in their writing. Developing analytical thinking among architectural students is also essential to ensure graduates have the employable quality and manage their continuous professional development later. The skill of writing also portrays the level of students' problem-solving skills. In addition, it is believed that architectural students would be able to develop their writing competency by reading and reviewing scholars' academic works.

The trend of having less time spent reading is familiar to architectural students and students in other disciplines. In 2011, a report titled Academically Adrift, by Richard Bios and associates (2011), stated 36 per cent of students in the United States of America made no significant gains in critical-thinking skills in college. Over the past half-century, the amount of times college students spend studying has dwindled from 24 hours a week to about 15 hours only, amounting to a 37.5% reduction (De Vise, 2012). Helen St Clair-Thompson, Alison Graham & Sara Marsham (2018) reported that college students spend 14.1 hours per week reading a range of sources, including textbooks and journal articles for guided and independent reading, which was lower than university expectations. A similar trend happens to the general public, where it is reported that people aged between 15 to 44 only read for an average of 10 minutes or less per day (Basmo (2021).

The activities of studying, reading and researching are interconnected in the sense that Bios (2011) regarded studying as referred to "read, write and prepare for class." Nevertheless, at the Master degree level, students are expected to do research more than merely study to show their maturity in learning. A question arises; do students know how to research? In UK National Conference on Current and New Research Agendas, Jerkins (2005) concluded that research skills were considered more essential focuses than research typologies for architectural research.

2.2 Focuses of Architectural Research

The UK Higher Education Research Assessment Exercise (RAE, 2008) viewed research as something for students to understand and gain knowledge. Research should have a specific objective, "where the search for new knowledge and practical solutions is purposely and methodically done to form answers to questions formulated beforehand" (Hanzehogeschool Groningen, 2012). RAE (2008) categorised research typologies as Scholarly Research, Basic Research, Strategic Research, Applied Research, Practice-based (or Practice-led) Research.

Architecture and architectural research are unique because they have a "breadth of relevant knowledge" (Jerkins, 2005). Both encompass a wide range of disciplines related to social, structural, constructional, economic, and environmental aspects of life. Jerkins (2005) perceived that all those independent domains of knowledge would build and interact in the architectural process. This interaction means architecture is about the problem or/and opportunity finding and as problem-solving. All these are parallels with the learning process that entails innovation and risk (Jerkins, 2005).

In contrast, Till (2004) acknowledged that the "stretching of architecture across separate areas of knowledge does not address the particular need for the architectural knowledge and practice to be integrative across epistemological boundaries." He perceived that the social, cultural, and economic functions of buildings could be analysed separately, but "the built form itself unifies them." Thus, Till (2004) and Jerkins (2005) viewed that architectural research must be conscious of interactions across traditionally separate intellectual fields.

Furthermore, Till (2005) suggests architectural research has interaction between academy and practice in three (3) different stages, forming a Tripartite model. The model is assumed to avoid the splits between art and science, qualitative and quantitative approaches, and allow interdisciplinary research into any three (3) stages. Sequeira (2011) further expanded the content of Till's categorisation with more research domains. Moreover, a recent book published by Aksamija (2021) showed a simplified categorisation of architectural research domains into seven (7) focused areas, namely: 1) architectural history and theory, 2) social and behavioural aspects,3) environmental, 4) technology, 5) building systems, 6) economics, and 7) design process. Table 1 shows Till's Tripartite model compared to Sequeira's (2011) and Aksamija's (2021) categorisation of research domains.

Table 1: Tripartite model of Till's Architectural Research, with its comparison.

No	stages	Description	Examples of research domains, given by Till (2005)	Examples of research domains, provided by Sequeira (2011)	Examples of research domains, provided by Aksamija (2021)
1	Architectural process	Process- refer to research into the process involved in the design and construction of buildings,	Research into performance in use informing the process of design, such as: ✓ issues of representation ✓ Theories of design ✓ Modelling of environment	Research on processes involved in the design and construction of the artefacts, including: ✓ the processes of design ✓ the operations of conception ✓ aspects of construction, representation, relationships between the various actors of the project ✓ the configuration of the environment	✓ Design process.
2	Architectural product	Product refers to research into buildings, as projected or completed objects and systems	Research into the products of design backwards to knowledge about the process of design, such as: ✓ issues of aesthetic ✓ Materials ✓ Construction techniques	Research on the designed artefacts or complete objects and systems with a high degree of identity ✓ history, ✓ aesthetics, ✓ materials ✓ construction techniques	✓ architectural history and theory
3	Architectural Performance	Performance refers to research into buildings once completed	Research into the performance of building being critically informed by knowledge of the processes of architecture, such as: ✓ Issues of social occupation ✓ Environmental performance ✓ Cultural assimilation	Research on aspects of use, fruition and performance of buildings. ✓ constructed artefacts ✓ technical aspect ✓ environmental aspect ✓ social aspect ✓ cultural aspect ✓ perceptual aspect	✓ social and behavioural aspects ✓ environmental ✓ technology ✓ building systems, ✓ economics

With a broad range of knowledge and stages of architectural research, architectural students are often confused with terms used in their research training. Master and PhD thesis are the products of vigorous research in other disciplines, but there is additional research called Design Thesis in architectural fields. A question arises on the differences between Research Thesis and Design Thesis. Van Dansik et al. (2018) views that a Design thesis relates to design research, and could be categorised as philosophical, meaning holistic, complex, integrated, value-laden, inventive, user-responsive, etc. As such, architecture students should think of their design work in terms of a research process because of the following reasons (Van Dansik et al., 2018):

- Students are in an academic institution, where academics is rigour.
- Students will become more conscious of the decision-making process and thus develop their strengths and methodologies that suit them best.
- Students should become better at explaining and substantiating their design proposals. Some students have an intuitive ability, but the clarity of thinking should support their work.
- The presupposition especially proclaimed in architecture and urban design disciplines that a design could be a means to develop scientific knowledge.

Ideas of Design work as design process (Van Dansik et al., 2018) is in conjunction with Till's (2004) first category of architectural research in his Tripartite model. The model refers to "research into the process involved in the design and construction of buildings." In addition, in his book (2013), Murray Fraser described

that design research provides a firm basis for the emerging field of investigation within architecture. He noted that there had been a "reluctance within the architectural culture to acknowledge and accept the role of design research." Still, architectural education in many countries has accepted design as a legitimate research area. Architectural design research could also be published. Thus, Design Thesis could be generalised into having research endeavour to produce architecture and thesis.

Arguments about what exactly is research happen between professional too. Architects in the practice world often argue that designing a building is not necessarily considered a research inquiry (Till, 2004). They repeatedly accused the Academy of being "out of touch with reality" when regards to Academy pursuing research. Meanwhile, the academy sees practitioners as "muddied by the market and philistinism" (Till, 2004). This dispute devalues the "worth of research in developing a sustainable knowledge base." Till (2004) calls for a clear definition of the context, scope and modes of research appropriate to architecture while at the same time "employing the generic definition of originality, significance, and rigours."

In the report of the UK National Conference on Current and New Research Agendas, Jerkins (2005) highlighted that Till (2004) had defined research as 'systematic enquiry whose goal is communicable knowledge." With the focus on the architectural process, products and performance, he formulated the Tripartite model of Architectural Research. He argued that architectural research should often be design-focused, but not all architecture design is research. Architectural design can be the subject, method, and result of research, depending on the inquiry's nature and the knowledge sought.

Discussing trends and problems in architecture research, Jerkins (2005) highlighted two (2) core issues of architectural research.

- First, "the issue of design as an activity and a clearer understanding of what design is about is a key aspect of developing architectural research."
- Second, the architectural research tends to be very "context-sensitive and hence case study approaches may need to be a strong component." It may require more clarity concerning the method and more research training for architects and architectural academics.

Jerkin (2005) added that there are also issues concerning how research in practice and practice-led research, can be assessed, especially in academia. He perceives that architectural research has “weakly developed scholarly infrastructure, which then has knock-on effects on how research is defined, resourced and eventually assessed.”

2.3 Architectural Research Methods

There is no established rule to embark on architectural research, but any research venture should be appropriately organised. Sequeira (2011) observed that architectural research has a "fusion of technique and science which provides a new freedom of inquiry that only complies with the internal rules of systematisation." He viewed that research methodology in architectural research has an indefinite number, based on the research object, the chosen typology and the acting area" (Sequeira (2011). He also emphasised the importance of having a good quality of research, evaluation criteria, the relevance of the results, "scientificity" of architecture (its grounding), the types of research, and the methodological models.

Discussion on research methods for the architectural profession succinctly presents qualitative, quantitative, and experimental methods (Kwok, in Aksamija, 2021). These three methods, prominently also called approaches, are helpful in architectural academia, profession, and research organisations. Research approaches are usually used to describe the primary methodology of research generally. Meanwhile, data collection and analysis usually have specific techniques on resourcefulness to achieve research objectives. Some scholars use research design, strategies, or research procedures to describe the research process. For example, Groat and Wang (2021) notably used the term Research Strategies. In their book, *Architectural Research Methods*, they outlined seven (7) major research strategies, namely 1) Historical Research, 2) Qualitative Research, 3) Correlational Research, 4) Logical Research/Argumentation, 5) Simulation Research, 6) Experimental and Quasi-experimental Research, and 7) Case study/combine strategies Research. Meanwhile, Pedamkar (2022) used "type" to describe research methodology. She listed ten (10) common research types: 1)Quantitative Research, 2)Qualitative Research, 3)Descriptive Research, 4)Analytical Research, 5)Applied Research, 6) Fundamental Research, 7)Exploratory Research, 8)Conclusive Research, 9) Surveys, and 10)Case Studies. With manifold terminologies, students often get confused and need clear examples to implement the appropriate methodology for their research.

3 RESEARCH METHODOLOGY

This research used both qualitative and quantitative approaches to achieve the objectives. Content analysis

was used to analyse the relevant subject literature and examine students' submitted dissertations. Researchers identified the domains of students' works to clarify researchers on students' knowledge assimilation and needs. Sequeira's (2011) classifications of architectural research domains were used as the basis for content analysis. Students' work samplings were studied to identify the domains of their research.

Meanwhile, this research used a comprehensive classification of research strategies, outlined by Groat and Wang (2013) to examine the trend of students' undertaking of research methodology. Looking at students' trends in selecting research methods could help researchers identify the appropriate emphasis for future research method teaching. The information regarding students' research would be examined via content analysis and transferred to an online survey form. Descriptive analysis of quantitative data was employed to illustrate the findings in diagrammatic forms. The classification of research strategies is as follows: 1) Historical Research, 2) Qualitative Research, 3) Correlational Research, 4) Logical Research/Argumentation, 5) Simulation Research, 6) Experimental and Quasi-experimental Research, and 7) Case study/combine strategies Research.

4 RESEARCH ANALYSIS

Sixteen students enrolled in MAAR 7271: Dissertation and all of them successfully submitted their completed research report in August 2021 (n/16). Researchers assessed and analysed students' submissions to identify students' architectural research domains, as required for objective 1. As listed in Table 1, architectural research domains were classified into three main categories (Architectural process, architectural product, and architectural performance. The three main domains were branched into fourteen (14) sub-domains. Fig. 1 shows the percentage of students undertaking certain domains of architectural research against 14 listed sub-domains stipulated by Sequeira (2011).

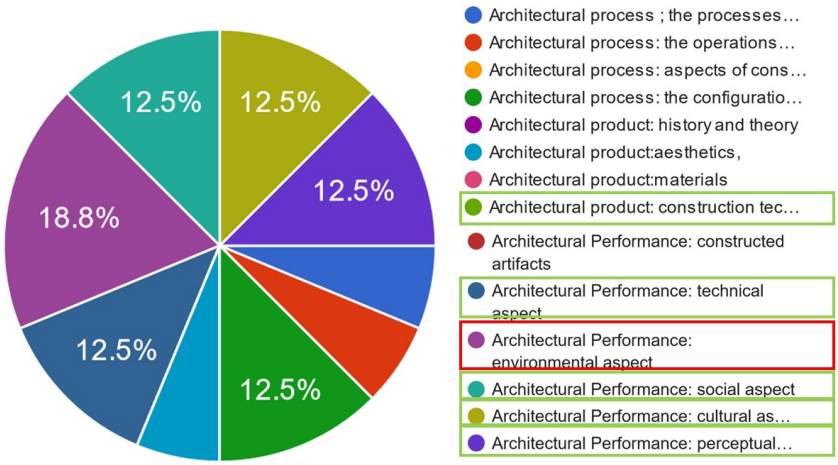

Fig 1 shows the percentage of students that used specific dominant research strategies.

The highest percentage of students (68.8%) chose Architectural Performance as the primary domain of their research area. Three of them (18.8%) focused on the environmental aspect for sub-domains. In Fig.1, the chosen main domain is shown in the red-coloured box. For the other four sub-domains of Architectural performance, two students (12.5%) chose each, presented in green-coloured boxes. This finding indicates that students tend to select sub-domains under architectural performance. This situation suggests that architectural performance is the popular domain of research study for Master of Architecture students, probably because it would be easy to analyse subject matters that are physically in existence.

Only two students chose to study under the domain of Architectural Product: construction techniques (12.5%). Students did not select the other three sub-domains of the architectural product as a research study. This condition indicates that the domain of Architectural Product is considered not trendy among students. Meanwhile, none of the students chose the domain of the Architectural Process. This scenario suggests that most students avoid having intangible subjects for discussion. Furthermore, the Architectural process domain usually requires argumentative discussion that students might consider challenging.

The second objective of this research was to examine the trend of students' research strategies in completing their master degrees. Since the researchers used Grout's and Wang's (2013) works as the basis,

therefore from now on, only the term research strategy would be used. There were nine (9) enquiries regarding research strategies. First, researchers examined students' work to check whether they used single or mixed research strategies. The result for enquiry 1 showed that most students used a mixed strategy (93.8%), and only 6.2% used a single research strategy. Second, researchers examine students' works to confirm students' dominant research strategies. The result showed that students used five (5) out of seven (7) research strategies classified by Groat and Wang. Majority of students used (g) Case study/combined strategy for their research (37%), while the second dominant research strategy is (c) Correlation/Quantitative research, which has a 25% score. Fig 2 shows the pie chart containing the percentage of students that used specific research strategies. It is noted that none of the students used (d) Logical research /Argumentation and (f) Experimental and quasi-experimental research as their dominant research strategy. This finding indicates that students of Master of Architecture are avoiding rigorous research argumentative and experimental research.

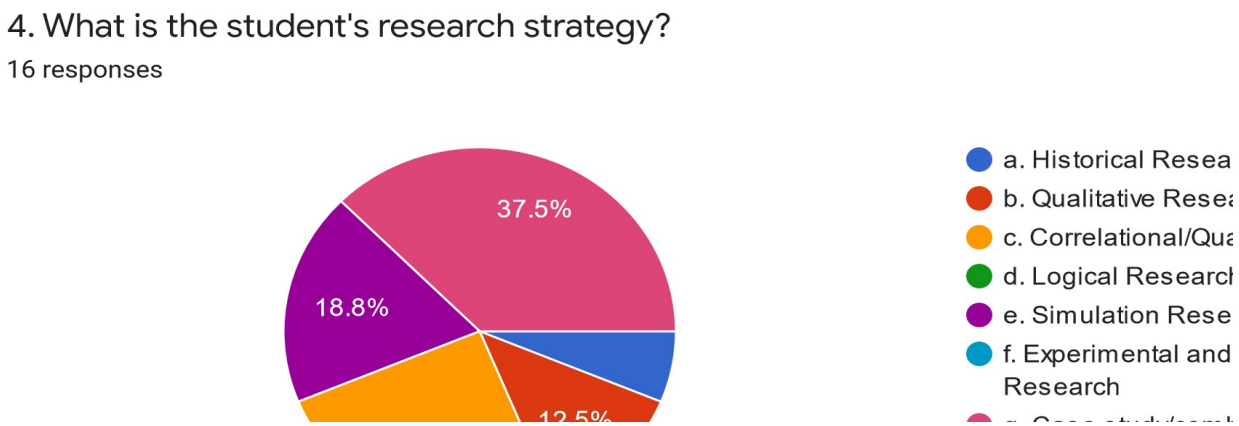

Fig 2 shows the percentage of students that used a particular dominant research strategy.

Seven (7) questions were formulated to identify the sub-strategies that students undertook. Below is the list of enquiries that the researchers analysed.

a) For historical research, what is the research trait?
b) For Qualitative Research, what are the component and sub-strategy?
c) For Correlational/Quantitative Research, what are the component and sub-strategy?
d) Logical Research/Argumentation
e) Simulation Research
f) For Experimental and Quasi-Experimental Research, what are the component and sub-strategy?
g) For Case Studies and Combined Strategies, what are the component and sub-strategy?

a) For Historical research, only one student adopted the research strategy (6.2%), and the students used all sub-strategies listed: View something from the past, Interpretation, Narrative, Cultural turn and spatial turn. The student's analysis of their study domains covered a broad spectrum of sub-research strategies. Fig 3 shows the sub-research strategy used by the students under a) historical research category.

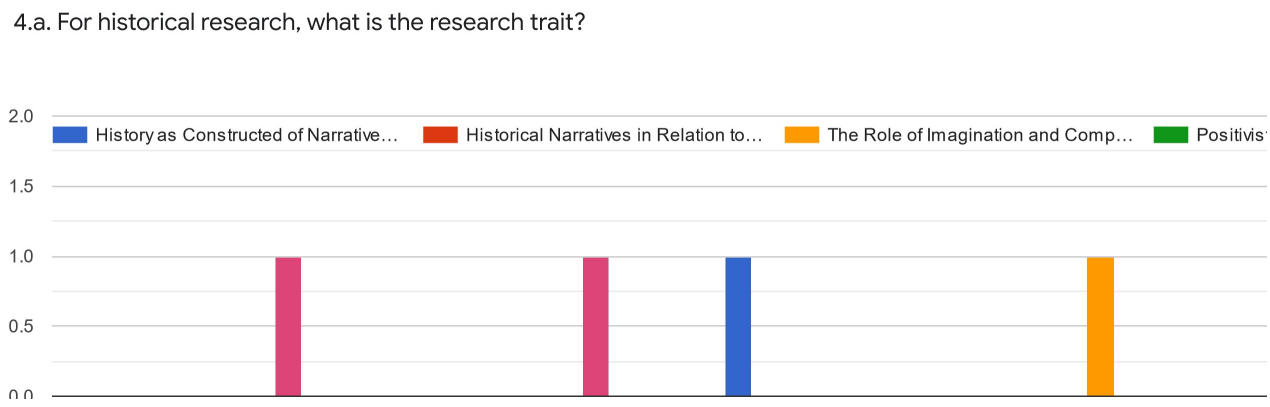

Fig 3: historical research sub-strategies used by the student

b) For Qualitative Research, two students adopted this strategy (12.58%). One of them emphasised natural settings, and both focused on "Interpretation and meaning" and "Making sense of their Circumstances". Fig 4 shows the sub-research strategies used by the students under b) Qualitative Research category.

c) For Correlational/Quantitative Research, 25% of students adopted this strategy. One of them used a Relationship study as his/her sub-strategy, and three used "Causal Comparative Study." This situation indicates that the Causal comparative study is quite popular among students. Fig 5 shows the sub-research strategies under c) Correlational/Quantitative research.

d) No student chose to use Logical Research/Argumentation, indicating the research strategy is not popular among architecture students. Students usually select a research strategy that does not require rigorous analysis and is time-consuming.

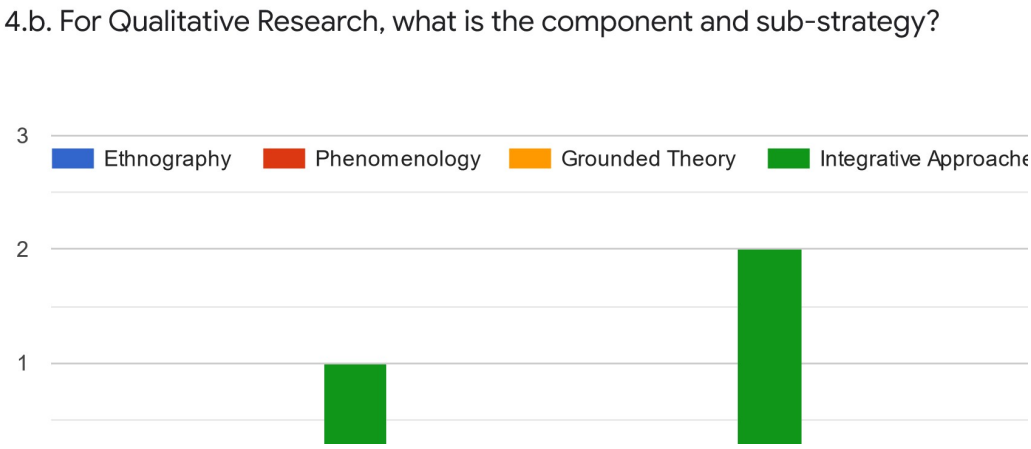

Fig 4: Qualitative Research sub-strategies used by the two students

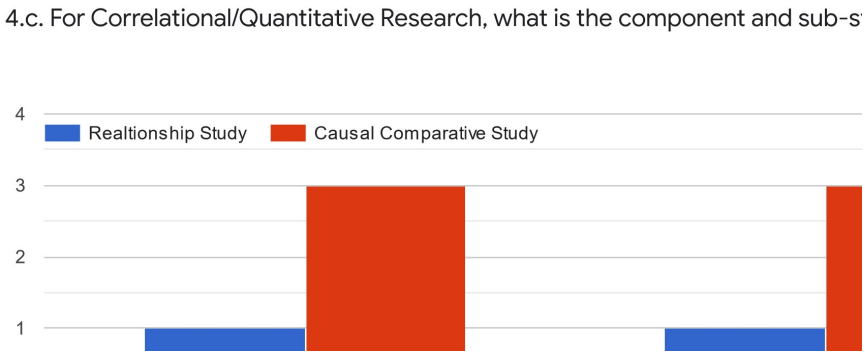

Fig 5: Correlational/Quantitative Research sub-strategies used by the four students

e) For Simulation Research, three students adopted this strategy (18.8%). One of them concentrated on emphasising natural settings, and two of them focused on Interpretation and meaning and Making sense of their Circumstances. Fig 6 shows the sub-research strategies under e) Simulation Research.

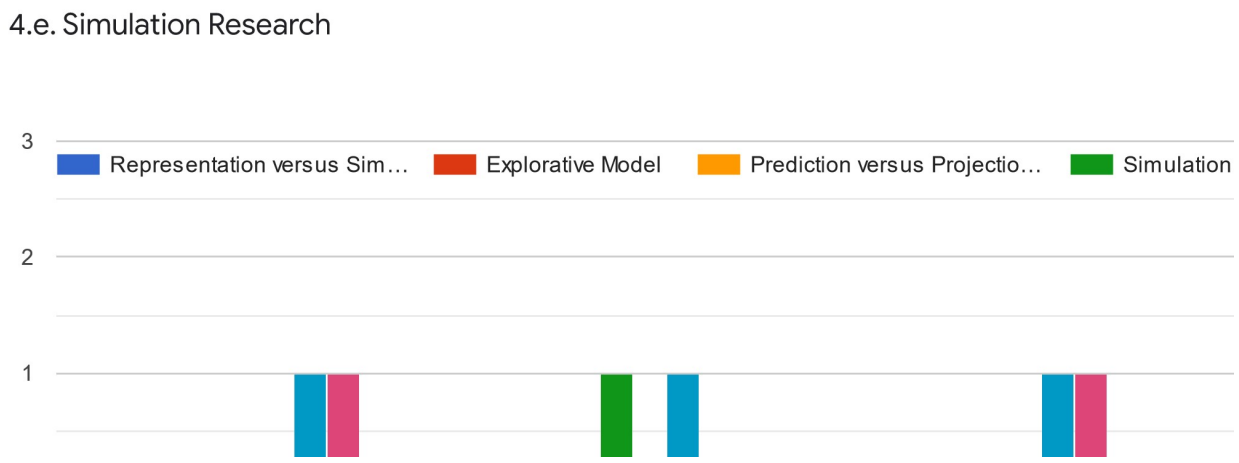

Fig 6: Simulation Research sub-strategies used by the three students

f) For Experimental and Quasi-Experimental Research, none of the students chose the strategy. It is understood that students usually avoid this research strategy, perhaps because it usually requires meta-data and sophisticated machinery.

g) Case Studies and Combined Strategies has the highest score, 37.5%. Six students adopted this dominant research strategy. However, students' research strategies mainly focused on a single case study, shown with blue-coloured bars. The six students simultaneously chose all sub-domains in this category. This scenario indicates that Case study with combined strategies is prevalent among Master of Architecture students. Students chose this domain probably because they are used to these particular aspects of research in their undergraduate studies. Fig 7 shows the sub-research strategies under g) Case Studies and Combined Strategies.

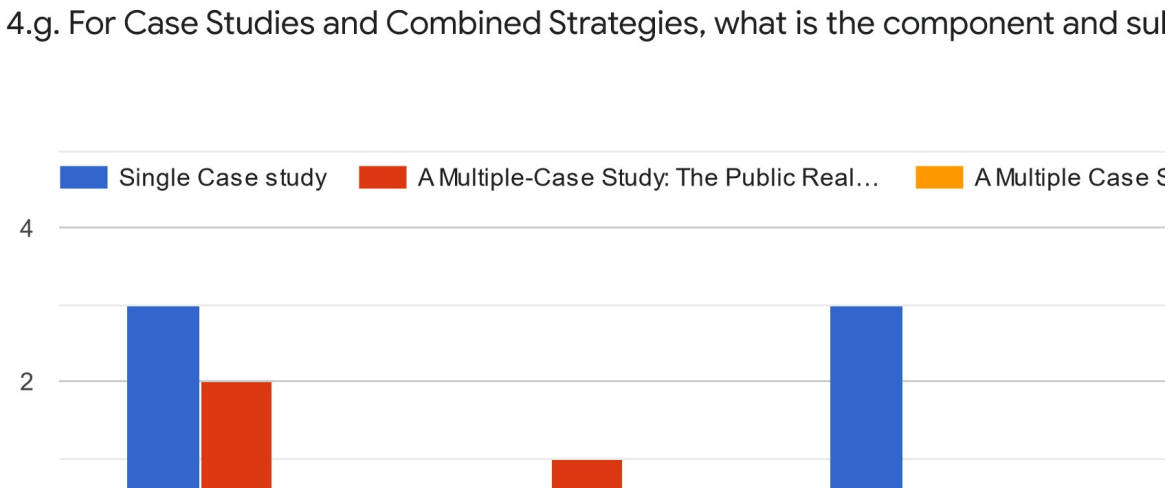

Fig 7: Case Studies and Combined Strategies Research, used by six students

5 CONCLUSION

This study concluded that Master of Architecture students chose to have research domains and strategies that they are familiar with in their post-graduate study. The scenario indicates that students are not brave to explore unfamiliar territory in doing research. Most of them limited themselves to doing research related to the case and precedents studies only, presenting their lack of knowledge about varieties of research methodology for architectural research. Such limitation obscures students' explorative horizons, and improvement measures need to be undertaken to enhance research training.

Based on the analysis of their written reports, students seem confused about the terminologies used in architectural research. It is suggested that the training of research should be simplified and avoid the usage of too many research terminologies. In addition, students' research writing often lacks coherence. Information is usually presented without much discussion on the theory behind the statement or findings. Students' writing composition is also at the infant stage. Students also had difficulty understanding the most straightforward way of doing research.

Based on the findings, academics should adjust to improve the dissertation course. Students need training in reading skills, writing skills and analytical thinking skills. The appropriate research training should be introduced in most core architectural courses to improve their research skills during architecture undergraduate study. Researchers hope that the findings of this research could serve as guidance for academics to design architectural courses related to research. This research may also help future students explore other research methods and have accurate preparation before embarking on architectural research.

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