

Assessment of Metacognitive Knowledge of Client on Their Patronage of Professionals in Building Construction Industry in Bauchi Metropolis

¹ABDULRASHEED YAHAYA YUSUF, ²DR JAMILU YA'U, AND
³PROF SANI USMAN KUNYA

^{1, 2 & 3}Department of Building Technology, Faculty of Environmental Technology
Abubakar Tafawa Balewa University Bauchi
Email: yahaya366@gmail.com

Abstract

This study is aimed at assessing the effect of metacognitive knowledge on construction professionals' patronage in Bauchi metropolis with a view to create awareness for the client and create a lasting solution on issues of construction professionals' patronage. A quantitative survey design was adopted to randomly collect data from private client involved in building construction work in Bauchi metropolis using structured questionnaire. A total number of 242 questionnaire was distributed in which 224 were valid and used for the analysis. The data collected was analysed using descriptive statistical tools (frequencies, standard deviation and mean) and multiple regression through the use statistical package for social science (SPSS). The research reveals that: (a) declarative knowledge, procedural knowledge, and conditional knowledge were all agreed by the private clients involved in building construction professional to be the metacognitive knowledge predictors in the study area: (b) the level of construction professionals' patronage was found to be moderate: (d) the metacognitive knowledge which significantly affects professional patronage in Bauchi metropolis are declarative knowledge and conditional knowledge. It's recommended that there is a need to initiate client education programs to enhance their understanding of the importance of metacognitive knowledge

Keywords: *Conditional Knowledge, Declarative Knowledge, Meta-Cognitive Knowledge, Patronage and Procedural Knowledge.*

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I. Introduction

From time immemorial, building has been an integral part of humanity. It has evolved through centuries of activities, from dwelling in caves to skyscrapers and recently to intelligent structures that can smartly respond to stimuli in its environment (Díaz-López, 2019; Norouzi *et al.*, 2021; Zingg, 2021). Mosaku, Kehinde and Kuroshi (2006) observed that building practice has also undergone a great deal of metamorphosis in response to the dynamic nature of human needs and development. The term 'metacognitive' was introduced by John Flavell in the early 1970s based on the term 'metamemory' previously conceived by the same scholar Flavell in 1971. Flavell in 1979 also viewed metacognition as learners' knowledge of their own cognition, defining it as 'knowledge and cognition about cognitive phenomena' (Alpert & Lauren, 2021). Metacognition referred to as 'thinking about one's own knowledge, awareness, and control of the process by which they learn (David, 2021). Metacognitive learner is thought to be characterized by the ability to recognize, evaluate and, where needed, reconstruct existing ideas (Bindu, 2021),

Teng and Wang (2022) identified two essential features in their definition of metacognition: 'self-appraisal' and 'self-management' of cognition. Self-appraisal of cognition comprises reflection about learners' understanding, abilities and affective state during learning process, while self-management refers to 'metacognition in action; that is, the mental processes that help to 'orchestrate aspect of problem solving. Metacognitive knowledge refers to what individual know about themselves as cognitive processors, about different approaches that can be used for learning and problem solving and about the demand of a particular learning task (Miller and Mazur, 2019). Construction professionals play a vital role in communities (Taylor and Francis, 2020). Their contributions are enormous and historical. Housing, bridges, drainages, and roads which are all useful and beneficial to societies, through man's journey, the traditional architect started building to the modern design of construction system. Construction industry brings the importance of the professionals working together as a team (Hackett, 2021). This study therefore aimed at Assessing meta-cognitive knowledge of client on their patronage on roles of professionals in construction industry.

Building construction requires many workers and trades (Lette et al., 2018). From the perspective of realizing a project, a professional project team is needed to make sure that project will be constructed successfully. In the modern industrialized world, construction usually involves translation of paper or computer-based design into reality. A formal design team may be assembled based on their roles to plan the physical proceedings, and to integrate those proceedings with the other parts of professions. The design usually consists of drawing and specifications which are prepared by a design team including architects, interior designers, land surveyors, civil engineers, quantity surveyors, mechanical engineers, electrical engineers, and structural engineers. The design team is most and commonly employed by the property owner which is named the client. The construction professionals deal with time, money, equipment, technology, people, and materials in managing a building project (Baroudi *et al*, 2020). They organize these resources into activities, execute the activities in logical sequences and manage to complete the projects within the stipulated time and budget. They will also have to manage the construction process to meet the need of clients with legal, cost and environmental constraints. They must look into the whole building cycle from inception to the end of economic life, dealing with the procurement, construction, design or property management, recycling and disposal of building and balancing the often-complete requirements of the clients, users and the community.

The increasing complexity of construction projects creates the need for design professionals trained in all phased of the projects life cycle develop an appreciation of the building as an advanced technological system requiring close integration of many sub-systems and their individual components, including sustainability. Building engineering is an emerging discipline that attempts to meet this new challenge (Adams *et al*, 2020). Hence, it is the roles and responsibility of these construction professionals to exercise all reasonable skill, care and diligence and display their expertise according to professional standards in the modern building engineering world. The patronage of the construction professionals may depend on the knowledge the clients possess on the roles and responsibilities of the professionals (Bello et al., 2020). Accordingly, this research will determine how the metacognitive knowledge of clients affect the patronage of the professionals in building construction in Bauchi metropolis. The client metacognitive knowledge includes their awareness on the roles of the professionals - the architect, civil engineer, quantity surveyor, mechanical engineer, electrical engineer, structural engineer, and builder – in the construction industry. Han and Paul (2021) state that lack of metacognitive knowledge by client about construction professionals tend to make the client on higher spending than it has ever been before, the biggest problem may occur as lack of knowledge about the challenges of labour shortage, theft on site, safety compliance, material or resources management all as a result of quackery which may affect health and quality of the building construction that may lead to defects in the building, maintenance problem and building collapse.

Problem Statement

Construction industry everywhere faces problem and challenges (Babatunde & Samuel, 2014). These difficulties and challenges are present alongside a general situation of institutional weakness, professional rivalry among others. Previous research about roles of professionals in construction industry have, so far, only been discussed to a significant extent. one of this study include a study by Babatunde and Samuel (2014) which examines the intensity of competition and roles of each professional among the existing professionals in the Nigeria's construction industry. Also, Alinaitwe (2008) conduct a study title an assessment of client's performance in having an efficient building process in Uganda. Generally, it seems not much has been known about the construction professionals and their roles in the society (Yap & Lee, 2020). This can be attested looking at how the public assign conflicting responsibilities to various construction professionals. It is a common practice among the public to call a builder, an architect, quantity surveyor, civil engineer as all engineers. It is similarly common among the public to contract the services of regional planner for construction activities.

According to Walker (2020), studies about knowledge regarding roles of medical professionals in the society has been made. Assigning roles to the wrong professionals yield in giving poor output in the construction process which it will affect the quality, labour, and materials, it will also generate high cost in workmanship which procures the construction not in economic process, the results will produce low quality building, building collapse. It will also affect the planning, execution and controlling process which will cause delay in project delivery time. However, there appears to be dearth of studies on the effect the level of client's knowledge of the role and responsibilities of the various professionals in the construction industry on their patronage. Accordingly, this research will assess the client meta-cognitive knowledge on their patronage of professionals in building construction in Bauchi state.

The study provided answers to the following research questions:

- i. What is the effect of declarative knowledge of client on their patronage of professionals in building construction industry in Bauchi Metropolis?
- ii. What is the effect of procedural knowledge of client on their patronage of professionals in building construction industry in Bauchi Metropolis?

- iii. What is the effect of conditional knowledge of client on their patronage of professionals in building construction industry in Bauchi Metropolis?

II. LITERATURE REVIEW

Conceptual Review

The research framework for this study presented below:

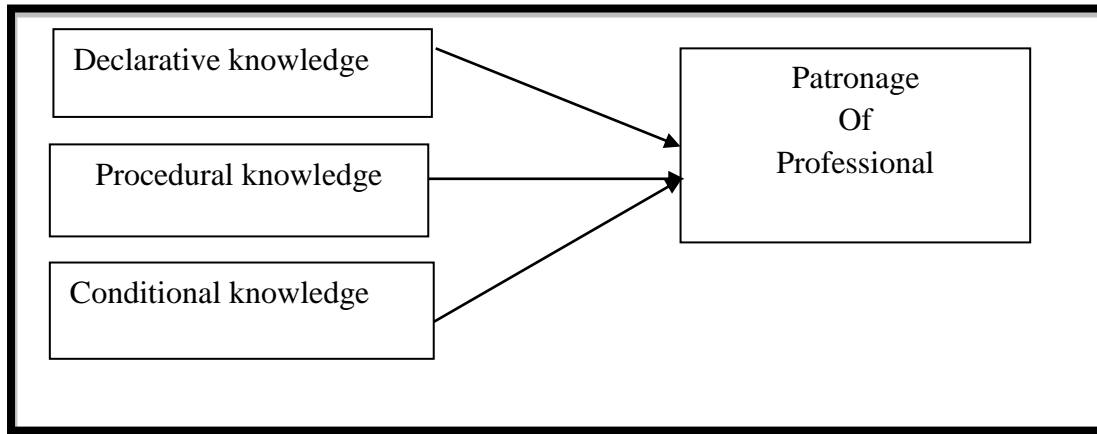


Figure 1: Research framework for the Study

2.1 Meta-cognitive

Meta-cognitive refers to person's ability to use prior knowledge to plan a strategy for approaching a learning task, and taking necessary steps to solve, reflect on and assess results with modifying someone approach as needed (Padmanabha, 2020). It helps learners choose the right cognitive tool for the task and plays a critical role in successful learning. Meta-cognitive refers to awareness of persons own knowledge, what persons does and doesn't know, and his ability to understand, control and manipulate his cognitive process (Ochilova, 2021).

A *meta* was one of the conical columns set in the ground at each end of the Circus in Rome to mark the turning point in the race. Similarly, the concept of meta-cognition can be seen as a turning point in our understanding of the mind. The prefix *meta* has come to refer to something that transcends the subject it is related to (Fisher, 1998). What does it mean then to transcend cognition? The term *metacognition* was introduced by Flavell in 1976 to refer to 'the individual's own awareness and consideration of his or her cognitive processes and strategies' (Flavell 1979). It refers to that uniquely human capacity of people to be self-reflective, not just to think and know but to think about their own thinking and knowing.

Metacognitive Knowledge

Meta-cognitive knowledge consists of knowledge of cognition in general as well as awareness and knowledge of one's own cognition (Padmanabha, 2020). It includes knowing strategies for how to accomplish task, knowing about the demands of various tasks, and knowing about the demands of various tasks, and knowing one's capabilities for accomplishing various task. Metacognitive knowledge refers to awareness individual possess about themselves and other people as cognitive processors (Fiedler, Ackerman & Scarampi, 2019). According to Teng, (2020), metacognitive knowledge has its own regulation which includes the monitoring of one's cognition and planning activities, awareness of comprehension and task performance, and evaluation of the efficacy of monitoring processes and strategies.

Dimensions of Metacognitive Knowledge

The metacognitive knowledge component of metacognition is divided into three (3) dimensions:

Declarative knowledge

Declarative knowledge plays a vital role in the framework of metacognitive knowledge within the building construction business. Metacognitive knowledge pertains to an individual's consciousness and comprehension of their own cognitive mechanisms, encompassing their thinking, learning, and problem-solving abilities (Wang, Gao, & Chen, 2023). Declarative knowledge, in this context, refers to the clear comprehension of facts, principles, and concepts pertaining to construction processes, materials, and regulations. Professionals in the building construction sector must have a strong foundation of declarative knowledge to effectively handle the intricate and diverse aspects of their profession. This includes comprehending building codes, material requirements, and safety standards (Selvi, Yazan, & Mahboob, 2023).

Declarative knowledge, as part of the metacognitive dimensions, serves as the fundamental understanding that guides decision-making and problem-solving. Professionals in the construction business that possess extensive factual knowledge are more capable of evaluating project needs, making well-informed design decisions, and ensuring adherence to applicable standards (Häußler, Esser, & Borrmann, 2021). Furthermore, possessing metacognitive awareness of one's declarative knowledge enables professionals to recognise deficiencies in comprehension, actively pursue further information as needed, and consistently adjust to the changing realm of construction technologies and laws. Declarative knowledge plays a crucial role in developing metacognitive skills, which are vital for achieving success in the dynamic and demanding domain of building construction (Ramesh, Dhariwal, Nichol, Chu, & Chen, 2022).

Procedural Knowledge

Procedural knowledge is crucial in the field of building construction, as it is a key aspect of metacognitive knowledge. Metacognitive knowledge encompasses the comprehension of one's own cognitive processes, while procedural knowledge pertains directly to the understanding of how to carry out activities and execute skills (Braithwaite & Sprague, 2021). Procedural knowledge in the construction industry involves a diverse set of practical abilities, including the aptitude to comprehend and analyse designs, oversee building timelines, collaborate with subcontractors, and enforce safety procedures. Professionals in the sector must cultivate metacognitive awareness regarding their procedural knowledge, encompassing both their specialised skills and their ability to effectively apply them in various circumstances (Marra, Hacker, & Plumb, 2022).

Procedural knowledge has a significant impact on decision-making and problem-solving in the field of building construction, within the metacognitive dimensions. Individuals possessing robust procedural knowledge possess the ability to strategically devise building processes, enhance the utilisation of resources, and effectively address any challenges that may develop throughout the project lifecycle (Wang, Gao, & Chen, 2023). Procedural knowledge metacognitive awareness enables construction professionals to introspect on their own abilities, recognise areas for enhancement, and adjust their approaches to fulfil the requirements of certain projects. Within the construction industry, which is constantly changing and presents different obstacles for each project, professionals can improve their skills and effectiveness by combining procedural knowledge with metacognitive strategies (Rebelo, Christodoulou, Payan-Carreira, Dumitru, Mäkiö, Mäkiö & Pnevmatikos, 2023).

Conditional Knowledge

Conditional knowledge, a component of metacognitive knowledge in the field of building construction, pertains to the comprehension of when and why to utilise particular techniques or procedural knowledge in different situations. This facet of metacognition entails the ability to identify the circumstances in which specific building techniques, project management approaches, or safety measures yield optimal results (Carlson, Lewis, Maliakal, Gerber, & Easterday, 2020). Having conditional knowledge is vital in the construction business, because projects might vary greatly in terms of scale, requirements, and environmental concerns. Professionals must possess the capability to evaluate the particular circumstances of a project, take into account external factors, and make well-informed judgements regarding the most suitable procedures or approaches for the given situation (Amann, Blasimme, Vayena, Frey, Madai, & Precise4Q Consortium, 2020).

Conditional knowledge, when applied within the metacognitive framework, improves the ability to solve problems and make decisions in a flexible and effective manner. Construction industry personnel with a keen understanding of contextual knowledge may predict obstacles, customise their approaches to match project-specific circumstances, and maximise results (Ghimire, Kim, & Acharya, 2023). The awareness of metacognition promotes an adaptable and proactive approach to managing construction, allowing professionals to effectively handle uncertainty and achieve successful project outcomes. Conditional knowledge enables construction experts to make informed decisions that match with the specific conditions of each project, such as adjusting building timetables to accommodate weather conditions or selecting materials based on site-specific characteristics (Tabarrini & Trioni, 2022).

Assessment of the Effects of Metacognitive Knowledge of Clients on their Patronage of Professionals in the Building Construction Industry

The clients' metacognitive expertise in the building construction sector can greatly influence their choice to hire pros. Metacognitive knowledge pertains to an individual's consciousness and comprehension of their own cognitive processes. In the context of clients in the construction business, it encompasses their capacity to assess and make well-informed choices regarding the services they need (Drigas & Mitsea, 2021). Clients that have a robust metacognitive comprehension are likely to have a more distinct perception of their project objectives, financial limitations, and anticipations, enabling them to communicate efficiently with construction experts. Increased awareness can enhance partnerships by enabling clients to effectively express

their expectations and assess the suitability of specialists for their specific project needs (Nivedhitha Sathish Kumar, 2023).

Moreover, clients' judgements of the competence and reliability of specialists in the building construction business may be influenced by their metacognitive knowledge (Shady, Bouchra, & Darrag, 2023). Customers who possess extensive knowledge regarding construction procedures, schedules, and possible obstacles are more inclined to value experts that exhibit openness, proficient communication, and adeptness in resolving issues. Professionals that possess a deep understanding of their clients' metacognitive demands and address them by offering lucid explanations, practical project schedules, and proactive communication have the ability to augment client contentment and foster trust. The impact of metacognitive knowledge on client patronage in the building construction sector is closely linked to the quality of communication, mutual understanding, and the overall success of construction projects (Hadebe, 2022). The beginning or starting point. These arguments led to the formulation of the following hypothesis

HO1: Declarative knowledge of client does not have significant effect on their patronage of professionals in building construction industry in Bauchi Metropolis.

HO2: Procedural knowledge of client does not have significant effect on their patronage of professionals in building construction industry in Bauchi Metropolis.

HO3: Conditional knowledge of client does not have significant effect on their patronage of professionals in building construction industry in Bauchi Metropolis.

III. METHODOLOGY

The research approach to be used in this study was a quantitative approach. There are various research designs that can be used for different studies, but for this research, a survey design was used because it provides a better understanding of the research problem and question than either method by itself. The population of this study comprised all private clients that involved building construction professionals in constructing their buildings in Bauchi metropolis. The study considers the 645 private clients that may involve professionals as those that sought building approval from the Bauchi State Urban Development Board from 2020 to date. The sample size for this study was obtained using the Krejcie and Morgan (1970) table. The table shows a total sample size of 242 is needed for a population size of 645.

Simple random sampling was adopted. The choice of simple random sampling was informed by the fact that the sample frame list is accessible based on the list at the Bauchi State Urban Development Board. The data collected was analysed using descriptive statistics tables and the regression method of analysis. Linear regression was used to predict the 'continuous dependent variable' using a given set of independent variables.

IV. DATA ANALYSIS AND RESULTS

The Linear regression was used to analyze the primary data with a 95 percent confidence level. The tests specifically address the null forms of hypotheses Ho1, Ho2 and Ho3. To conduct the analysis, we used the linear regression statistic. The probability of accepting the null hypothesis at ($p > 0.05$) or rejecting the null hypothesis at ($p < 0.05$) is determined by the use of the 0.05 significance level as the criterion.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.981 ^a	.962	.961	.19421

a. Predictors: (Constant), Conditional Knowledge, Declarative Knowledge, Procedural Knowledge

Source: SPSS Output, 2023

Table 1 summarized the results of a linear regression model with four predictor variables: Constant, Conditional Knowledge, Declarative Knowledge, and Procedural Knowledge. The R-squared value of 0.962 indicates that the model explains 96.2% of the variance in the dependent variable. This is a very high R-squared value, which suggests that the model is a good fit for the data.

The adjusted R-squared value of 0.961 is slightly lower than the R-squared value. This is because the adjusted R-squared value takes into account the number of predictor variables in the model. The fact that the adjusted R-squared value is close to the R-squared value suggests that the model is not overfitting the data. The standard error of the estimate of 0.19421 indicates the average distance between the predicted values and the actual values. A lower standard error of the estimate is better, as it indicates that the model is more accurate.

Table 2: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	156.189	3	52.063	1380.306	.000 ^b
	Residual	6.224	165	.038		
	Total	162.412	168			

a. Dependent Variable: Patronage Of Professional

b. Predictors: (Constant), Conditional Knowledge, Declarative Knowledge, Procedural Knowledge

Source: SPSS Output, 2023

The F-statistic was 1380.306, which is statistically significant at the $p < .000$ level. This means that the model is a good fit for the data. The mean square for the regression is 52.063, which is much larger than the mean square for the residual (0.038). This means that the model is explaining a lot of the variance in the dependent variable. The ANOVA results provide strong evidence that the model is a good fit for the data and that the predictor variables (Conditional Knowledge, Declarative Knowledge and Procedural Knowledge) have a significant impact on the dependent variable.

Table 3: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.222	.069		-3.219	.002
	Declarative Knowledge	.319	.028	.265	11.225	.000
	Procedural Knowledge	.110	.027	.122	4.123	.000
	Conditional Knowledge	.635	.027	.665	23.523	.000

a. Dependent Variable: Patronage Of Professional

Source: SPSS Output, 2023

The table presents the coefficients (B), standardized coefficients (Beta), standard errors, t-values, and significance levels (Sig.) for a regression model predicting "Patronage of Professional" using three predictor variables: Declarative Knowledge, Procedural Knowledge, and Conditional Knowledge.

All three predictor variables have a positive and statistically significant relationship with Patronage of Professional. Conditional Knowledge has the strongest association with Patronage of Professional, followed by Declarative Knowledge and Procedural Knowledge.

V. CONCLUSION AND RECOMMENDATIONS

The assessment of the effect of metacognitive knowledge of clients on their patronage of professionals in the building construction industry in Bauchi Metropolis has shed light on the intricate dynamics that influence client choices in this critical sector. Through an exploration of metacognitive knowledge, which encompasses clients' awareness, understanding, and evaluation of their own thought processes during the decision-making journey, this study has uncovered valuable insights. The findings suggest that clients who possess a heightened level of metacognitive knowledge tend to make more informed decisions when engaging with professionals in the building construction industry.

The study reveals a positive correlation between clients' metacognitive knowledge and their preferences for specific professionals. Clients who actively engage in reflective thinking about their construction needs, preferences, and expectations are more likely to seek out and patronize professionals whose expertise aligns with their cognitive considerations. This underscores the importance of professionals in the building construction industry not only understanding their clients' explicit requirements but also recognizing the impact of metacognitive factors on client decisions.

In conclusion, the implications of this study extend beyond the immediate context of Bauchi Metropolis, offering a framework for professionals in the building construction industry to enhance their client interactions. By acknowledging and addressing the metacognitive aspects of clients' decision-making processes, professionals can build stronger, more collaborative relationships with their clientele. This research contributes to the ongoing dialogue in the construction industry, emphasizing the need for a nuanced understanding of client behavior and preferences for sustainable professional-client engagements.

The following recommendations were made:

- i. Professionals in the building construction industry should implement targeted educational initiatives to enhance clients' declarative knowledge. Providing accessible and informative materials, workshops, or online resources that explain various aspects of construction processes, materials, and industry standards can empower clients with the necessary declarative knowledge.

- ii. Professionals in the building construction industry are encouraged to streamline and communicate their procedural knowledge effectively. Clear and comprehensive explanations of the construction process, project timelines, and the step-by-step procedures involved can help clients understand what to expect. Additionally, professionals should establish open channels of communication to address any concerns or questions related to procedural aspects.
- iii. Professionals in the building construction industry should tailor their services to meet specific client needs and preferences. This involves actively listening to clients, understanding their unique conditional requirements, and customizing solutions accordingly. Offering flexible options, providing personalized consultations, and adapting to changing project conditions can contribute to clients' confidence in the professionals' ability to meet their individualized needs.

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