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Architects in Palawan: Perception and Practices Towards Green Building Design

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ABSTRACT: Green building design is widely recognized as essential for sustainable development, yet its actual implementation often falls short. This study explores how architects in Palawan perceive and practice green building principles, focusing on key aspects such as energy efficiency, water conservation, material sustainability, and site sustainability. Surveys were conducted among 58 licensed architects from the United Architects of the Philippines (UAP) Palawan Chapter to understand their awareness, application, and challenges in adopting sustainable architecture. The results reveal a strong belief in green building design ($\bar{x}$ = 4.31, Highly Positive), with the highest perception in solid waste management ($\bar{x}$ = 4.50, Highly Positive). However, actual practice lags behind ($\bar{x}$ = 3.36, Moderate), with site sustainability ($\bar{x}$ = 3.57, Good) being the most implemented. The weakest area was green building drivers ($\bar{x}$ = 2.32, Poor), highlighting a lack of financial incentives, policy support, and client demand. Interestingly, demographic factors such as age, education, and experience had no significant influence on an architect's perception or practice. Instead, high costs, limited access to sustainable materials, and weak policy enforcement were identified as major barriers. Despite their willingness to embrace green design, architects struggle to implement it in real-world projects due to these constraints. To turn intent into action, this study calls for stronger collaboration between local government units (LGUs), the Palawan Council for Sustainable Development (PCSD), and UAP Palawan. Initiatives such as accessible training programs, financial incentives, policy improvements, and better material supply chains can help architects bridge the gap between knowledge and practice. By addressing these external barriers, architects in Palawan can move beyond just believing in sustainability—they can start building it. Future research should explore long-term policy impacts, industry trends, and technological innovations to further strengthen green architecture in the region.

KEYWORDS: architect's practices, green building design, green architecture, sustainability, sustainable development

I. INTRODUCTION

Climate change, resulting from human activities such as the release of greenhouse gases, leads to enduring shifts in temperatures and weather patterns (EPA, 2023). In the global effort to combat climate change, green building design has emerged as a response to these unfavorable effects, serving as a strategy for reducing carbon emissions and promoting more environmentally responsible building practices (Jaradat et al., 2024).

Green building design is a critical element in the fight against climate change. It places a strong emphasis on creating energy-efficient structures, has minimal carbon footprints, and integrates with the local climate and environment (PNNL, n.d). The emphasis on architecture in mitigating climate change through green building design is particularly important due to the significant influence of buildings on energy consumption, resource usage, and emissions. The buildings and construction sector, responsible for 36% of final energy use and 39% of energy and process-related carbon dioxide emissions in 2018, plays a pivotal role in global energy consumption and associated carbon emissions (UNEP, 2019). Acknowledging this reality underscores the necessity of reshaping the built environment through the implementation of sustainable architectural practices that integrate green building design to achieve their climate goal effectively.

Globally, C40 cities have committed to achieving net zero targets and reducing greenhouse gas (GHG) emissions by constructing net zero-rated buildings that operate using renewables and produce no greenhouse gas emissions (Net0, 2022). The concept of net-zero carbon buildings falls under the broader category of green buildings, aiming to minimize energy use through efficient design and operations, and balance remaining energy needs with renewable sources to achieve a net-zero carbon footprint, aligning with the green building movement's focus on sustainability and reduced environmental impact (Jamaludin and Li, 2023). The objective by 2030 is to ensure that every newly constructed building is environmentally sustainable, and by 2050, this goal expands to cover all buildings in alignment with the Paris Agreement's aim to limit global warming to 1.5°C (IEA, 2021).

The World Green Building Council is spearheading a global project aimed at achieving net-zero targets in the entire building industry by 2050 and in all new buildings by 2030. This initiative involves the participation of numerous countries, including the Philippines Sustainable Building Council (Net0, 2022).

The Philippines pledged to reduce greenhouse gas emissions by 75 percent by 2030 under the Nationally Determined Contributions (NDC), while it committed to help limit global warming to less than 2°C under the Paris Agreement of the United Nations Framework Convention on Climate Change (DENR, 2023). The momentum behind the adoption of sustainable architecture in the Philippines has been driven by the urgent need to confront environmental challenges and promote sustainable development (Fulgar, 2022). Notably, organizations such as the Philippine Green Building Initiative (PGBI) have been instrumental in advocating for the integration of sustainable design principles into architectural planning and construction (Pabellano, 2021). For instance, PGBI-certified buildings like the Hyundai Logistics Center demonstrate energy-efficient designs, renewable energy systems, water conservation measures, and the incorporation of green spaces, showcasing the country's commitment to sustainable architectural practices (Pabellano, 2021). These initiatives underscore the Philippines' proactive stance towards sustainable architecture and its endeavor to build a more environmentally conscious and resilient future.

The island of Palawan in the Philippines possesses unique environmental characteristics that are highly relevant to sustainable design. Its rich biodiversity and delicate ecosystems present an opportunity for architectural practices to align with the preservation of its environmental integrity. The potential for implementing green building design in Palawan is promising, as it aligns with the island's environmental and cultural context, offering an avenue to further harmonize architectural development with the preservation of Palawan's natural beauty and ecological balance.

Palawan, renowned as the last frontier of the Philippines, has witnessed a notable surge in urbanization, leading to the construction of large buildings in previously remote areas such as El Nido and Puerto Princesa City. This urban expansion has contributed to an increase in the region's carbon footprint, as highlighted by the United Nations Environment Programme (UNEP) in 2019. In response to this, the Zero Carbon and Green Building Seal project was introduced in Palawan to align the region's objectives with the national goal of reducing the carbon footprint and achieving global decarbonization by 2050.

However, the generalized consideration of architecture within the seal may result in ambiguous interpretations by local architects, raising questions about their understanding and application of strategies for adopting green building design. Furthermore, existing studies in Palawan, such as the Zero Carbon Resorts Best Practices: A Case of Palawan, Philippines (Manalo, 2019), predominantly did not focus on the impact of architectural design on energy consumption and savings, despite its significant influence if designed effectively.

Thus, this study sought to bridge the gap in existing research by focusing on the role of architects in adopting sustainable design practices, with the ultimate aim of not only recognizing green building Resorts but also promoting sustainable design across all types of building constructions, be it commercial or residential. By delving into the understanding and practices of architects, this research endeavors to contribute to the improvement and formal recognition of sustainable architectural practices, fostering a more environmentally conscious and energy-efficient built environment in Palawan.

II. METHODOLOGY

A. Research Design

The study utilized a quantitative descriptive research methodology to systematically collect and analyze numerical data. The aim was to offer a comprehensive representation of the existing perceptions and practices related to sustainable design methods among architects in the area. By employing this research approach, the study aimed to present an authentic reflection of the architects' perspectives and efforts, providing valuable insights into their contributions to the promotion of environmentally conscious architectural practices in Palawan. Furthermore, the study sought to leverage these results to formulate a recommendation that would support the implementation of green building design.

B. Respondents of the Study

The target population was centered on active members of the United Architects of the Philippines (UAP) Palawan Chapter, comprising 66 licensed architects engaged in architectural projects in Palawan. Those who responded to the questionnaire were utilized in the study, while those who did not respond were excluded.

C. Research Instrument

The key data collection tool utilized to gather information from the respondents was a researcher-developed questionnaire based on the Philippine green building code, which underwent validation by an expert in green building design. Respondents were required to complete the questionnaire by marking the provided spaces to signify their answers, with the questionnaire employing a Likert scale to measure responses.

Part 1 of the questionnaire focused on the participants' profiles, encompassing gender, age, educational background, years of experience in architecture (including apprenticeship), number of trainings in green building design and sustainable design, and membership in groups dedicated to sustainable architecture and design.

Part 2 of the questionnaire was designed to assess perceptions toward green building design, drawing upon insights and information gathered from relevant literature sources. Participants were presented with 30 statements related to their perceptions of green building design across various areas and 10 statements related to their perceived barrier in practicing green building design. They were required to indicate their level of perception by choosing from the following options: 1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always, in areas such as Energy Efficiency, Water Efficiency, Material Sustainability, Solid Waste Management, Site Sustainability, Indoor Environmental Quality, and Barriers to Green Building Design.

The responses collected from the respondents were scored for each of the green building design categories using a rating scale that provided both the weighted mean and descriptive interpretation. Data comparisons among architects were based on their perception levels, which were categorized as follows: Very High Perception (scores of 126–150) indicated that practices are consistently applied and exceed expectations, corresponding to a scale of 4.5 to 5.0; High Perception (scores of 101–125) suggested that practices are regularly applied and meet expectations, aligned with a scale of 3.5 to 4.4; Moderate Perception (scores of 76–100) reflected that practices are sometimes applied but need improvement, corresponding to a scale of 2.5 to 3.4; Low Perception (scores of 51–75) indicated that practices are rarely applied and often fall short, with a scale of 1.5 to 2.4; and Very Low Perception (scores of 30–50) signified that practices are not applied at all, corresponding to a scale of 1.0 to 1.4. This method enabled an in-depth analysis of the varying levels of perception among architects regarding green building design principles.

Part 3 of the questionnaire was designed to evaluate the practices related to green building design that the respondents were implementing and adhering to. Participants were presented with 30 statements regarding their practices across various areas of green building design. They were asked to indicate their level of practice by selecting from the following options: 1: Never, 2: Rarely, 3: Sometimes, 4: Often, 5: Always. For the drivers, participants were presented with 10 statements and were required to indicate their level of agreeableness by selecting from the following options: 1: Strongly Disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Strongly Agree.

The responses gathered from participants were evaluated across various categories of green building design using a rating scale that provided both weighted means and descriptive interpretations. Comparisons among architects were based on their levels of practice, which were classified as follows: Excellent (scores of 126–150) indicates that practices are consistently applied and exceed expectations, aligning with a scale of 4.5 to 5.0; Good (scores of 101–125) implies that practices are regularly implemented and meet expectations, corresponding to a scale of 3.5 to 4.4; Average (scores of 76–100) signifies that practices are sometimes applied but need improvement, corresponding to a scale of 2.5 to 3.4; Poor (scores of 51–75) suggests that practices are rarely applied and often fall short, with a scale of 1.5 to 2.4; and Very Poor (scores of 30–50) indicates that practices are not applied at all, corresponding to a scale of 1.0 to 1.4. This approach facilitated a comprehensive analysis of the differing levels of practice among architects concerning green building design principles.

D. Statistical Treatment

For the demographic profile, the statistical analysis involved calculating the frequency and percentage distribution of the respondents based on their respective characteristics such as gender, age, educational attainment, years of experience, professional membership, and attendance at related green building training. This analysis provided a comprehensive understanding of the demographic composition of the respondents and their relevance to the study.

Regarding the assessment of the level of perception and practices, the statistical analysis involved determining the frequency and percentage distribution of the responses to the perception and practices survey questions. This approach provided a clear and quantitative understanding of the respondents' perceptions and practices related to green building design, facilitating a comprehensive analysis of their viewpoints and behaviors in this context.

To examine the correlation between the level of perception and practices, the statistical analysis employed Spearman's rank-order correlation coefficient (Spearman's rho). This test was suitable for measuring the strength and direction of the relationship between two ordinal-level variables, providing valuable insights into the association between architects' perceptions and their actual practices related to green building design.

In evaluating the connection between demographic profiles and the level of perception and practices, the statistical approach utilized the Mann-Whitney U test. This test was well-suited for examining the relationship between nominal (such as gender, professional membership) and ordinal (such as level of perception and practices) level data. It provided valuable insights into how demographic factors influenced architects' perceptions and practices in the context of green building design.

E. Ethical Consideration

The ethical considerations for the study on "Architects in Palawan: Perception and Practices Towards Green Building Design" ensured that architects were informed, respected, and protected throughout the research process. This included obtaining voluntary consent, maintaining confidentiality and data security, minimizing harm, respecting participants, complying with regulations, and upholding transparency to safeguard the rights and well-being of the architects while preserving the integrity of the study.

Participation in this research was voluntary, not compensated, and it was expected by the researcher that the questionnaire was answered truthfully. There were 58 participants in this survey who were active members of the United Architects of the Philippines Palawan Chapter.

There was no significant risk in participating in the research survey via Google Form or printed questionnaire, except for the possible inconvenience of the respondents' time, which lasted only around 10 to 15 minutes. The collected data of the study was kept confidential and was not used against the respondents. Survey responses were deleted, and printed questionnaires were shredded after the publication of the research study.

To maintain confidentiality and data privacy, the survey form and its results were accessible only to the participants, researcher, adviser, and statistician.

Participants were provided with the overall results and analysis of the study. They were given a link to view the final results of the study. If, at any point, a participant refused or wished to withdraw, their responses were immediately removed. There was no sponsorship from any funding agency, and all expenses were covered by the researcher.

III. RESULTS AND DISCUSSION

Demographic Profile of the Respondents

Fifty-eight licensed architects who are actively engaged in architectural projects in Palawan were asked to answer the survey questionnaire to determine their demographic backgrounds.

The data shown in Table 1 presents the respondent's profile such as *age, sex, highest level of educational attainment, years of experience in the field, membership in professional organizations dedicated to Sustainable Architecture and Design, and participation in training sessions related to achieving green building design.*

Table 1. Demographic Profile of the Respondents

	f	Percentage
a. Age		
20-29	21	36.2%
30-39	32	55.2%
40-49	4	6.9%
50-59	1	1.7%
b. Sex		
Male	30	51.7%
Female	28	48.3%
c. Highest Educational Attainment		
College Graduate	53	91.4%
Master's Graduate	5	8.6%
Doctorate Graduate	0	0.0%
d. Years of Experience		
5 years and below	12	20.7%
6 to 10 years	31	53.4%
11 to 15 years	8	13.8%
16 to 20 years	4	6.9%
More than 20 years	3	5.1%
e. Professional Membership in Groups Focused on Sustainable Architecture and Design		
No	51	87.9%

Yes	7	12.1%
f. Attendance to Trainings Related to Green Building Design		
None	14	24.1%
Once	16	27.6%
Twice	8	13.8%
Thrice	8	13.8%
4 times	0	0.0%
5 times or more	12	20.7%

As indicated in Table 1, the largest segment of respondents is comprised of individuals aged 30 to 39 years, accounting for 55.2% of the total population surveyed. This age group exhibits a significant presence in the study, highlighting the perspectives of early to mid-career professionals. Furthermore, 21 respondents, representing 36.2% of the total, fall within the 20 to 29-year age range. This group provides valuable insights from younger individuals who are either entering the field of architecture or are in the early stages of their careers.

The remaining portion of the respondents consists of individuals aged 40 years and older, who contribute to the study by sharing experiences and viewpoints that reflect a more seasoned perspective. This demographic breakdown allows for a comprehensive understanding of the diverse age-related viewpoints present in the survey. Moreover, the survey reveals that there are 30 male respondents, which accounts for a majority of the total participants. In contrast, there are 28 female respondents. This data indicates that the number of male respondents exceeds that of female respondents by a margin of two.

When examining the highest level of educational attainment among the surveyed respondents, it is evident that 90% have completed a college degree. Furthermore, for every ten individuals in this group, one has achieved a post-baccalaureate degree, demonstrating a notable commitment to furthering their education beyond the undergraduate level. This highlights not only a strong foundation of college education but also a willingness among a segment of the population to pursue advanced studies.

An analysis of the years of experience within the architectural profession reveals that a substantial majority, specifically 74.1% of respondents, have been engaged in their practice for 10 years or fewer. Furthermore, a smaller portion of the cohort—comprising 12 respondents or 20%—possesses 11 to 20 years of architectural experience. In contrast, only 5.1% of respondents have accrued over 20 years of experience in the field. This data indicates a pronounced concentration of relatively early-career professionals within the architecture sector.

Out of the 58 respondents, approximately 90%, are not actively engaged in any professional groups focused on sustainable architecture and design. In contrast, 7 out of the 58 respondents are members of various professional organizations dedicated to sustainable architecture and design. These groups include Zero Carbon, which advocates for reducing carbon emissions; the Heritage Conservation Society, focused on preserving historical structures; Filinvest Development Corporation, known for its sustainable development projects; and the Byanyas Foundation, which aims to contribute to community development through architectural initiatives. This diverse range of affiliations highlights the varying levels of engagement and commitment to sustainable practices within the architectural community.

In examining the attendance rates for training sessions centered on green building design, it becomes evident that nearly 25% of the individuals surveyed have not participated in any training related to this vital area. Among those who have engaged in such professional development, approximately 32 individuals, which accounts for 55.2% of the total respondents, reported attending training sessions at least once, with many participating in up to three sessions. Furthermore, it is particularly significant that 20% of the participants have demonstrated a strong commitment to furthering their knowledge in green building design by attending training sessions more than five times. This data highlights varying levels of engagement and may indicate opportunities for increased participation and awareness in green building education within the professional community.

Level of perception of architects in Palawan on green building design

Table 2. Level of Perception of Architects in Palawan Regarding Green Building Design

	MEAN	DESCRIPTION
a. Energy Efficiency	4.41	Highly Positive
b. Water Efficiency	4.38	Highly Positive
c. Material Sustainability	4.49	Highly Positive
d. Solid Waste Management	4.50	Highly Positive
e. Site Sustainability	4.46	Highly Positive

f. Indoor Environmental Quality	4.31	Highly Positive
g. Drivers	4.04	Highly Positive
Overall Mean	**4.31**	**Highly Positive**

Scaling: 4.20 – 5.0 Highly Positive
3.4 – 4.19 Positive
2.6 – 3.39 Neutral
1.8 – 2.59 Negative
1.0 – 1.79 Highly Negative

A survey was conducted to fifty-eight architects in Palawan to determine their level of perception on green building design in terms of *energy efficiency, water efficiency, material sustainability, solid waste management, site sustainability, indoor environmental quality,* and *barriers.*

As depicted by Table 2, the respondents posited a highly positive perception on green building design, particularly on the aspect of *energy efficiency*, with a mean score of 4.41. They asserted that green building designs should incorporate natural ventilation strategies to reduce energy consumption and promote sustainable practices. Furthermore, they emphasized the necessity of integrating on-site renewable energy generation and prioritizing design methodologies that maximize the utilization of natural light, thus decreasing dependence on artificial lighting.

As to *water efficiency,* the computed mean score of 4.3 suggests that most respondents casted a highly positive perception on this issue. They express a strong conviction that effective building design should integrate systems for collecting rainwater from both roofs and hardscapes, repurposing this resource for non-potable applications. Furthermore, they advocate for the incorporation of advanced plumbing fixtures, such as sensors, automatic control valves, aerators, and flow control and pressure-reducing devices. These innovative tools and techniques are believed to play a crucial role in substantially decreasing overall water consumption, reflecting a commitment to sustainable practices in architectural design should be used to significantly reduce water consumption.

The respondents also have a strongly favorable perception on *material sustainability*, with a mean score of 4.49. This implies that building materials such as paints, coatings, adhesives, and sealants used indoors or in non-ventilated areas should not contain Volatile Organic Compounds (VOCs) or should adhere to levels tolerable to humans. According to them, building materials, such as composite wood, should not contain urea formaldehyde content and all other materials containing chemicals used in construction shall not compromise the health and safety of the workers and occupants of the building.

In terms of *solid waste management,* the respondents also have very positive perception on green building design with mean score of 4.50. They believe that buildings should incorporate a material recovery facility (MRF) for the collection and segregation of solid waste materials. Moreover, it should be fully enclosed and easily accessible from within the building and from the outside for easy collection of waste.

The architect-respondents also have very positive perception on *site sustainability*, with mean score of 4.46. According to them, site clearing, grading, and excavation shall be planned at the start of construction to mitigate pollution caused by erosion and sedimentation, taking into consideration existing endemic foliage as regulated by the DENR. In designing the site, all existing utilities, water bodies, and waterways shall be protected and shall not be disturbed, storm water collection management plan should be utilized and structures or facilities for storm water collection should be incorporated.

With regard to *indoor environmental quality,* the respondents have positive perception on this aspect as well, with mean score of 4.31. According to them, building design should comply with the minimum fresh air rates provided in the latest Philippine Society of Ventilating, Air-Conditioning, and Refrigerating Engineers (PSVARE) Standards. In addition to this, it should have designated smoking areas that are naturally ventilated and located outside of the building shell, away from building entrances, windows, and outside supply air (OSA) intakes by at least ten (10) meters, if smoking is on.

The selected architects have positive perception towards the *barriers* in promoting green building design, with 4.04 as the average mean score. According to them, without widely recognized standards for assessing a building's performance in terms of green building design, it is difficult to ascertain whether they are truly contributing to a positive environmental impact or not. In addition, they responded that the absence of specific building regulations or methods for green building design makes it challenging to implement it smoothly. In connection with that, many workers lack the specific skills needed to effectively implement green building design principles, making it challenging to create environmentally friendly buildings. They also responded that high initial costs of green building design are not always balanced out by long-term financial rewards, making it harder for people to invest in these eco-friendly building methods and higher cost related to green building design technologies are discouraging potential homeowners and investors from opting for environmentally friendly homes. Trades and professional coordination to implement green building design is a difficult task.

Overall, the selected architects in Palawan demonstrated a notably positive perception of green building design. Their responses yielded a mean score of 4.31. indicating a strong inclination toward sustainable architectural practices.

Level of practice of architects in Palawan on green building design

Table 3. Level of Practice of Architects in Palawan Regarding Green Building Design

	MEAN	DESCRIPTION
a. Energy Efficiency	3.05	Moderate
b. Water Efficiency	2.98	Moderate
c. Material Sustainability	3.32	Moderate
d. Solid Waste Management	3.60	Good
e. Site Sustainability	3.57	Good
f. Indoor Environmental Quality	3.09	Moderate
g. Drivers	2.32	Poor
Overall Mean	**3.13**	**Moderate**

Scaling: 4.20 – 5.0 Excellent

3.4 – 4.19 Good

2.6 – 3.39 Moderate

1.8 – 2.59 Poor

1.0 – 1.79 Very Poor

Data in Table 3 evaluates the level of practice of 58 architects in Palawan when it comes to green building design. The extent of practice was measured in terms of the following: *energy efficiency, water efficiency, material sustainability, solid waste management, site sustainability, indoor environmental quality,* and *barriers.*

The architect's level of practice in terms of *energy efficiency* is moderately good, with a mean score of 3.05. Most of them place significant emphasis on the integration of natural lighting within their architectural designs, recognizing its potential to considerably diminish reliance on artificial lighting sources. This practice not only contributes to energy conservation but also enhances the aesthetic quality and ambiance within built environments.

On the other hand, it is noteworthy that one of the least utilized practices among architects is the use of photoelectric sensors. These sensors are designed to connect with luminaires, enabling functionalities such as dimming or automatic shut-off of lighting systems when adequate daylight is available. The limited adoption of such advanced technology may indicate a gap in awareness or a lack of resources to implement these energy-efficient solutions, despite their potential to optimize energy usage within architectural projects.

In terms of *water efficiency*, their level of practice is categorized as moderately good, with an average score of 2.98. The architects admitted that they consistently use efficient plumbing fixtures, sensors, auto control valves, aerators, flow control, and pressure-reducing devices in building design to significantly reduce water consumption. Conversely, the incorporation of systems to recycle water from Sewage Treatment Plants (STP) is the least observed practice.

The architects' level of practice on *material sustainability* was found to be in moderate level, with a 3.32 mean score. The architects use building materials such as paints, coatings, adhesives, and sealants used indoors or in non-ventilated areas that do not contain Volatile Organic Compounds (VOCs) but tend to still use materials that contain chemicals in construction that compromise the health and safety of the workers and occupants of the building.

The respondents displayed a good level of practice in terms of *solid waste management*, achieving a mean score of 3.60. Most of them still integrate a Material Recovery Facility (MRF) into their planning and design processes, ensuring effective collection and segregation of solid waste materials. This practice reflects their strong commitment to implementing sustainable waste management strategies.

The level of practices of the respondents on *site sustainability* is also good, with mean score of 3.57. Most of them still planned site clearing, grading, and excavation at the start of construction to mitigate pollution caused by erosion and sedimentation, taking into consideration existing endemic foliage as regulated by the DENR. The respondents somehow still consider green building design in site sustainability.

In terms of *indoor environment quality*, the respondent's level of practices is moderately good, with a mean score of 3.09. Most of them still comply with the minimum fresh air rates provided in the latest Philippine Society of Ventilating, Air-Conditioning, and Refrigerating Engineers (PSVARE) Standards in building design. However, most of them also failed to integrate the indoor designated smoking area in a building.

The drivers toward green building practices are generally recognized as inadequate. Respondents noted poor accessibility to comprehensive educational materials and training programs that would encourage the integration of green building design principles into their work. Additionally, market demand and client preferences are largely absent as motivating factors, along with insufficient availability of training for widespread adoption. While economic incentives like tax rebates and grants could potentially motivate green building adoption, these drivers received a mean score of 2.32, indicating a poor level of influence. Overall, architects demonstrate a moderately good commitment to green building design, with an overall mean score of 3.13.

Comparing the level of perception and the level of practice of the respondents on green building design, the mean scores only reflect a gap between their perception and the practical application of their concept on green building design. Despite the favorable views on green building, the actual application of these principles has not progressed significantly, suggesting that while architects appreciate sustainable design, several challenges impede its consistent execution. Among the primary barriers identified are high costs, limited access to sustainable materials, insufficient specialized training, and fluctuating client demand for green features.

Relationship between respondent's profile and their level of perception on green building design

Figures presented in Table 4 summarizes the detailed association between the respondent's demographic profile and their level of perception on green building design in the accompanying table below.

Table 4. Correlation between the Respondents' Profile and their Level of Perception on Green Building Design

	r	p-value
Age	-0.135	0.312
Sex	-0.022	0.870
Highest Educational Attainment	0.196	0.140
Years of Experience	0.056	0.677
Professional Membership in Groups Focused on Sustainable Architecture and Design	0.103	0.443
Attendance to Trainings related to green building design	-0.075	0.578

**Significant at 0.05 level*

The analysis employed Spearman's Rho statistical test to examine the correlation between respondents' perception of green building design and various aspects of their demographic profiles. The specific demographic factors considered included *age, sex, highest level of educational attainment, years of experience in the field, membership in professional organizations dedicated to Sustainable Architecture and Design, and participation in training sessions related to achieving green building design.*

The results indicated that there were both positive and negative correlations between these variables, suggesting that certain demographic characteristics could influence respondents' views on green building design. However, it is crucial to emphasize that these identified relationships were found to be statistically insignificant. This means that, despite the observed correlations, we cannot conclusively assert that these factors meaningfully affect the respondents' perceptions of green building design based on the data collected, as the statistical significance threshold was not met.

Generally, the perception of green building design tends to be broadly independent of demographic factors. This means that individuals can develop a range of perceptions—positive or negative—toward green building practices, irrespective of their specific demographic backgrounds. Such perceptions may be shaped instead by other factors not considered in this study such as personal experiences, values, or awareness of environmental issues rather than by the characteristics that typically define demographic groups.

Relationship between respondent's profile and their level of practices on green building design

The researcher examines whether the respondent's level of practices on green building design is dependent to his/her demographic profile such as *age, sex, highest level of education, years of experience, professional membership in groups focused on sustainable architecture and design, and attendance at trainings related to green building design.* The statistical test used to test the relationship among these variables is Spearman's Rho. The complete data is summarized in Table 5.

Table 5. Correlation between the Respondents' Profile and their Level of Practices on Green Building Design

	r	p-value
Age	0.149	0.266
Sex	0.041	0.747
Highest Educational Attainment	-0.064	0.632
Years of Experience	0.102	0.448
Professional Membership in Groups Focused on Sustainable Architecture and Design	0.017	0.897
Attendance to Trainings related to green building design	0.661	0.521

**Significant at 0.05 level*

Based on the computed correlation values, the result of this study showed both positive and negative connections among the various demographic variables under consideration, suggesting that certain respondent's characteristics may influence respondents' level of practice on green building design. Nonetheless, it is imperative to highlight that these identified relationships were deemed statistically insignificant since the p-values are greater than 0.05.

In general, one's level of proficiency in green building design is not determined by their demographic profile. This suggests that an individual can exhibit an excellent or very poor level of expertise irrespective of their demographic characteristics.

V. CONCLUSIONS

This research underscores a clear gap between the high perception ($\bar{x}$ = 4.31, Highly Positive) and moderate practice ($\bar{x}$ = 3.36, Moderate) of green building design among architects in Palawan. While architects demonstrate strong support for sustainability principles, their actual implementation remains limited due to various external challenges.

The findings confirm that demographic factors do not significantly influence green building adoption, suggesting that institutional, economic, and policy-related factors play a more critical role. The main barriers identified include financial constraints, lack of material availability, weak policy enforcement, and insufficient training opportunities, all of which hinder architects from fully integrating sustainability into their designs.

To bridge the gap between perception and practice, a collaborative approach involving local government units (LGUs), the Palawan Council for Sustainable Development (PCSD), and UAP Palawan Chapter is necessary. Financial incentives, training programs, and standardized policies can provide architects with the necessary tools and motivation to advance sustainable architecture in Palawan.

Ultimately, this study highlights the importance of addressing external barriers to green building adoption. By implementing the recommended strategies, architects in Palawan can move beyond awareness and actively contribute to a more sustainable built environment. Future research should explore long-term policy effects, market trends, and technological advancements to further enhance green building adoption in the region.

VI. RECOMMENDATIONS

To bridge the gap between the positive perception and the moderate practice of green building principles among architects in Palawan, a collaborative framework led by local government units (LGUs), with the technical support of the Palawan Council for Sustainable Development (PCSD) and the United Architects of the Philippines (UAP) Palawan Chapter, is recommended. This approach integrates the regulatory authority of LGUs, the environmental oversight of PCSD, and the professional expertise of UAP Palawan, establishing a unified pathway toward advancing sustainable architecture in the province.

LGUs, in partnership with UAP Palawan and local academic institutions, should spearhead comprehensive training programs covering core green building competencies, including renewable energy systems, sustainable material selection, and eco-friendly construction practices. While LGUs would organize and fund these initiatives, UAP Palawan can provide technical expertise and trainers.

To ensure accountability, PCSD—working closely with LGUs and industry experts—should design measurable performance metrics aligned with international benchmarks such as LEED or BREEAM. These metrics would evaluate critical factors such as energy efficiency, water conservation, and indoor air quality. PCSD would lead the development of these standards with technical inputs from UAP Palawan.

Sustained compliance can be reinforced through periodic third-party audits of certified buildings. PCSD could accredit auditors, while LGUs collaborate with recognized green building organizations to facilitate these assessments, thereby ensuring long-term adherence to sustainable practices.

Further, LGUs, together with local businesses, should foster the production and distribution of eco-friendly materials by providing incentives and establishing supplier partnerships. PCSD can strengthen this effort by certifying locally produced sustainable materials, ensuring quality and credibility.

To promote interdisciplinary collaboration, LGUs and UAP Palawan can hold regular workshops that bring together professionals from diverse fields to learn and apply integrated green building strategies. UAP Palawan would supply industry knowledge, while LGUs oversee logistics and outreach.

Finally, to enhance design efficiency and compliance with Philippine Green Building Code (PGBC) standards, LGUs should provide financial assistance to firms for acquiring advanced tools such as Building Information Modeling (BIM) and energy modeling software. UAP Palawan can complement this initiative by offering specialized training on these digital tools.

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