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Exploring the Relationship between Education, Experience, and Age in Shaping the Skill Quality of Residential Construction Workers in San Fernando, Pampanga: A Correlational Analysis

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Abstract- ***Construction is one of the largest industries in the world, with many benefits that help people worldwide and are vital to the expansion of any country's economy. The construction sector is widely present in people's daily life and employs a sizable workforce. It is crucial to the nation's economic development and progress since it creates the infrastructure required for socioeconomic advancement while also significantly contributing to the nation's overall economic growth. The purpose of this research is to ascertain whether age, industry experience, and educational attainment are related to the skill sets of construction workers in San Fernando, Pampanga's residential building sector. Respondents to the questionnaire include 153 construction workers who are presently employed by six (6) different construction companies in San Fernando, Pampanga, on residential projects. Civil engineers assess the skills of construction workers by regularly visiting and monitoring the site, as they have been acquainted with each worker's performance and are aware of their talents. The Likert Scale Questionnaire, a five-point scale, was used in the study. The results of the study showed that a worker's intangible talents are influenced by their sociodemographic profile, while their tangible skills are only marginally impacted.***

Index Terms — Correlation, Residential Construction Industry, Intangible Skill, Tangible Skill.

I. INTRODUCTION

As a vital of housing for communities, the residential construction sector is essential to economic growth. Its dynamic nature stems from its continuous evolution in response to technological advancements, strict modifications to building codes, and incorporation of novel construction processes (Uusitalo, 2021). All of these elements work together to create a setting where proficiency, expertise, and adaptability are critical. A key factor in the industry's long-term prosperity and expansion is the caliber of human capital.

The competence of building workers is essential to guaranteeing the completion of quality residential projects. Modern technologies like Building Information Modeling (BIM) and sustainable construction methods have increased the need for construction personnel to have a wide range of abilities (Wong, 2013) . This calls for a thorough comprehension of the variables affecting skill quality, with age, experience, and education standing out as crucial components.

Given the continued prominence of the residential building sector in San Fernando, Pampanga, in the context of regional development, a careful examination of the interactions between age, experience, and education is necessary. The research emphasizes how important these elements are in determining how competent construction workers are. For example, research by Smith and Jones (2018) and Johnson et al. (2020) has demonstrated that improved technical skill among construction workers is positively correlated with higher educational attainment. In a similar vein, research by Brown and White (2019) emphasizes the value of experiential component of urban planning and a source learning in enhancing construction professionals' practical skills.

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Another well-established factor determining skill development is age. Garcia et al. (2017) highlight how experience gained through age can be very beneficial to problem-solving and decision-making skills in the construction industry. Thus, a thorough analysis of these variables is essential to comprehending the complex nature of skill quality in the residential construction labor force.

By examining the intricate link between age, experience, and education in determining the skill quality of residential construction workers in San Fernando, Pampanga, this study seeks to add to the body of knowledge already in existence. This research aims to provide insights that can inform targeted workforce development strategies, customize educational programs, and direct policy initiatives to support the development of a skilled and flexible construction workforce in the area. It does this by drawing on both established theories and current research findings. The subsequent investigation is anticipated to have an impact on practitioners in the industry, legislators, and educators in equal measure, opening the door to a more comprehensive comprehension of the complex processes supporting the competence of residential construction workers.

This study aims to determine whether a construction worker's educational experience, experience in the residential construction industry, or age have a correlation on their skills in construction works in the said industry. The researchers developed their conceptual framework using the correlation model.

The first frame makes up the socio-demographic profile of the respondents. These were determined by the researchers through initial surveys made by the researchers. For the purpose of this study, the researchers determine and focus on the respondent's educational attainment, experience in the residential construction industry, and their age. Each worker's classification was added to this part of the framework for additional information about the worker. The researcher's chose these factors because they are theoretically relevant and may affect the construction workers' skills.

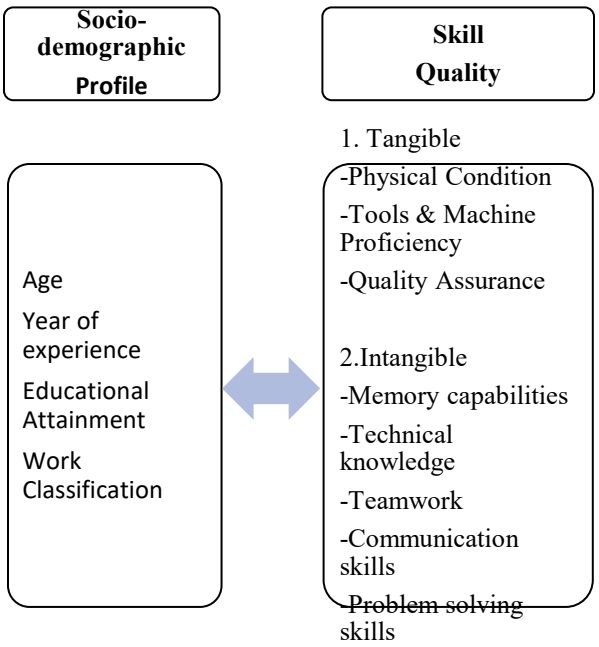

Fig.1. Conceptual Framework

The second frame consists of the skill qualities of the respondents. The skill qualities of each respondent are divided into tangible and intangible skills. Tangible skills include the respondent's physical condition, tools and machine proficiency, and the quality assurance. Intangible skills include the respondent's memory, technical knowledge, teamwork, communication skills, and problem solving skills. The respondent's skill was determined through the data gathering process by using survey questionnaires and descriptive analysis for statistical treatment. The researchers used a Likert-type scale questionnaire that measured how well the respondents are in terms of a specific skill. The researchers chose to categorize skills in this way because it allows them to examine both physical and cognitive aspects of skill development and performance.

II. STATEMENT OF THE PROBLEM

This study would like to determine if there is correlation on the education, experience and age to the skill quality of construction workers in the residential construction industry in San Fernando, Pampanga. By doing so, information obtained through this study will enable Construction Engineers and Construction managers to determine the best workers to make up a

group. Thus, the study aims to answer the following questions:

1. What is the profile of the respondents? In terms of:
(a) Age
(b) Educational attainment
(c) Year of Experience
(d) Work Classification
2. What is the assessment of a construction worker's tangible skills in terms of:
(a) Physical Condition
(b) Tools and Machine Proficiency
(c) Quality Assurance
3. What is the assessment of a construction worker's intangible skills in terms of:
(a) Memory
(b) Technical Knowledge
(c) Teamwork
(d) Communication
(e) Problem Solving
4. Is there a significant relationship between the socio-demographic profile and the tangible skills of construction workers?
5. Is there a significant relationship between the socio-demographic profile and the intangible skills of construction workers?

Hypothesis

Based on the research objectives, the formulated hypotheses for tangible skills are the following:

H_0: There is no significant relationship between the socio-demographic profile and the tangible skill quality of construction workers.

H_1: There is a significant relationship between the socio-demographic profile and the tangible skill quality of construction workers.

Based on the research objectives, the formulated hypotheses for intangible skills are the following:

H_0: There is no significant relationship between the socio-demographic profile and the intangible skill quality of construction workers.

H_1: There is a significant relationship between the socio-demographic profile and the intangible skill quality of construction workers.

This study intends to determine the correlation of education, experience and age to the skill quality of construction workers in the residential construction industry in San Fernando, Pampanga. The researchers will gather the socio-demographic data of construction workers from the construction workers themselves. From 31 Construction firms around San Fernando, Pampanga, twenty (20) of them confirmed that they accept residential projects. Of the twenty (20) construction firms, six (6) of them agreed to disclose the number of their manpower in terms of construction worker. Some construction firms are not qualified since they don't have an ongoing residential project, while some construction firms did not agree to disclose the number of their manpower in terms of construction workers. Other construction firms did not agree to disclose their manpower for specific reasons such as privacy and confidentiality reasons.

The respondents of the study are limited to construction workers who work in a residential project, specifically in San Fernando, Pampanga. Construction workers employed in construction firms who are willing to participate are the subjects of the study. The range of construction workers evaluated include all those who are working in an ongoing residential project at the time of the data gathering, from the six companies who agreed to disclose their manpower in terms of their construction workers. As a result, the focus of this research will be limited only for one hundred sixty-three (163) construction workers. The construction workers who will take part in this study have similarities in many ways, but they are still unique from each other, which may affect the result of the study itself. This study will concentrate on the correlation between age, education, and experience in the residential building industry in San Fernando Pampanga and the skill quality of construction workers.

III. METHODOLOGY

In order to conduct statistical analysis, the study used the quantitative descriptive technique, which aims to collect quantifiable data from a population sample, and a correlational study. In using a correlational study, no variables are within the researcher's control or manipulation. This type of study determines

whether two or more variables affect each other, one way or another. It can gather and describe demographic data using this regularly used data analysis tool. The objectives and nature of the study had an impact on the methodology used.

As indicated by Mohamed Adam and Hassan (2017), the majority of the time, a research population is a sizable group of people or things that are the subject of a particular scientific inquiry. The goal of all research is to help the general public. As it would be costly and time-consuming to examine every member of the community, researchers frequently must utilize sampling techniques due to the vastness of the population. The research will be conducted in San Fernando, Pampanga at a random construction site, which focuses on the correlation of education, experience and age to the skill quality of construction workers. The respondents of the study are limited to one hundred sixty-three (163) construction workers coming from six (6) construction firms that has an ongoing residential projects in San Fernando Pampanga namely; TRACCOR BUILDERS (17), 98 A.N. VALENCIA CONSTRUCTION (17), HOME NETWORK CONSTRUCTION AND REALTY (32), ABECO DESIGN & BUILD (33), B-CONCEPTS (29), B.M CARLOS CONSTRUCTION SERVICES (35). A construction worker's skill will be assessed by the civil engineers who visit and monitor on-site regularly as they know how each construction worker works and they know their capabilities and tendencies. The researchers chose construction sites of the respective construction workers in San Fernando Pampanga as the location because it fits the time constraint and resources needed of the researchers.

A questionnaire has become one of the most commonly used data collection tools in social science research. The primary goal of a questionnaire in study is to gather necessary details in the most accurate and valid way possible. In this study, a five-point scale questionnaire survey will be used which is the Likert Scale Questionnaire. The options range from poor performance to great performance, allowing the questionnaire creator to obtain a comprehensive picture of society's views.

The questionnaire used for this study underwent a validity test. The validity test was done by three experts related to the topic of the study. Each expert gave insights and valuable suggestions that improved the questionnaire, and it resulted into what was used for the data gathering. The average grade of the questionnaire is 4.47. A civil engineering professional and a research expert graded the questionnaire 5.0, while the other research expert graded the questionnaire 3.42, all of which were rated as valid questionnaires that will help the researchers to obtain the necessary data for the study.

The researchers then proceeded to conduct a pilot testing, which underwent through a reliability test. The reliability test method was done by a statistician using Cronbach's Alpha. The Cronbach's Alpha returned 0.962, which signifies a high reliability of the instrument tested.

Table 1 *Tabulation of Sample Population*

Company	Population	Samples
Home Network	55	32
B Concepts	50	29
BM Carlos	60	35
ABECO Design	57	33
Traccor Builders	30	17
98 AN Valencia	30	17
TOTAL	282	163

Sample size for the study is computed using Raosoft.com Sample Size Calculator. The formula allows the researchers to calculate a sample size with a 5% margin of error and 95% confidence level. The total population size is 282. Therefore, the calculation for the sample size will be 163. Thus, the sample size will be composed of thirty-two (32) respondents from Home Network Construction, twenty-nine (29) respondents from B-Concepts, thirty-five (35) respondents from BM Carlos Construction, thirty-three (33) respondents from ABECO Design, and seventeen (17) respondents each from Traccor Builders and 98 AN Valencia Construction.

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A questionnaire was chosen as a data collection instrument. A questionnaire refers to a device for securing answers to questions by using a form which the respondents fill in by them and questionnaires were composed of closed-ended questions. Its purpose is to collect information from the respondents (Chandra, 2017).

Data will be collected with the aid of questionnaires to evaluate a construction worker's knowledge and views about the correlation of education, experience and age to the skill quality of construction workers in the residential construction industry in San Fernando, Pampanga.

One questionnaire was used to collect the data, having three parts classified as Domain A, Domain B, and Domain C. Domain A was answered by the construction worker themselves, which is concerned about the socio-demographic profile, while Domains B and C were filled up by an engineer or another professional looking over the ongoing residential projects because these domains evaluate the construction worker's skills. The questionnaires consisted mostly of closed-ended questions. Closed-ended questions were included because they are easier to administer and analyze. They are also more efficient in the sense that a respondent is able to complete the closed-ended question rather than open-ended question in a given period of time (Polit, et. al., 1993; 203).

After gathering the data, the researchers will organize and analyze it. Manual computation was used to analyze closed-ended questions. The data was analyzed using descriptive statistics, which are short, informational, explanatory variables which refers to a process, which can be a representation of the whole population or a sample of a population. A test of normality was conducted in order to determine if a parametric test or a non-parametric test is to be done. After conducting the Normality test, it was determined that a non-parametric test is best suitable for this study. Hence, a Spearman's Rho Test was conducted to interpret the results. Frequency tables will be created, and the data will demonstrate in table similar to APA format used tables.

IV. RESULTS AND DISCUSSION

Results show that out of one hundred sixty-three (163) respondents, 23.9 % or 39 of the respondents were within the ages of 18-23 years old, which where the majority of the respondents belong to. 20.9 % or 34 of them were within the ages of 24-29 years old, 19 % or 31 were within the ages of 30-35 years old, 16 % or 26 respondents were within the ages of 36-41 years old, 14.1 % or 23 respondents were within the ages 42-47 years old, and 6 % or 10 of the respondents were aged 48 years old and above as of the date of data gathering.

Table 2 *Construction Worker's Demographic Profile*

	Frequency	Percentage
Age		
18-23	39	23.9
24-29	34	20.9
30-35	31	19.0
36-41	26	16.0
42-47	23	14.1
48 and above	10	6.0
Highest Educational Attainment		
Undergraduate	17	10.4
Elementary Graduate	35	21.5
High school Graduate	84	51.5
College Graduate	13	8.0
Vocational Graduate	14	8.6
Work Classification		
Skilled Worker	66	40.5
Helper	97	59.5
Work Experience		
0-12 months	32	19.6
1-2 years	27	16.6
3-4 years	23	14.1
5-6 years	24	14.7
7-8 years	18	11.0
9-above years	39	23.9

Most of the respondents graduated high school, since 51.5 % or 84 the respondents answered it as their highest educational attainment. Following that, 21.5 % or 35 were elementary graduates, 10.4 % or 17 were undergraduates, 8.6 % or 14 were vocational

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graduates, and 8 % or 13 of the respondents were college graduates.

For the work classifications, 59.5 % or 97 of the respondents were helpers and 40.5 % or 66 of them classified as skilled workers.

When it comes to the respondents' experiences in regards to working as construction workers in the residential construction industry, 19.6 % or 32 of the respondents have less than a year of experience (0-12 months), 16.6 % or 27 of the respondents have 1-2 years of working experience, 14.1 % or 23 of them have 3-4 years of experience, 14.7 % or 24 of them have 5-6 years of experience, 11 % or 18 of them have 7-8 years of experience, and 23.9 % or 39 of the respondents have over 9 years of experience.

Table 3 *Assessment of Construction Worker's Tangible Skills*

Item	Frequency					Mean	Std. Deviation
	1	2	3	4	5		
Physical Condition							
1	0	6	23	72	62	4.17	.803
2	0	1	23	71	68	4.26	.719
3	0	1	18	63	81	4.37	.703
Overall						4.28	.602
Tools and Machine Proficiency							
1	0	0	32	91	40	4.05	.665
2	0	0	20	74	69	4.30	.677
3	0	1	33	93	36	4.01	.671
Overall						4.12	.519
Quality Assurance							
1	0	1	11	80	71	4.36	.635
2	0	1	18	78	66	4.28	.680
3	0	4	12	92	55	4.21	.683
Overall						4.28	.518

For the respondent's individual assessments regarding their physical condition, they were assessed in three ways. The first one is their physical capability to do efficient construction labor. 3.7 % or 6 of the workers barely meet the standards or expectations, 14.1 % or 23 of the workers meet the standards or expectations most of the time, 44.2 % or 72 of the workers meet the standards or expectations all the time, and 38 % or 62 of the workers exceed standards or expectations. The next item assessed a worker's ability to work during work hours properly without a dip in their quality of performance or work. Results show 0.6% or 1 of the respondent barely meet the standards, 14.1 % or 23 of the respondents meet the standards or expectations most of the time, 43.6 % or 71 of the respondents meet the standards or expectations all the time, and 41.7 % or 68 of the respondents exceed standards or expectations. The final item for physical condition assessed a worker's ability to come to work and not miss coming to work due to physical incapability and/or illnesses. Results show that 0.6% or 1 of the respondent barely meet the standards, 11% or 18 of the respondents meet the standards or expectations most of the time, 38.7% or 63 of the respondents meet the standards or expectations all the time, and 49.7% or 81 of the respondents exceed standards or expectations.

For the respondent's individual assessments regarding "Tools and Machine Proficiency," they were assessed in three ways. The first item assessed the worker's ability to utilize tools and machines appropriately resulting in smooth and quality outputs. Results show that 19.7% or 32 of the respondents meet the standards or expectations most of the time, 55.8% or 91 of the respondents meet the standards or expectations all the time, and 24.5% or 40 of the respondents exceed standards or expectations. The next item assessed a worker's ability or eagerness to learn and applies the tools and machine for other unconventional ways when other tools are unavailable. Results show that 12.3% or 20 of the respondents meet the standards or expectations most of the time, 45.4% or 74 of the respondents meet the standards or expectations all the time, and 42.3% or 69 of the respondents exceed standards or expectations. The final item regarding

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"Tools and Machine Proficiency" assessed a worker's ability to use tool and machines efficiently without a waste of time and resources. Results show that 0.6% or 1 of the respondent barely meets the standards, 20.2% or 33 of the respondents meet the standards or expectations most of the time, 57.1% or 93 of the respondents meet the standards or expectations all the time, and 22.1% or 36 of the respondents exceed standards or expectations.

With regards to the assessments regarding "Quality Assurance," they were also assessed in three ways. The first item regarding "Quality Assurance" assessed a worker's ability to comply with all the standards and codes in a construction project. Results show that 0.6% or 1 of the respondent barely meet the standards, 6.7% or 11 of the respondents meet the standards or expectations most of the time, 49.1% or 80 of the respondents meet the standards or expectations all the time, and 43.6% or 71 of the respondents exceed standards or expectations. The next item assessed the worker's ability to adhere and follow the plans for a given project. Results show that 0.6% or 1 of the respondents barely meet the standards or expectations, 11% or 18 of the respondents meet the standards or expectations most of the time, 47.9% or 78 of the respondents meet the standards or expectations all the time, and 40.5% or 66 of the respondents exceed standards or expectations. The final item assessed a worker's ability to produce neat and polished outputs on or before the deadline of the project. Results show that 2.5% or 4 of the respondents barely meet the standards, 7.4% or 12 of the respondents meet the standards or expectations most of the time, 56.4% or 92 of the respondents meet the standards or expectations all the time, and 33.7% or 55 of the respondents exceed standards or expectations.

Table 4 *Assessment of Construction Worker's Intangible Skills*

Item	Frequency					Mean	Std. Deviation
	1	2	3	4	5		
Memory							
1	0	25	60	53	25	3.48	.932
2	8	33	42	37	43	3.45	1.218
3	2	22	71	39	29	3.44	.975
Overall						3.46	.927
Technical Knowledge							
1	4	39	50	33	37	3.37	1.149
2	0	58	40	43	22	3.18	1.065
3	0	23	61	41	38	3.58	.999
Overall						3.37	.994
Teamwork							
1	0	28	66	44	25	3.40	.947
2	1	32	62	41	27	3.37	1.001
3	0	16	46	76	25	3.67	.853
Overall						3.48	.820
Communication							
1	0	11	71	52	29	3.61	.857
2	0	24	80	40	19	3.33	.868
3	0	42	65	31	25	3.24	1.005
Overall						3.39	.814
Problem Solving							
1	10	40	73	30	10	2.94	.960
2	6	38	71	36	12	3.06	.947
3	32	50	44	31	6	2.56	1.117
4	35	43	36	30	19	2.72	1.307
Overall						2.82	.986

A worker's "Memory" was assessed in this study through three items. The first item assessed a worker's ability to retain information and instructions given by supervisors and/or engineers. Results show that 15.3% or 25 of the respondents barely meet the standards or expectations, 36.9% or 60 of the respondents meet the standards or expectations most of the time, 32.5% or 53 of the respondents meet the standards or expectations all the time, and 15.3% or 25 of the respondents exceed standards or expectations. The next item assessed a worker's ability to use previous experiences through previous projects to solve situations that occur on a residential project. Results show that 4.9% or 8 of the respondents perform unsatisfactory or does not meet the standards, 20.2% or 33 of the respondents barely meet the standards, 25.8% or 42 of the respondents meet the standards or expectations most of the time, 22.7% or 37 of the respondents meet the standards or expectations all the time, and 26.4% or 43 of the respondents exceed standards or expectations. The final item assessed a worker's ability to not need constant reminder of what needs to be accomplished, while accomplishing what needs to be. Results show that 1.2% or 2 of the respondents perform unsatisfactory or does not meet the standards, 13.5% or 22 of the respondents barely meet the standards, 43.6% or 71 of the respondents

meet the standards or expectations most of the time, 23.9% or 39 of the respondents meet the standards or expectations all the time, and 17.8% or 29 of the respondents exceed standards or expectations.

The following section is the "Technical Knowledge" section. A worker's "Technical Knowledge" was assessed in this study through three items. The first item assessed a worker's ability knowledge on the basic requirements for a residential project. Results show that 2.5% or 4 of the respondents perform unsatisfactory or does not meet the standards, 23.9% or 39 of the respondents barely meet the standards or expectations, 30.7% or 50 of the respondents meet the standards or expectations most of the time, 20.2% or 33 of the respondents meet the standards or expectations all the time, and 22.7% or 37 of the respondents exceed standards or expectations. The next item assessed a worker's ability to provide input and possible courses of action when there are minor revisions on the project. Results show that 35.6% or 58 of the respondents barely meet the standards, 24.5% or 40 of the respondents meet the standards or expectations most of the time, 26.4% or 43 of the respondents meet the standards or expectations all the time, and 13.5% or 22 of the respondents exceed standards or expectations. The final item assessed a worker's ability to provide suggestions on what materials or methods suit best for a given situation in a project. Results show that 14.1% or 23 of the respondents barely meet the standards, 37.4% or 61 of the respondents meet the standards or expectations most of the time, 25.2% or 41 of the respondents meet the standards or expectations all the time, and 23.3% or 38 of the respondents exceed standards or expectations.

"Teamwork" was assessed in this study through three items. The first item assessed a worker's ability to participate in work discussions to make progression of the project efficient. Results show that 17.2% or 28 of the respondents barely meet the standards or expectations, 40.5% or 66 of the respondents meet the standards or expectations most of the time, 27% or 44 of the respondents meet the standards or expectations all the time, and 15.3% or 25 of the respondents exceed standards or expectations. The next item assessed a worker's ability and willingness to impart his knowledge and ideas to his co-workers. Results show that 0.6% or 1 of the respondents perform unsatisfactory or does not meet the standards, 19.6% or 32 of the respondents barely meet the standards, 38% or 62 of the respondents meet the standards or expectations most of the time, 25.2% or 41 of the respondents meet the standards or expectations all the time, and 16.6% or 27 of the respondents exceed standards or expectations. The final item assessed whether a worker values and comprehends the perspective of his co-workers, especially those on-site. Results show that 9.8% or 16 of the respondents barely meet the standards, 28.2% or 46 of the respondents meet the standards or expectations most of the time, 46.6% or 76 of the respondents meet the standards or expectations all the time, and 15.4% or 25 of the respondents exceed standards or expectations.

"Communication" was also assessed in this study through three items. The first item assessed a worker's effectiveness when it comes to listening and sharing ideas with his co-workers. Results show that 6.7% or 11 of the respondents barely meet the standards or expectations, 43.6% or 71 of the respondents meet the standards or expectations most of the time, 31.9% or 52 of the respondents meet the standards or expectations all the time, and 17.8% or 29 of the respondents exceed standards or expectations. The next item assessed a worker's ability to present ideas properly through different means of communication, including speaking. Results show that 14.7% or 24 of the respondents barely meet the standards, 49.1% or 80 of the respondents meet the standards or expectations most of the time, 24.5% or 40 of the respondents meet the standards or expectations all the time, and 11.7% or 19 of the respondents exceed standards or expectations. The final item assessed a worker's ability to communicate with other people outside of the project including suppliers and clients with respect, courtesy, confidence, and open-mindedness. Results show that 25.8% or 42 of the respondents barely meet the standards, 39.9% or 65 of the respondents meet the standards or expectations most of the time, 19% or 31 of the respondents meet the standards or expectations all the time, and 15.3% or 25 of the respondents exceed standards or expectations.

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For the final section labeled as "Problem Solving," a worker was assessed in this study through four items. The first item assessed a worker's ability to solve unexpected and unconventional problems that occur in a project. Results show that 6.1% or 10 of the respondents perform unsatisfactory or does not meet the standards, 24.5% or 40 of the respondents barely meet the standards or expectations, 44.9% or 73 of the respondents meet the standards or expectations most of the time, 18.4% or 30 of the respondents meet the standards or expectations all the time, and 6.1% or 10 of the respondents exceed standards or expectations. The next item assessed a worker's ability to use critical thinking when challenges occur. Results show that 3.7% or 6 of the respondents perform unsatisfactory or does not meet the standards, 23.3% or 38 of the respondents barely meet the standards, 43.5% or 71 of the respondents meet the standards or expectations most of the time, 22.1% or 36 of the respondents meet the standards or expectations all the time, and 7.4% or 12 of the respondents exceed standards or expectations. The third item assessed a worker's ability to quickly come up with solutions during times of challenges. Results show that 19.6% or 32 of the respondents perform unsatisfactory or does not meet the standards, 30.7% or 50 of the respondents barely meet the standards, 27% or 44 of the respondents meet the standards or expectations most of the time, 19% or 31 of the respondents meet the standards or expectations all the time, and 3.7% or 6 of the respondents exceed standards or expectations. The final item assessed a worker's ability to make sound and rational decisions during the absence of an engineer. Results show that 21.5% or 35 of the respondents perform unsatisfactory or does not meet the standards, 26.4% or 43 of the respondents barely meet the standards, 22.1% or 36 of the respondents meet the standards or expectations most of the time, 18.4% or 30 of the respondents meet the standards or expectations all the time, and 11.6% or 19 of the respondents exceed standards or expectations.

Table 5 *Tests of Normality*

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Degree of freedom	Sig./p-values	Statistic	Degree of freedom	Sig./p-values
PC	.181	163	.000	.906	163	.000
TMP	.146	163	.000	.951	163	.000
QA	.200	163	.000	.893	163	.000
M	.136	163	.000	.946	163	.000
TK	.173	163	.000	.910	163	.000
TW	.150	163	.000	.949	163	.000
C	.182	163	.000	.917	163	.000
PS	.137	163	.000	.946	163	.000

Among the widely-used tests to identify either a parametric or non-parametric test are the Anderson-Darling test, Kolmogorov-Smirnov test, and the Shapiro-Wilk test. Two of these three tests were used in this study, which were the Kolmogorov-Smirnov test, and the Shapiro-Wilk test. As shown on the Tests of Normality, both for Kolmogorov-Smirnov and Shapiro-Wilk, the p-values are less than the level of significance which is 0.05. This means that our data are not normally-distributed. Hence, the more appropriate tools to prove the hypothesis are non-parametric tests, preferably the Spearman's Rho to measure and/or determine how strong are the correlation between two variables considered (Sullivan, 2017).

Table 6 *Spearman's rho: Relationship Between Age and the Tangible Skills of Construction Workers*

Tangible Skills	Correlation Coefficient	p-value	Remarks
Physical Condition	-0.469	0.000	Significant
Tools and Machine Proficiency	-0.006	0.940	Not Significant
Quality Assurance	0.006	0.935	Not Significant

Note:

- *If p-value is less than or equal to the significance level of 0.05, reject the null hypothesis; otherwise, accept.*
- *Correlation coefficient: ±0.76 to ±0.99 Very Strong; ±0.51 to ±0.75 Strong; ±0.26 to ±0.50 Moderate; ±0.11 to ±0.25 Weak; ±0.01 to ±0.10 Very Weak.*

Table 6 shows that age has a significant correlation with a worker's physical condition while age has no significant correlation on a worker's tools and machine proficiency and quality assurance. As a worker's age goes up, his physical condition reduces. This is determined through the correlation coefficient value considered to be "moderate." The p-value of the correlation between the age and the tangible skills in terms of "physical condition" is found to be less than 0.05, thus the null hypothesis is rejected. As for the tools and machine proficiency and quality assurance, the correlation coefficient is not significant due to having values considered to be "very weak." P-values of both categories in correlation to a construction worker's age is found to be more than 0.05, thus we accept the null hypothesis.

Table 7 *Spearman's rho: Relationship Between Education and the Tangible Skills of Construction Workers*

Tangible Skills	Correlation Coefficient	p-value	Remarks
Physical Condition	-0.109	0.167	Not Significant
Tools and Machine Proficiency	-0.112	0.154	Not Significant
Quality Assurance	0.055	0.484	Not Significant

Note:
- *If p-value is less than or equal to the significance level of 0.05, reject the null hypothesis; otherwise, reject.*
- *Correlation coefficient: ±0.76 to ±0.99 Very Strong; ±0.51 to ±0.75 Strong; ±0.26 to ±0.50 Moderate; ±0.11 to ±0.25 Weak; ±0.01 to ±0.10 Very Weak.*

Table 7 indicates that there is no correlation between a construction worker's education and the three categories under tangible skills of a construction worker. This is due to the p-values of all three categories being over 0.05 which leads to the null hypothesis being accepted. Correlation coefficients for physical condition, tools and machine proficiency, and quality assurance are all considered to fall either on "weak," or "very weak."

Table 8 *Spearman's rho: Relationship Between Experience and the Tangible Skills of Construction Workers*

Tangible Skills	Correlation Coefficient	p-value	Remarks
Physical Condition	-0.417	0.000	Significant
Tools and Machine Proficiency	-0.004	0.960	Not Significant
Quality Assurance	0.028	0.726	Not Significant

Note:
- *If p-value is less than or equal to the significance level of 0.05, reject the null hypothesis; otherwise, reject.*
- *Correlation coefficient: ±0.76 to ±0.99 Very Strong; ±0.51 to ±0.75 Strong; ±0.26 to ±0.50 Moderate; ±0.11 to ±0.25 Weak; ±0.01 to ±0.10 Very Weak.*

Table 8 depicts that experience has a significant correlation with a worker's physical condition while it has no significant correlation on a worker's tools and machine proficiency and quality assurance. As a worker's experience goes up, his physical condition reduces. This is determined through the correlation coefficient value considered to be "moderate." The p-value of the correlation between the experience and the tangible skills in terms of "physical condition" is found to be less than 0.05. Hence, the null hypothesis is rejected. As for the tools and machine proficiency and quality assurance, the correlation coefficient is not significant due to having p-values of both categories in correlation to a construction worker's experience is found to be more than 0.05, thus we accept the null hypothesis.

Table 9 *Spearman's rho: Relationship Between Age and the Intangible Skills of Construction Workers*

Intangible Skills	Correlation Coefficient	p-value	Remarks
Memory	0.788	0.000	Significant

Technical Knowledge	0.758	0.000	Significant
Teamwork	0.677	0.000	Significant
Communication	0.717	0.000	Significant
Problem Solving	0.705	0.000	Significant

Note:
- *If p-value is less than or equal to the significance level of 0.05, reject the null hypothesis; otherwise, reject.*
- *Correlation coefficient: ±0.76 to ±0.99 Very Strong; ±0.51 to ±0.75 Strong; ±0.26 to ±0.50 Moderate; ±0.11 to ±0.25 Weak; ±0.01 to ±0.10 Very Weak.*

Spearman's Rho revealed that age has a correlation to the intangible skills of a construction worker since the p-values for memory, technical knowledge, teamwork, communication, and problem solving were all found to be less than 0.05. Furthermore, correlation coefficient of values of all the five categories are considered to be either "strong" or "very strong," meaning that the correlation of age to the intangible skills of a construction worker is significant. Since all correlation coefficient values are in the positive values, it means that as the construction worker's age goes up, his intangible skill increases.

Table 10 *Spearman's rho: Relationship Between Education and the Intangible Skills of Construction Workers*

Intangible Skills	Correlation Coefficient	p-value	Remarks
Memory	0.510	0.000	Significant
Technical Knowledge	0.552	0.000	Significant
Teamwork	0.482	0.000	Significant
Communication	0.558	0.000	Significant
Problem Solving	0.496	0.000	Significant

Note:
- *If p-value is less than or equal to the significance level of 0.05, reject the null hypothesis; otherwise, reject.*
- *Correlation coefficient: ±0.76 to ±0.99 Very Strong; ±0.51 to ±0.75 Strong; ±0.26 to ±0.50 Moderate; ±0.11 to ±0.25 Weak; ±0.01 to ±0.10 Very Weak.*

Education was also found to have a correlation with a construction worker's intangible skills with regards to memory, technical knowledge, teamwork, communication, and problem solving. P-values are all less than 0.05 and all the correlation coefficients are considered to be "moderate" or "strong." With all correlation coefficient values being positive values, it means that as the construction worker's educational attainment increases, his intangible skill increases.

Table 11 *Spearman's rho: Relationship Between Experience and the Intangible Skills of Construction Workers*

Tangible Skills	Correlation Coefficient	p-value	Remarks
Memory	0.837	0.000	Significant
Technical Knowledge	0.773	0.000	Significant
Teamwork	0.709	0.000	Significant
Communication	0.699	0.000	Significant
Problem Solving	0.724	0.000	Significant

Note:
- *If p-value is less than or equal to the significance level of 0.05, reject the null hypothesis; otherwise, reject.*
- *Correlation coefficient: ±0.76 to ±0.99 Very Strong; ±0.51 to ±0.75 Strong; ±0.26 to ±0.50 Moderate; ±0.11 to ±0.25 Weak; ±0.01 to ±0.10 Very Weak.*

Finally, working experience in the industry was found to have a correlation with a construction worker's intangible skill. As a worker's experience increases, his memory, technical knowledge, teamwork, communication, and problem solving sharpens due to the values of the correlation coefficient all being considered to either be "strong" or "very strong." The p-values of all five categories are under 0.05, which means that the null hypothesis must be rejected.

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V. DISCUSSIONS

After gathering data from 163 respondents, the results of the test are analyzed. Table ii, table iii, and table iv shows the data gathered by the researchers through the questionnaire they distributed, themselves. The researchers then proceeded to the Normality test, which determines whether a parametric test or a non-parametric test is most appropriate for the study. Looking at the significance or p-values obtained in the normality test for physical condition, tools and machine proficiency, quality assurance, memory, technical knowledge, teamwork, communication, and problem solving, all significance or p-values are less than 0.05. Due to this result from the normality test, a non-parametric test must be conducted for the interpretation of the data. This meant that the data gathered for the study does not fall under the normal distribution curve. This means that a normal distribution is not assumed.

For this study, Spearman's Rho test was chosen to interpret the data to determine whether there is a correlation between a construction worker's age, education, and experience to his tangible and intangible skills.

Majority of the construction workers are aged 18 to 23, precisely 23.9%, while only 6% of construction workers were aged 48 and above which is the least amount for this study. As the categories of "age," goes up, the number of percentage of workers in that category goes down. In terms of highest educational attainment, more than half (51.5%) of the respondents graduated high school but were unable to finish their education. Those who did finish their education, were the least frequency among the construction workers. Only 8% of the respondents finished and graduated college. When it comes to their year of experience, 19.6% of them, or 32 of them, have less one year of experience, while 23.9%, or 39 of them, have nine years or more. In terms of work classification, 97 of them—or 59.5%—are helper employees, while the remaining were skilled workers.

A worker's physical capability of performing expedient construction work is the first thing to be evaluated when determining their tangible skills in terms of physical condition, 3.7% of the workers, or 6 of them, barely manage the criteria or expectations, while 62 of them go above and beyond whilst this first category has 4.17 mean value and 0.803 standard deviation value. The next phase was to evaluate a worker's capacity to perform satisfactorily during work hours without experiencing a drop in the quality of their work. With a mean value of 4.26 and a standard deviation of 0.719, it is clear that 0.6% of respondents, or 1 of them, barely meet the standards while 41.7%, or 68 people surveyed, exceed standards or expectations. With a 4.37 mean value and 0.703 standard deviation value, the final physical condition item has further evaluated a worker's ability to report to work and not miss it due to physical incompetency or illnesses. This shows that 0.6% of respondents, or 1 of them, barely meet the standards while 49.7%, or 81 respondents, exceed standards or expectations. The mean result for the three phases is 4.28, and the standard deviation is 0.602.

When evaluating the respondents' proficiency with tools and machines, the first phase is the worker's ability to use the equipment effectively, producing consistent and high-quality results with a 4.05 mean value and 0.665 value of standard deviation. Of the respondents, 19.7% or 32 respondents meet standards or expectations frequently; 55.8% or 91 do so constantly; and the remaining respondents have merely surpassed. The next phase, which assesses a worker's aptitude for learning and willingness to use tools and machinery in creative ways when other tools are not available, has a mean value of 4.30 and a standard deviation of 0.677; the results show that 12.3% or 20 of the respondents, meet the standards or expectations most of the time, 45.4% or 74 of the participants, meet the standards or expectations always; and the rest have exceeded the standards and expectations. With a 4.01 mean value and 0.671 standard deviation value, the final phase evaluates a worker's ability to use tools and machines effectively without wasting time or resources. The results show that 0.6% or 1 respondent barely meet the standards, 20.2% or 33 respondents meet the standards or expectations most of the time, 57.1%, or 93 respondents meet the standards or expectations consistently, and 22.1% or 36 respondents outweigh

the standards or expectations. The three phases' final mean value is 4.12, with a 0.519 standard deviation.

In terms of quality assurance, it was also evaluated in three different ways. The first phase evaluated a worker's ability to adhere to all rules, standards, and codes in a construction project. The results, which had a mean value of 4.36 and a standard deviation of 0.635 show that 0.6% of the respondents or 1 respondent barely meet the standards, 6.7% or 11 of them do so frequently, 49.1% or 80 of respondents do so consistently, and 43.6% or 71 of them do so exceedingly. The following phase, had a mean value of 4.28 and a standard deviation of 0.680, measured the worker's ability to adhere to and follow the plans for a particular project. The results showed that 0.6% or 1 of respondents barely met standards or expectations, 11% or 18 of the participants met them most of the time, 47.9% or 78 surveyed respondents met them always, and 40.5% or 66 of them exceeded it. From a 4.21 mean value and 0.683 standard deviation value, the final phase evaluates a worker's capacity to deliver polished outputs on time or earlier for the project. The results show that 2.5% or 4 of the respondents barely meet standards, 7.4% of respondents or 12 of them do so most of the time, 56.4% or 92 participants do so consistently, and 33.7%, or 55 of respondents exceed standards. The ultimate mean value for the three phases is 4.28 with a 0.518 standard deviation value.

Throughout this study, three questions were used to evaluate the intangible skills of the workers in terms of memory. The first item, with a mean of 3.48 and a standard deviation of 0.932, measuring a worker's capacity to remember knowledge and the guidelines established by managers and/or engineers. The study's findings indicate that 15.3%, or 25 respondents, barely meet standards or expectations; 36.9% or 60 respondents, generally meet standards or expectations; 32.5%, or 53 respondents, always meet standards or expectations; and 15.3%, or 25 respondents, consistently exceed standards or expectations. The following test question evaluated a worker's capacity to apply knowledge gained from earlier jobs to address problems that arise on a residential project. Its results, which have a 3.45 mean value and 1.218 standard deviation value, reveal that 4.9% of them or 8 participants, undertake unsatisfactorily or fail to meet the standards; 20.2% or 42 of respondents, yet hardly meet the standards; 25.8% or 42 respondents, adhere to the requirements or expectations most of the time; 22.7% of the respondents or 37, meet the standards or expectations as always; and 26.4% or 43 of the respondents, surpassed the standards or expectations. The final item, with a mean item score of 3.44 and a standard deviation of 0.975, measured a worker's capacity to complete tasks without frequent reminders of what must be done. Findings show that 1.2% or 2 of respondents, perform dissatisfying or do not meet standards; 13.5% of respondents or 22, barely meet standards; 43.6% of respondents or 71, do so for the majority of the time; 23.9% of respondents or 39, do so consistently; and 17.8% of respondents or 29, do so above expectations. And, all of these items got an overall 3.46 mean value and 0.927 standard deviation.

Regarding the worker's technical knowledge, the first question evaluated a worker's understanding of the fundamental specifications for a residential project. The results, which have a mean value of 3.37 and a standard deviation value of 1.149, show that 2.5% or 4 respondents perform unsatisfactorily or do not adhere to the requirements, 23.9% or 39 respondents barely meet the standards or expectations, 30.7% or 50 respondents adhere to the criteria or expectations most of the time, 20.2% or 33 respondents meet the standards or expectations as always, and 22.7% or 37 respondents surpasses the standards or expectations. The following question measured a worker's capacity to offer suggestions and potential courses of action during times of minor project adjustments, with a mean value of 3.18 and a standard deviation of 1.065. The findings reveal that 35.6% of respondents or 58 people just barely meet the standards, 24.5% of respondents or 40 of them meet the standards or expectations most of the time, 26.4%, or 43 respondents meet the standards or expectations always, and 13.5% or 22 respondents exceed the standards or expectations. Lastly, the final question, which had a 3.58 mean value and a 0.999 standard deviation, evaluated a worker's ability to suggest the materials or methods that would be most appropriate for a particular circumstance in a project. Findings show that 14.1% of respondents or 23 barely meet standards, 37.4% of respondents or 61 always meet

standards or expectations, 25.2% of respondents or 41 always exceed standards or expectations, and 23.3% of respondents or 38 barely meet standards. The overall mean and standard deviation for all of these items were 3.37 and 0.994, respectively.

In regard to teamwork, the first item evaluated a worker's capacity to take part in work conversations to facilitate the effective advancement of the project; it has a mean value of 3.40 and a standard deviation of 0.947. The findings reveal that 17.2% or 28 respondents, barely satisfy standards or expectations; 40.5% or 66 respondents, do so most of the time; 27% or 44 respondents, do so consistently; and 15.3% or 25 respondents go beyond or above those standards or expectations. The subsequent question, which measured a worker's capacity and openness to share his expertise with colleagues, had a mean score of 3.37 and a standard deviation of 1.001. The findings indicate that 0.6% of respondents or 1, perform unsatisfactorily or do not meet the standards; 19.6% of respondents or 32, barely meet the standards; 38% of respondents or 62, do so most of the time; 25.2% of respondents or 41, do so constantly; and 16.6% of respondents or 27, do so above expectations. The final question, which examined whether a worker appreciates and understands the perspectives of his co-workers, particularly those present, had a mean score of 3.67 and a standard deviation of 0.853. The findings indicate that 9.8% of respondents, or 16 workers, barely meet the standards; 28.2% of respondents or 46 workers, always meet the standards or expectations; 46.6% of respondents or 76 workers, consistently reach the standards or expectations; and 15.4% of respondents or 25 workers, surpasses the standards or expectations. The mean rating for all three tasks was 3.48, with a standard deviation of 0.820.

The first communication-related question had a mean score of 3.61 and a standard deviation of 0.857, and it measured a worker's efficacy in terms of listening to and sharing ideas with his co-workers. The findings reveal that 6.7% or 11 respondents, barely satisfy standards or expectations; 43.6% or 71 respondents, do so most of the time; 31.9% or 52 respondents, do so consistently; and 17.8% or 29 respondents, go above those standards or expectations. The next question measured a worker's capacity to effectively communicate ideas through several channels, including speaking, and had a mean score of 3.33 and a standard deviation of 0.868. Findings indicate that 14.7% of respondents or 24 workers, barely satisfy requirements; 49.1% or 80 workers, generally meet standards or expectations; 24.5% or 40 workers, always meet standards or expectations; and 11.7% or 19 workers, consistently go above and beyond expectations. The third item, which had a mean score of 3.24 and a standard deviation of 1.005, measured a worker's capacity for respectful, courteous, confident, and open-minded communication with others outside of the project, including suppliers and clients. Findings indicate that 25.8% or 42 respondents, barely meet requirements; 39.9% or 65 respondents, generally meet standards or expectations; 19% or 31 respondents, always meet standards or expectations; and 15.3% or 25 respondents, consistently surpass standards or expectations. The mean score for all of these items was 3.39, with a standard deviation of 0.814.

The first question in the final phase, which focused on problem-solving, measured a worker's aptitude for resolving unforeseen and unusual issues that arise throughout a project. Its mean value was 2.94, and its standard deviation is 0.960. In accordance with the findings, 6.1% or 10 respondents perform below expectations or in an unsatisfactory manner, 24.5% or 40 respondents barely meet expectations, 44.9% or 73 respondents continuously meet expectations, 18.4% or 30 respondents consistently exceed expectations, and 6.1% or 10 respondents perform above expectations. The subsequent question, which measured a worker's capacity to apply critical thinking in challenging situations, had a mean score of 3.06 and a standard deviation of 0.947. According to the results, 6.3% of respondents or 6 perform poorly or fall short of expectations, 23.3% of respondents or 38 barely meet expectations, 43.5% of respondents or 71 workers meet expectations or standards almost always, 22.1% of respondents or 36 workers meet expectations or standards constantly, and 7.4% of respondents or 12 workers exceed expectations or standards. The third question, which measured a worker's capacity for speedy problem-solving under pressure, had a mean score of 2.56 and a standard deviation of 1.117. The findings indicate that 19.6% of the respondents, or 32

workers, perform below expectations or do not meet standards; 30.7% of the respondents, or 50 workers, barely meet standards; 27% of the respondents, or 44 workers, do so most of the time; while 19% of the respondents, or 31 workers, do so consistently; and 3.7% of the respondents, or 6 workers, do so above expectations. The final question, which measured a worker's capacity to act sensibly and rationally in the absence of an engineer, had a mean score of 2.72 and a standard deviation of 1.307. The findings indicate that 21.5% of respondents, or 35 workers, perform below expectations or do not meet standards; 26.4% of respondents, or 43 workers, barely meet standards; 22.1% of respondents, or 36 workers, meet standards or expectations most of the time; 18.4% of respondents, or 30 workers, meet standards or expectations all the time; and 11.6% of respondents, or 19 workers, exceed standards or expectations. The average score for all of these items was 2.82, with a 0.986 standard deviation.

VI. SUMMARY OF THE FINDINGS

The researchers conducted this study to determine whether the socio-demographic profile of a construction worker contributes to the skill quality of these workers in the residential construction industry in San Fernando, Pampanga. The factors considered by the researchers for a construction worker's socio-demographic profile are age, experience, and education, while the skill quality of a construction worker is divided into tangible and intangible skills. Tangible skills include physical condition, tools & machine proficiency, and quality assurance of the output, while intangible skills include memory, technical knowledge, teamwork, communication, and problem solving.

The researchers conducted a survey to 163 respondents that serves as the sample population for this study. After gathering the data, it was discovered that in order to interpret the data gathered appropriately, a non-parametric tests should be conducted. Hence, the Spearman's Rho test was used. After interpreting the results of the survey and interpreting them through Spearman's Rho, the findings of the study were revealed.

It was found out that Age and Experience has a significant correlation to a construction worker's physical condition. On the other hand, Education has little to no correlation to a worker's physical condition. All of these factors have an inverse relationship with the physical condition of a construction worker. The difference is that the correlation of Age and Experience reach a level that is undeniable to disregard, making the correlation significant. As for the correlation of Education to the physical condition is negligible, thus deemed as not significant.

As for the tools and machine proficiency, it was revealed that a construction worker's socio-demographic profile has little to no correlation to their skills in the said category. Spearman's Rho test confirmed this since the correlation coefficient and p-values both interpret to the result. The correlation of Age, Education, and Experience is inversely to their tools and machine proficiency, but the relationship is too weak that it can be considered to be negligible.

Coincidentally, a construction worker's socio-demographic profile has little to no correlation with regards to the quality assurance of the output of their work. Similar to the tools and machine proficiency of construction workers, this interpretation was also confirmed through both the correlation coefficient and the p-value obtained through the test. The difference though is that the correlation of a construction worker's Age, Education, and Experience is directly proportional to the quality assurance of their work. The values of how proportional they are varies, but all values are too little that it can be interpreted as negligible.

Moving on to the intangible skills, all factors considered by the researchers for the socio-demographic profile are found to have a significant correlation to a worker's memory. Correlation coefficient and p-values of Age and Experience are considered as "very strong," while the values obtained for Education were considered as "strong." In addition, all factors considered were found to have a directly proportional correlation with the memory of the workers.

The following category for intangible skills is the technical knowledge. Technical knowledge is confirmed to have a significant correlation with the worker's socio demographic profile. Age, Education, and Experience have a direct correlation to the technical knowledge possessed by a worker. Age and Education both contain a correlation coefficient that is labeled as "strong," and Experience contain a correlation coefficient labeled as "very strong."

The third factor considered for assessing a worker's intangible skill is teamwork. Similar to memory and technical knowledge, socio-demographic profile also has a significant correlation with the worker's teamwork. Age and Experience revealed the correlation coefficient to be "strong," while the Education obtained a "moderate" value for its correlation coefficient. All of which were also found to have a direct correlation, and deemed to be a significant correlation.

Next is concerned with their communication skills. Coefficient correlation values all prove that the correlation of Age, Education, and Experience are "strong," hence the correlation of the socio-demographic profile to the communication skills as significant. All values also prove that the correlation of the socio-demographic profile is directly proportional.

The final category is problem solving. Similar to other intangible skill categories, problem solving is also found to have a significant correlation with the construction worker's socio-demographic profile. The correlation is discovered to be directly proportional to the problem solving skill of a worker. Age and Experience obtained a correlation coefficient labeled as "strong," while Education obtained a correlation coefficient labeled as moderate.

CONCLUSION

The socio-demographic profile of a construction worker has little effect on his tangible skills. The little effect is evident on the physical condition of the construction worker. Age and Experience affects a construction worker's physical condition, but it has no effect on his tools & machine proficiency and quality assurance of their work. The physical condition of a construction worker reduces as his age and experience goes up. On the other hand, education has no effect on the overall tangible skill of a construction worker.

The socio demographic profile of a construction worker affects his intangible skill. Age, Education, and Experience affect a construction worker's intangible skills, specifically when it comes to his memory, technical knowledge, teamwork, communication, and problem solving. Although the effects vary, when a construction worker's age, education, and experience goes up, his memory, technical knowledge, teamwork, communication, and problem solving skills increases.

To come up with the best skilled group of construction workers for a residential project, Construction Engineering Managers should distribute the "older," "educated," and "experienced," appropriately to provide wisdom and mentor the other workers that make up the group. Construction workers with youth also tend to perform better physically, but lack the intangible skills necessary. Which is why putting the youthful construction workers under the guidance of a more experience construction workers in order to hone and develop their skills, both tangible and intangible.

It is advised that construction firms take into account the age and experience of their workers before entrusting them with physically demanding activities based on the study's findings, as these variables have a significant association with a worker's physical condition. Education, though, might not be equally significant in this regard.

On the other hand, it is advised to take into account all three variables—age, education, and experience—when it comes to intangible talents like memory, technical knowledge, teamwork, communication, and problem-solving because they have a strong association with these abilities.

REFERENCES

[1] Uusitalo, P., Lavikka, R. Technology transfer in the construction industry. J Technol Transf 46,

1291–1320 (2021). https://doi.org/10.1007/s10961-020-09820-7

[2] Wong, K. and Fan, Q. (2013), "Building information modelling (BIM) for sustainable building design", Facilities, Vol. 31 No. 3/4, pp. 138-157. https://doi.org/10.1108/02632771311299412

[3] Smith, J., & Jones, A. (2018). "Educational Attainment and Technical Proficiency in the Construction Industry: A Longitudinal Analysis." Journal of Construction Education, 25(2), 145-162.

[4] Johnson, R., et al. (2020). "Advancements in Construction Technologies and the Need for Higher Education: A Comparative Study." Construction and Building Materials, 120, 312-325.

[5] Brown, P., & White, S. (2019). "Experiential Learning in Construction: A Case Study Approach." International Journal of Construction Education and Research, 15(3), 234-248.

[6] Garcia, M., et al. (2017). "The Influence of Age on Problem-Solving and Decision-Making Skills in Construction Management." Journal of Construction Engineering and Management, 143(11), 04017075.

[7] Abdul Karim, N. (2021, June). Exploring the Roles of Heritage Museums in Promoting Intangible and Tangible Heritage in Kelantan. Research Gate. https://www.researchgate.net/publication/352117120_Exploring_the_Roles_of_Heritage_Museums_in_Promoting_Intangible_and_Tangible_Heritage_in_Kelantan

[8] Arabia, J. (2023, April 6). 14 Construction Skills You Need to Land a Job. https://www.bigrentz.com/blog/constructionskills?fbclid=IwAR2IFNlSG9IBOuZ0EE_vrqQgmtWMLkU7U03S8_jtmFHHgLcyzn2t11aJBA4

[9] Atuzie, J. (2022, February 4). Are Construction Workers Essential to The Economy? SANA Global Projects. https://www.sanaglobalprojects.com/construction-knowledge-base/are-construction-workers-essential-to-the-economy/

[10] Awonuga, O. O. (2020). Skills gap assessment to enhance the delivery of technical and vocational education : a case study of electrical installation graduates in Ogun and Kaduna states of Nigeria. https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.809254

[11] Ballard, H. P. (2020). Local economic development assessment on the construction sector's transformation approach through skills development in South Africa. Electronic Theses and Dissertations. https://etd.cput.ac.za/handle/20.500.11838/3143

[12] Baseline Study to Assess Gender Disparities in Construction Sector Jobs. (n.d.). https://www.ilo.org/wcmsp5/groups/public/@asia/@ro-bangkok/@ilo-islamabad/documents/publication/wcms_185255.pdf

[13] Bhandari, P. (2022, December 5). Correlational Research | When & How to Use. Scribbr. https://www.scribbr.com/methodology/correlational-research/

[14] Caldwell, L. F. (2014, June). Childhood poverty, living below the line. American Psychological Association. https://www.apa.org/pi/ses/resources/indicator/2014/06/childhood-poverty

[15] Chen, J. (2023). What's Poverty? Meaning, Causes, and How to Measure. Investopedia. https://www.investopedia.com/terms/p/poverty.asp

[16] Construction - Construction workers: roles and responsibilities CDM 2015. (n.d.). https://www.hse.gov.uk/construction/cdm/2015/workers.htm

[17] Construction Statistics from Approved Building Permits Central Luzon, First Quarter 2022 Preliminary Results | Philippine Statistics Authority RSSO 03. (n.d.). http://rsso03.psa.gov.ph/article/construction-statistics-approved-building-permits-central-luzon-first-quarter-2022

[18] Current Issues on Construction Project Management. (n.d.-c). Scribd. https://www.scribd.com/document/436069960/

Current-Issues-on-Construction-Project-Management

[19] Dobronte, A. (2016, December 8). The importance of socio-demographics in online surveys. CheckMarket. https://www.checkmarket.com/blog/socio-demographics-onlinesurveys/#:~:text=Socio%2Ddemographics%20are%20nothing%20more,in%20all%20kinds%20of%20surveys.

[20] Fischer, R., & Walters, D. (2019). Construction Industry. ScienceDirect. https://www.sciencedirect.com/topics/social-sciences/construction-industry

[21] Gavino, C., III. (2022, April 1). RANDOM THOUGHTS | The Philippines remains a Third World Nation. Mindanao Times. https://mindanaotimes.com.ph/2022/04/01/the-philippines-remains-a-third-world-nation/

[22] Gross Domestic Product: An Economy's All. (2019, June 15). IMF. https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/gross-domesticproductGDP#:~:text=GDP%20is%20important%20because%20it,the%20economy%20is%20doing%20well.

[23] Hayes, A. (2022). Skilled Labor: Definition, Training, Vs. Unskilled. Investopedia. https://www.investopedia.com/terms/s/skilled-labor.asp#:~:text=Skilled%20labor%20refers%20to%20highly,period%20of%20training%20and%20experience.

[24] Herrity, J. (2020, February 5). 40 Jobs You Can Get Without a College Degree. Indeed. https://www.indeed.com/career-advice/finding-a-job/jobs-without-a-degree

[25] Hidayat, B., Novitasari, L., &Ophiyandri, T. (2019). Study of the skills of construction labours in building construction projects in Padang City. MATEC Web of Conferences. https://doi.org/10.1051/matecconf/201927602013

[26] Hussain, S., Xuetong, W., & Hussain, T. (2021, March 30). Impact of Skilled and Unskilled Labor on Project Performance Using Structural Equation Modeling Approach. Sage Journals. https://journals.sagepub.com/doi/full/10.1177/2158244020914590?fbclid=IwAR3DR46GJGQC819fgUmIZyBOnEdqzItPMrFapiGy0xCEiRHv_OvjqP1JvRI

[27] Indeed Editorial Team. (2021, February 16). Construction Skills. Indeed. https://www.indeed.com/career-advice/resumes-cover-letters/construction-worker-skills

[28] Intrinsic psychosocial stressors and construction worker productivity: impact of employee age and industry experience. (n.d.). Taylor & Francis. https://www.tandfonline.com/doi/full/10.1080/1331677X.2018.1495571?fbclid=IwAR0Gh-RlRuqVXsq2sXy5bRf325C0b9pZ8UkRtf_xIOmxLbjHqPGWvpp8idQ

[29] Fernando, J. (2023). Compound Annual Growth Rate (CAGR) Formula and Calculation. Investopedia. https://www.investopedia.com/terms/c/cagr.asp Logan

[30] W., &Kockel, U. (2015, May 27). (Re-)Building Heritage. Wiley Online Library. https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118486634.ch29

[31] Ltd, R. A. M. (n.d.). Global Residential Construction Market Summary, Competitive Analysis and Forecast, 2017-2026. Research and Markets Ltd 2023. https://www.researchandmarkets.com/reports/5632297/global-residential-construction-market-summary

[32] Managing and measuring the intangibles to tangibles value flows and conversion process: Romanian Space Agency case study | Emerald Insight. (2007, March 27). https://www.emerald.com/insight/content/doi/10.1108/13683040710740934/full/html?utm_source=TrendMD

[33] Matyanowski, M. (2023, April 4). What Skills Does a Construction Worker Need? Homebuilding Executive Recruiting Search Firm. https://matchbuilt.com/blog/what-skills-does-aconstructionworkerneed/?fbclid=IwAR0YrW5ot7AGt8HixKDY2jLQSTNXgrtSCXNOwaQOh15-VZDNB8Isl71xPa8

[34] Nirmalawatf, Labombang, M., &Fadjar, A. (2019). Analysis Factors Affecting the Outcomes of Skilled Construction Workers Training in the Region of Central Sulawesi Province. MATEC Web of Conferences. https://doi.org/10.1051/matecconf/201925802022

[35] Nonparametric Tests. (n.d.). https://sphweb.bumc.bu.edu/otlt/mphmodules/bs/bs704_nonparametric/bs704_nonparametric_print.html

[36] New approaches to solving the skills shortages in the New Zealand construction industry | Emerald Insight. (2008, January 11). https://www.emerald.com/insight/content/doi/10.1108/09699980810842052/full/html

[37] Nyaga, K. G. (2014). Role of project management skills on performance of construction projects: a case of selected construction firms in Mombasa county, Kenya. qhttp://erepository.uonbi.ac.ke/handle/11295/77591

[38] SafetyCulture. (2023, January 31). A Quick Guide to Residential Construction | SafetyCulture. https://safetyculture.com/topics/residential-construction/

[39] Ocean, J. (2021b, November 3). Top 12 Construction Issues & Challenges. Revizto. https://revizto.com/en/construction-issues-challenges/

[40] Planting the Seed of Hope. (2019, November 13). https://www.deped.gov.ph/2019/11/13/planting-the-seed-of-hope-instilling-childs-rights-in-education/.