





































from the sampling frame was first randomly chosen. After the first participant was randomly selected, every  $n$ th number on the list following the first selection was chosen. In this case, the size of  $n$  was calculated by dividing the population size by the desired sample size.

For this study, the researcher was interested in selecting 80 participants from the 170 target population. Therefore, 170 divided by 80 is 2.125. Since a person cannot be fractionalized, the  $n$ th in this case was rounded down to 2. This is the same as  $90/40 = 2.25$  and  $80/40 = 2$  in each program of study. The numbers were normalized so that the two student groups have equal sample sizes. In this case, each program of study was represented by 40 respondents. While the number of respondents in each group is altered, the sample size remains unchanged. For the remainder of this section, the data collection methods and the data analysis techniques (research methods) used are discussed.

## **RESEARCH METHODS**

The goal in this section is to understand and describe the presumed dependent variable, or to explain its variability. This is the variable that lends itself to investigation as a viable factor. By analyzing the scale items in the questionnaire as they relate to the learners' perception and finding out what variable influences it, it is possible to find answers or solutions to the research problem/questions/hypotheses. To achieve this goal, it is necessary to quantify and measure the variables in question.

A variable is anything that can take on differing or varying values (Sekaran & Bougie, 2012). In this study, the two variables of interest are the graduate programs of study and the learners' perception of project management regarding the two-dimensional constructs. It should be noted that perception is an abstract concept. Therefore, it has to be reduced from its level of abstraction and operationalized in such a way that it becomes measurable (Sekaran & Bougie, 2012). However, in this study, "perception" is the variable of primary interest to the researcher. It is measured on the level of agreement or disagreement to the scale items. Here, perception will be labelled as the presumed dependent (criterion) variable and program of study will be labelled as the presumed independent (predictor) variable. This study adopts a survey research strategy designed to establish a relationship and differences. Therefore, a correlation is not causation. A questionnaire is the chosen data collection instrument used in this study.

### **Data Collection Instrument**

The data collection instrument was divided into two sections: A and B. In section A, respondents were asked on a scale from 1 ("strongly disagree") to 5 ("strongly agree") to

indicate the extent to which they disagree or agree with a series of statements. This produced a measure of the respondents' perceptions about project management concerning the two-dimensional constructs under investigation. The following table shows the coding frame used to produce the numerical data.

Table 1. Coding Frame

|                        |              |             |           |                     |
|------------------------|--------------|-------------|-----------|---------------------|
| Strongly Disagree (SD) | Disagree (D) | Neutral (N) | Agree (A) | Strongly Agree (SA) |
| 1                      | 2            | 3           | 4         | 5                   |

Section B asked respondents to provide demographic information such as age, gender, and program of study. The two sections of the questionnaire produced both numerical and categorical data which were used in the data analysis phase of the study. This, in turn, enabled the researcher to answer the research questions and the formulated research hypotheses. First, the data from section B (the demographic data) will be discussed.

**Data Analysis, Results, and Discussions**

**The Research Questions**

- RQ1. Is there a relationship between learners' program of study and their perception regarding the two-dimensional constructs of project management?*
- RQ2. Is project management as much art as it is science?*
- RQ3. Is there a statistically significant difference between the perceptions of learners from different project management programs of study towards the two constructs?*

**Results**

Table 2a. Program of Study at = School of Biz and Mgmt Studies

| Descriptive Statistics <sup>a</sup> |    |         |         |      |                |
|-------------------------------------|----|---------|---------|------|----------------|
|                                     | N  | Minimum | Maximum | Mean | Std. Deviation |
| PM is more Sci                      | 40 | 1       | 2       | 1.85 | .362           |
| PM is more Art                      | 40 | 4       | 5       | 4.30 | .464           |
| Valid N (listwise)                  |    |         |         |      |                |
| per                                 | 40 |         |         |      |                |

a. Program of Study at: SOBMS or FOBMS  
 Table 2b. Program of Study at = Faculty of Engrng and Technology

| Descriptive Statistics <sup>a</sup> |    |         |         |      |                |
|-------------------------------------|----|---------|---------|------|----------------|
|                                     | N  | Minimum | Maximum | Mean | Std. Deviation |
| PM is more Sci                      | 40 | 4       | 5       | 4.38 | .490           |
| PM is more Art                      | 40 | 1       | 2       | 1.55 | .504           |

|                    |    |  |  |  |  |
|--------------------|----|--|--|--|--|
| Valid N (listwise) |    |  |  |  |  |
| per                | 40 |  |  |  |  |

a. Program of Study at: FET

When the data file was split by Program of Study, separate descriptive statistics were calculated for SOBMS or FOBMS and FET learners. From tables 2a and 2b, there appears to be a huge difference between the perceptual levels reported by these two groups of learners regarding the two project management constructs. These differences are discussed in the discussion section of this paper.

As expected, from table 2a, SOBMS learners perceive project management as more art than science (n = 40, mean = 4.30 with SD = .464) and from table 2b, FET learners reported perceiving project management as more science than art (n = 40; mean = 4.38 with SD = .490). These scores are from a range of 1 to 5 scale as presented in table 1. The mean of one program of study is almost the opposite of the mean of the other. These differences show that learners' perceptions of the two constructs of project management are influenced by their program of studies. The outputs in tables 2a and 2b **provide the answers to RQ1 and partially to H<sub>1</sub>**. A relationship is established. It means that learners' perception of project management is influenced by their learning orientation as indicated.

**NOTE:** It should be noted that normally, the mean as a measure of central tendency only makes sense if the data are measured on an interval or ratio scale. However, some scholars argue that multiple-item measures of concepts, like Likert scales (Table 1 in this case), produce, strictly speaking, ordinal variables. In this respect, these scholars argue that ordinal data can be treated as though they produce interval/ratio variables. These writers maintain that this is because of the relatively large number of categories the items generate. This position was articulated by Bryman and Bell (2011); Saunders, Lewis, and Thornhill (2016); Blumberg, Cooper, and Schindler (2011). Therefore, in this study, it makes sense to report the mean scores of the dependent variable of this study. However, it does not make sense to report the mean score for the program of study (the presumed independent variable) since it is a categorical variable measured on a nominal scale. Questions 2 and 3, as well as the hypotheses, are answered later.

## DISCUSSION AND ANALYSIS

### Hypotheses

*H<sub>1</sub>: There is no relationship between learners' program of study and their perception regarding the two-dimensional constructs of project management.*

Firstly, a chi-square test of independence (with  $\alpha = .05$ ) was conducted on *H<sub>1</sub>* stated above. The test was intended to evaluate whether there is a relationship between learners'

program of study and their perception regarding the two project management constructs. The two constructs considered in this study are whether project management is more art than science or whether project management is more science than art. Table 3 is the output of the first part of the hypothesis (i.e., PM is more Art than Science). From table 3, it can be seen that there is a relationship and that the relationship is statistically significant with,  $\chi^2 (1, N = 80) = 8.170, p < .001$ . This leads to the partial rejection of hypotheses  $H_1$  and  $H_3$  as well as questions 1 and 3. Besides showing a relationship between the two presumed independent and dependent variables, the results show that the relationship is statistically significant ( $p < .001$ ) which is below the chosen level of significance ( $p < .05$ ).

Table 3. Program of Study \* PM is more Art than Science

| Chi-Square Tests                |                    |    |   |                         |                         |
|---------------------------------|--------------------|----|---|-------------------------|-------------------------|
|                                 | Value              | df | Asymptotic<br>Significance<br>(2-sided) | Exact Sig.<br>(2-sided) | Exact Sig.<br>(1-sided) |
| Pearson Chi-Square              | 8.170 <sup>a</sup> | 1  | <.001                                   |                         |                         |
| Continuity Corrections          | 5.818              | 1  | <.001                                   |                         |                         |
| Likelihood Ratio                | 7.343              | 1  | <.001                                   |                         |                         |
| Fisher's Exact Test             |                    |    |   | <.001                   | <.001                   |
| Linear-by-Linear<br>Association | 6.468              | 1  | <.001                                   |                         |                         |
| N of Valid Cases                | 80                 |    |   |                         |                         |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.18.

b. Computed only for a 2x2 table

The footnote below the chi-square test table (Table 3) indicates that 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.18 which is much greater than 5. This means that one can be confident that one of the assumptions for a chi-square test has not been violated.

Secondly, a chi-square test of independence (with  $\alpha = .05$ ) was conducted on  $H_1$  stated above. The test was intended to evaluate whether there is a relationship between learners' program of study and their perception regarding the two project management constructs. The two constructs considered in this study are whether project management is more art than science or whether project management is more science than art. Table 4 is the output of the second part of the hypothesis (i.e., PM is more Science than Art). From table 4, it can be seen that there is a relationship, and that the relationship is statistically significant with,  $\chi^2 (1, N = 80) = 6.170, p < .001$ . This also leads to the partial rejection of hypotheses  $H_1$  and  $H_3$  as well as questions 1 and 3. Besides showing a relationship between the two presumed independent and dependent variables, the results show that the relationship is statistically significant ( $p < .001$ ) which is below the chosen level of significance ( $p < .05$ ). This completes the responses to hypotheses  $H_1$  and  $H_3$  and questions  $RQ1$  and  $RQ3$  as stated in the introductory section.

Table 4. Program of Study \* PM is more Science than Art

**Chi-Square Tests**

|                                    | Value              | df | Asymptotic<br>Significance<br>(2-sided) | Exact Sig.<br>(2-sided) | Exact Sig.<br>(1-sided) |
|------------------------------------|--------------------|----|---|-------------------------|-------------------------|
| Pearson Chi-Square                 | 6.170 <sup>a</sup> | 1  | <.001                                   |                         |                         |
| Continuity Correction <sup>b</sup> | 4.818              | 1  | <.001                                   |                         |                         |
| Likelihood Ratio                   | 7.343              | 1  | <.001                                   |                         |                         |
| Fisher's Exact Test                |                    |    |   | <.001                   | <.001                   |
| Linear-by-Linear<br>Association    | 5.468              | 1  | <.001                                   |                         |                         |
| N of Valid Cases                   | 80                 |    |   |                         |                         |

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.50.

b. Computed only for a 2x2 table

The footnote below the chi-square test table indicates that 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.50 which is much greater than 5. This means that one of the assumptions for a chi-square test has not been violated.

*H<sub>2</sub>: Project management is as much art as it is science.*

Thirdly, a chi-square test of independence (with  $\alpha = .05$ ) was conducted on *H<sub>2</sub>* stated above. The test was intended to evaluate whether Project Management is as much art as it is science. Table 5 is the output of *H<sub>2</sub>* (i.e., PM is as much art as it is science). From table 5, it can be seen that learners from the two program of studies responded similarly. However, at this instance, the two groups of learners disagree that Project Management is as much Art as it is Science, and that the differences in their views of *H<sub>2</sub>* is statistically significant with,  $\chi^2 (1, N = 80) = 8.000, p < .001$ . This also leads to the rejection of hypothesis *H<sub>2</sub>*. Besides showing a relationship between the two presumed independent and dependent variables, the results show that the relationship is statistically significant ( $p < .001$ ) which is below the chosen level of significance ( $p < .05$ ). This completes the responses to hypothesis *H<sub>2</sub>* and *RQ2* as stated in the introductory section.

Table 5. Program of Study \* PM is as much Art as it is science

**Chi-Square Tests**

|                                    | Value              | df | Asymptotic<br>Significance<br>(2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|------------------------------------|--------------------|----|---|----------------------|----------------------|
| Pearson Chi-Square                 | 8.000 <sup>a</sup> | 1  | <.001                                   |                      |                      |
| Continuity Correction <sup>b</sup> | 7.050              | 1  | <.001                                   |                      |                      |
| Likelihood Ratio                   | 9.204              | 1  | <.001                                   |                      |                      |
| Fisher's Exact Test                |                    |    |   | <.001                | <.001                |
| Linear-by-Linear<br>Association    | 8.300              | 1  | <.001                                   |                      |                      |
| N of Valid Cases                   | 80                 |    |   |                      |                      |

- a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.25.
- b. Computed only for a 2x2 table

The footnote below the chi-square test table (Table 5) indicates that 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.25 which is greater than 5. This means that one can be confident that one of the assumptions for a chi-square test has not been violated.

These results confirm the majority of the views in the literature as observed by Warburton and Kanabar (2016), Pourdehnad (2007), Virine and Trumper (2008), Varghese (2020) among others. Using a different population in a different context with such findings, one can see these results as validation of findings in the literature.

*H<sub>3</sub>: There is no statistically significant difference in perceptions towards project management between learners enrolled in different project management programs of study.*

A hypothesis test summary was generated to confirm whether the relationship between program of study and learners' perception is statistically significant. The results clearly show that the relationship between the two programs of study concerning their perception of the two PM constructs is statistically significant at the .05 level. In fact,  $p < .001$  as all three null hypotheses are rejected. These results support those published in the literature by Larson & Gray, 2014; Briggs, 2012; Varghese, 2020; and Sukhoo et al., 2005 among others.

## **CONCLUSIONS AND RECOMMENDATIONS**

Finally, the fifth section provides the conclusions drawn from the study and provides recommendations for practice.

Whether project management is art or science, more art or more science, in fact, depends on the skills, methods, techniques, and training applied in a given project as well as the environment (context) in which the project is carried out. Project management does not bear absolute truth from the methods and techniques that are applied. Different combination of skills is used in project management leading to the success of the project hence, it is very difficult to conclude whether project management is science or art, and which one has more weight. Projects require both technical and social applications for their success. In essence, project management requires the development of distinct technical and management skills where some maintain that the technical part of project management is scientific whereas the managerial aspect of project management is artistic. These positions are supported by the literature and corroborated by the results from the empirical activities of this study.

Most students, academics, scholars, and practitioners of project management would easily say that project management is both art and science. However, most would struggle to allocate

numerical values to either side of the debate. After all, perception is a social construct. As such it cannot be placed with any mathematical exactitude. Applying mathematical precision to project management will lead to flat-out failure. Different phases and aspects of the project lifecycle demand different or mixed-dimensional constructs. The weightage of art or science in any of the phases or aspects of the discipline and practice is circumstantial. One needs to contextualize the space, knowledge, skills, tools, and techniques needed to make the call.

The findings from this study corroborate previous research findings. Project management is not an exact science. In project management, science and art are not mutually exclusive, rather they are complementary to each other. Therefore, whether project management is art or science is a matter of debate in terms of context, skills, methods, and techniques applied. This is demonstrated by the respondents in this study. Learners enrolled in a project management program with engineering and technology orientation would view project management as more science whereas those enrolled in a project management program with business and management orientation would view the discipline and practice as more art. The beauty, in fact, lies in the context as well as the skills, methods, and techniques applied. Finally, considering project management as more art or more science also depends on similar thinking and perceptions as the findings in this study indicate. Therefore, whether project management is 60/40 in favor of art or 60/40 in favor of science, again depends on the context, skills, methods, tools, and techniques applied and needed by the project.

No project management context can be entirely technical or entirely aesthetic. Most project management practices or programs of study involve a blend of art and science. The two constructs coexist (occur together). Nevertheless, the result of the current study is one addition to the lack of consensus among authors in the debate about the constructs under study. Furthermore, the inferential statistical techniques result also confirms that the relationship between learners' perceptions and their programs of studies is statistically significant at the  $p < 05$  levels.

## **Recommendations**

The author recommends that considering project management as art or science, or more art or more science by academics, learners, institutions, or Liberians would depend on the context, skills, methods, tools, and techniques applied and needed by the project. For academics and institutions, this means considering the content, tools, and techniques emphasized in the teaching and learning spaces. For practitioners, it means considering the skills needed for the project, the roles, and the context in which the project is carried out. And for Liberians, it

means considering the content of the learning materials and the target audience for those resources.

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