The Dynamics of Students' Performance in Architectural History and Architectural Design: A Case Study of Imo State University, Owerri Nigeria. 2017-2020

Nwanguma, Ephraim Ogechi
Department of Architecture, Imo State University, Owerri. Imo State. Nigeria
Email: nwangumaephraim@imsu.edu.ng

DOI: 10.56201/wjimt.v6.no1.2022.pg116.131

Abstract

Students' performance dynamics are the patterns of behaviour between variables that impact on the teaching and learning outcome, how they interact, and relate. A healthy relationship enhances students' performance. An unhealthy relationship deters expected positive outcome. This paper investigated students' performance in Architectural history and Architectural design at various levels in Imo State University, Owerri, Nigeria between year 2017-2020. The study adapted multi-stage random sampling to select representative sample of 392 out of a total of 613 secondary data of students' performance in the two courses. The data were analysed using Statistical Packages for the Social Sciences (SPSS). The findings were that there is a significant correlation between students' performance in Architectural History and Architectural Design at all the levels, and there is no difference among students' performance in Architectural History and Architectural Design. The paper concludes that architectural design education is a manifestation of critical thinking and translation of inner order of reasoning into tangible forms. Thus, architecture students must continually be encouraged to imbibe teachings in architectural history and theory as they seek solutions to contemporary architectural problems. In the quest to impact positively on the built environment, the architecture curriculum for training future practitioners must emphasize core areas such as history and theory of architecture to better equip the student to proffer successful solutions in the interest of the society.

Keywords: *dynamics, architectural history, architectural design, students' performance.*

1. Introduction

Conceptualization of meaningful knowledge and comprehensive understanding of the subject matter in architectural design is the focus of this paper. Architectural education traditionally seeks to bridge the knowledge gap in the student architect with hierarchical arrangement of courses in the curriculum. Soliman (2017) identified three anchors of teaching and learning strategies in pedagogic design studies as teaching and learning methods, assigned tasks or study aspects, and design communication techniques. Architectural design does not gather all the theoretical and practical courses related to the architectural discipline, but is a veritable nexus of the responsibility

of the architect (Lizondo-Sevilla et al 2019, Kelly & Jamieson 2020;Sagdic &Kosova 2013). The importance and complexity of learning architectural design is not linear or unidirectional, but malti-directional. Olutunde and Olotuah (2006) and Swenarton (1987) assert that architecture plays a critical role in improving the quality of the built-environment. It further opines that due to rapid urbanisation in Nigeria, the quality of the environment has been negatively impacted on, thereby necessitating shifts in areas of emphasis of the architectural education curriculum designed to better prepare students with requisite skills and knowledge to resolve emerging environmental issues in Nigeria. It is against the aforetasted background that this paper seeks to investigate students' performance in Architectural History and Architectural Design at the Imo State University, Owerri from 2017-2020.

The research paper was underpinned with studies in dynamics. At the end of 16th century Galileo Galili used a smooth ball rolling down an inclined plane to derive the law of motion for falling bodies, which was consolidated by Isaac Newton in the 17th century in his second law of motion. The law states that "the force acting on a body is equal to the rate of change of the body's movement (Smith, 2020; Goren and Galili, 2020). The focus of this paper is to investigate the extent teaching and learning architectural history impacts on students' performance in architectural design.

The objectives of the study were to; (i) examine the extent students' performance in architectural history affects students' performance in architectural design at various levels between 2017 and 2020 at the Department of architecture, Imo State University, Owerri. (ii) investigate difference among students' performance in architectural history and architectural design at various levels between 2017 and 2020 at the Department of architecture, Imo State University, Owerri. Nigeria. The research questions were; (i) "to what extent does students' performance in architectural history affect students' performance in architectural design at various levels between 2017 and 2020 in the study area. (ii) to what extent are there difference in students' performance in architectural history and architectural design at various levels between 2017 - 2020 in the study area. The null hypotheses were: Ho1" students' performance in architectural history does not affect students' performance in architectural design at various levels between the years 2017 - 2020 in the study area; (ii) H02 "there is no difference among students' performance in architectural history and architectural design at various levels in the study area.

2. Methodology

The study was carried out in the Department of Architecture, Imo State University, Owerri, Nigeria. The data were secondary data which was made up of students' performance in Architectural history and Architectural design for years 2017 - 2018; 2018-2019; 2019-2020 for 200 level, 300 level, and 400 level. Table 1 depicts the students' population for 200 level, 300 level, and 400 level for years 2017 - 2018; 2018 - 2019; and 2019 - 2020.

Table 1: Students' Population in the Department of Architecture, Imo State University, Owerri

LEVEL	2017-2018	2018 - 2019	2019 - 2020
200L	101	92	65
300L	53	67	80
400L	49	38	68
Total	203	197	213

Source: Fieldwork (2020)

Multi-stage random sampling was adopted to select representative study sample for the study years. At the first stage of selection through lucky, dip students' performance for 2017 - 2018 and 2019 - 2020 were selected for 200 level. At the second stage through lucky dip students' performance for years 2017 - 2018; 2018-2019 were chosen for 300 level. At the third stage of sampling through lucky dip, students' performance for 400 level for years 2018 - 2019; and 2019 - 2020 were chosen for the study. A total of 392 samples were chosen out of the study population of 613.

3. Results and Discussion

Table 2: 2019 - 2020 400 Level

The frequency distribution of students' performance in Arc 431 (History and Theory of Architecture III) for 2019 - 2020 is shown in Table 2:

Tables 2: Students' Performance in Arc 431 History and Theory of Architecture 2019 to 2020

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31-40	3	4.4	4.4	4.4
	41-50	13	19.1	19.1	23.5
	51-60	24	35.3	35.3	58.8
	61-70	20	29.4	29.4	88.2
	71-80	7	10.3	10.3	98.5
	81-90	1	1.5	1.5	100.0
	Total	68	100.0	100.0	

Source: Fieldwork (2020)

It depicts that 4.4 percent of the class scored 31 - 40%; 19.1% scored 41-50%; 35.3% scored 51-60%; 29.4% of the students obtained 61-70%; 10.3% scored 71-80%; while 1.5% scored 81-90%.

Figure 1 shows the students performance in Arc 411 (Architectural Design III) for 2019 - 2020 as follows: 6.1% of the students obtained 41-50%; 71.2% scored 51-60%; 25.8% obtained 61-70%; while 3% of the students score 71-80%.

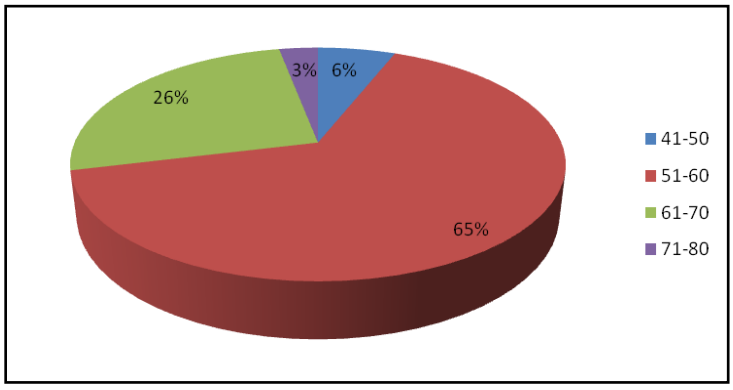

Figure 1: Students' Performance in Arc 411 (Architectural Design) for 2019-2020
Source: **Field work (2020)**

Table 3 shows the Pearson Product Moment Correlation analysis results for Arc 431 (History and Theory of architecture III), and Arc 411 (Architectural Design III) for 2019 to 2020.

Table 3: Pearson Product Moment Correlation Analysis of Students' Performance Correlation in Arc 431 (History and Theory of Architecture III) and Architectural Design III for 2019 - 2020

		Arc 431: History and theory of architecture III 2019 to 2020	Arc 411: Architectural Design III , 2019 to 2020
Arc 431: History and theory of architecture III 2019 to 2020	Pearson Correlation	1	0.056
	Sig. (2-tailed)		0.944
	N	6	4
Arc 411: Architectural Design III , 2019 to 2020	Pearson Correlation	0.056	1
	Sig. (2-tailed)	0.944	
	N	4	4

Source: Fieldwork (2020)

It indicates that p-value = 0.944> 0.05, which shows that there is a correlation between Arc 431 (History and Theory of architecture III, and Arc 411 (Architectural Design III). The Pearson's correlation analysis result indicates a weak positive relationship (0.056) between Arc 431 (History and theory of architecture III), and Arc 411 (Architectural Design III).

Table 4 shows the Levene's Test for Equality of Variances, the p-value = 0.248 < 0.05, we fail to reject the null test and conclude that the result equal variance is assumed.

Table 4: Independent Samples Test Results for Equality of Variance

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
observation	Equal variances assumed	1.553	0.248	-0.584	8	0.575
	Equal variances not assumed			-0.508	3.989	0.638

Source: Fieldwork (2020)

Based on independent samples test which shows that p-value = 0.575 < 0.05, therefore we fail to reject the null hypothesis and conclude that there is no significant difference in students' performance among History and theory of Architecture III and Architectural Design III from 2019 to 2020.

2018 - 2019 400 Level

The frequency distribution of students' performance in Arc 431 (History and Theory of Architecture III) for 2018 - 2019 is shown in Figure 2 as follows: 5.3% of students obtained 31-40%; 7.9% scored 41-50%; 42.1% scored 51-60%; 31.6% obtained 61-70%; while 13.2% scored 71-80%. The students' performance in Arc 411 (Architectural Design III) for the year 2018 - 2019 is depicted in Table 5.

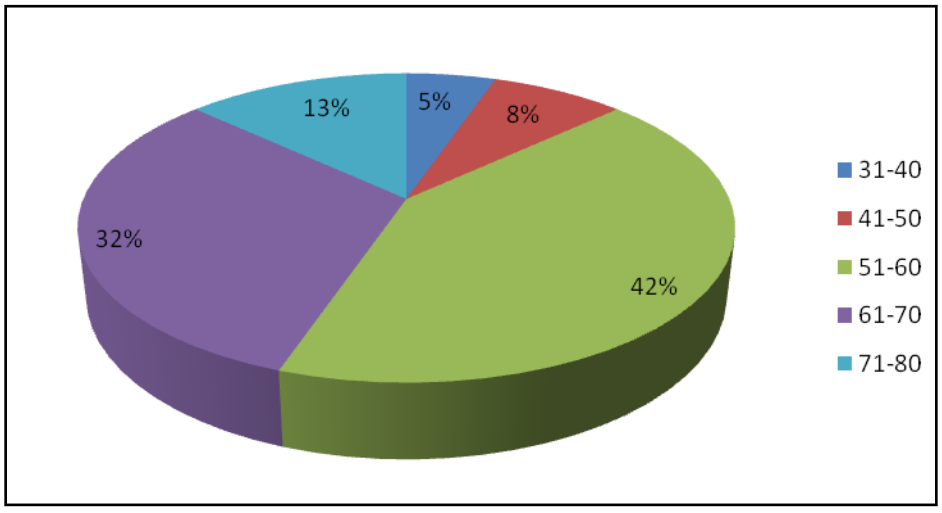

Figure 2: Students' Performance in Arc 431 (History and Theory of Architecture III) for year 2018 - 2019.

Source: Fieldwork (2020)

It indicates that 7.8% obtained 31-40%; 27.3% scored 41-50%; 44.2% scored 51-60%; while 20.8% obtained 61-70%.

The students' performance in Arc 411 (Architectural Design III) for the year 2018 - 2019 is depicted in Table 5:

Table 5: Students' Performance in Arc 411 Architectural Design III 2018 to 2019

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31-40	6	7.8	7.8	7.8
	41-50	21	27.3	27.3	35.1
	51-60	34	44.2	44.2	79.2
	61-70	16	20.8	20.8	100.0
	Total	77	100.0	100.0	

Source: Fieldwork (2020)

It indicates that p-value = 0.265> 0.05, which shows that there is a significant correlation between Arc 431(History and theory of architecture), and Arc 411 (Architectural Design III). The Pearson's correlation analysis results indicates a strong positive relationship (0.735) between Arc 431(history and theory of Architecture III), and Arc 411 (Architectural Design III) for 2018-2019. Table 6 shows the Pearson Product Moment Correlation analysis results for Arc 431 (History and Theory of architecture), and Arc 411 (Architectural Design III) for 2018 to 2019.

Table 6: Pearson's Product Moment Correlation Analysis of Students' Performance Correlation in Arc 431 (History and Theory of Architecture IV) and 411 (Architectural Design III for 2018 - 2019

		Arc 431: History and theory of architectural, 2018 to 2019	Arc 411: Architectural Design III , 2018 to 2019
Arc 431: History and theory of architectural, 2018 to 2019	Pearson Correlation	1	0.735
	Sig. (2-tailed)		0.265
	N	5	4
Arc 411Architectural Design III , 2018 to 2019	Pearson Correlation	0.735	1
	Sig. (2-tailed)	0.265	
	N	4	4

Source: Fieldwork (2020)

Table 7 above shows the Levene's Test for Equality of Variances, the p-value = 0.351< 0.05, we fail to reject the null hypothesis and conclude that the result of equal variance is assumed.

Table 7: Independent Samples Test for Equality of Variance Result of Students' Performance in Arc 431 and Arc 411 for 2018 - 2019

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
observation	Equal variances assumed	0.998	0.351	-1.949	7	0.092
	Equal variances not assumed			-1.812	4.309	0.139

Source: Fieldwork (2020)

Based on independent samples test which shows that p-value = 0.092< 0.05, therefore we fail to reject the null hypothesis and conclude that there is no significant difference in students' performance among History and theory of Architecture III and Architectural Design III for 2018 to 2019.

2018 - 2019: 300 Level

A total of 67 results were returned for 300 level students in Arc 331 (History and Theory of Architecture III) for 2018 - 2019 as shown on Table 8:

Table 8: Students' Performance in Arc 331 History and theory of architectural, 2018 to 2019

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	41-50	32	47.8	47.8	47.8
	51-60	33	49.3	49.3	97.0
	61-70	2	3.0	3.0	100.0
	Total	67	100.0	100.0	

Source: Fieldwork (2020)

It indicates that 47.8% obtained 41-50%; 49.3% scored 51-60%; while 3% obtained 61-70%.

The students' performance in Arc 311 (Architectural Design II) is shown in Figure 3:

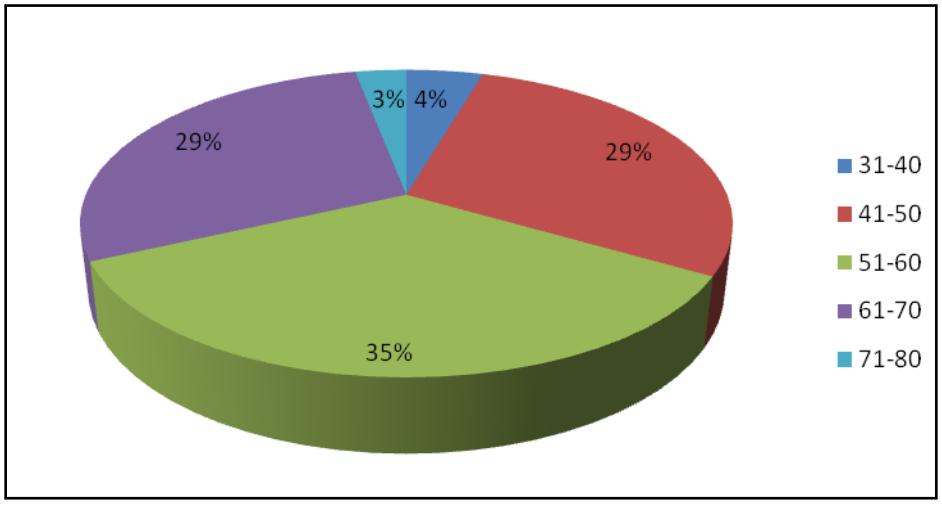

Figure 3: Students' Performance in Arc 311 (Architectural Design II) in 2018 - 2019.

Source: Fieldwork (2020)

It indicates 4.5% scored 31-40%; 28.8% scored 41-50%; 34.8% obtained 51-60%; 28.8% of the class scored 61-70%; while 3% obtained 71-80%.

Table 9 shows the Pearson Product Moment Correlation Analysis result for Arc 331 (History and theory of Architecture II), and Arc 311 (Architectural Design II) for 2018 -2019.

Table 9: Pearson's Product Moment Correlation Analysis Result of Students' Performance in Arc 331(History and Theory of Architecture) and 311 (Architectural Design II) for 2018 to 2019

		Arc 331: History and theory of architectural, 2018 to 2019	Arc 311: Architectural Design II , 2018 to 2019
Arc 331: History and theory of architectural, 2018 to 2019	Pearson Correlation	1	0-.633
	Sig. (2-tailed)		0.564
	N	3	3
Arc 311: Architectural Design , 2018 to 2019	Pearson Correlation	0-.633	1
	Sig. (2-tailed)	0.564	
	N	3	5

Source: Fieldwork (2020)

It indicates that P-value = 0.564>0.05, which shows that there is a significant correlation between Arc 431 (History and theory of Architecture II), and 311 (Architectural Design II). The Pearson's correlation analysis results indicates a strong negative relationship (-0.633) between Arc 331 History and Theory of Architecture II and Arc 311(Architectural Design II) for 2018 - 2019.

Table 10 shows Levene's Test for Equality of Variances, the P-value - 0.138<0.05, we fail to reject the null hypothesis and conclude that the result of equal variance is assumed.

Table 10: Independent Samples Test for Equality of Variance Result of Students' Performance in Arc 331 and Arc 311 for 2018 - 2019

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
observation	Equal variances assumed	2.929	0.138	0.962	6	0.373
	Equal variances not assumed			0.823	2.781	0.475

Source: Fieldwork (2020)

Based on independent samples test which shows that P-value = 0.373<0.05, therefore we fail to reject the null hypothesis and conclude that there is no significant difference among students' performance in Arc 331 History and theory of Architecture, and Arc 311 (Architectural Design II) for 2018 - 2019.

The Frequency distribution of students' performance in Arc 331 (History and Theory of Architecture II) for 2017 - 2018 is shown in figure 4:

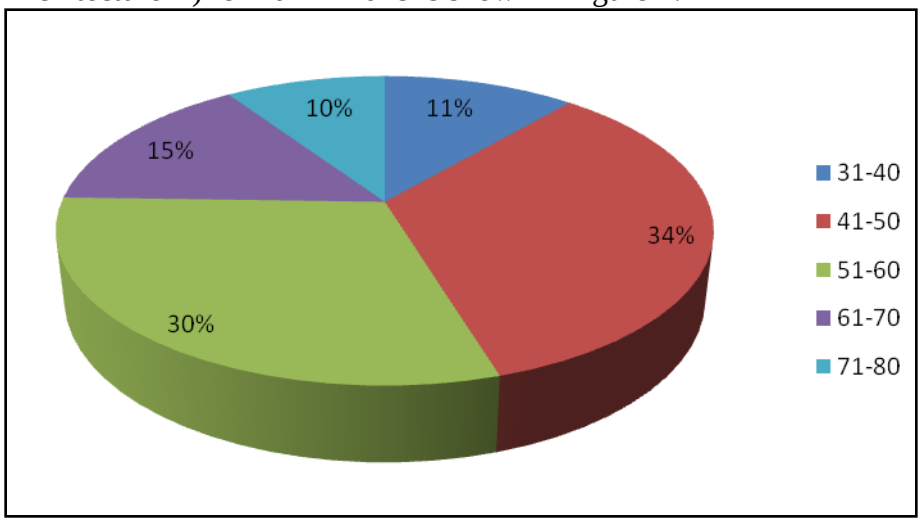

Figure 4: Students' Performance in Arc 311 (Architectural Design II) in 2017 - 2018.

Source: Fieldwork (2020)

It indicates that 11.3% of the students obtained 31-14%; 34.0% scored 41-50%; 30. 2% obtained and 51-60%; 15.1% scored 61-70%; while 9.4% obtained 71-80%.

The students' performance in Arc 311 (Architectural Design II) for 2017 - 2018 is shown on Table 11.

Table 11: Students' Performance in Arc 311 Architectural Design , 2017 to 2018

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31-40	1	2.4	2.4	2.4
	41-50	8	19.0	19.0	21.4
	51-60	26	61.9	61.9	83.3
	61-70	6	14.3	14.3	97.6
	71-80	1	2.4	2.4	100.0
	Total	42	100.0	100.0	

Source: Fieldwork (2020)

It indicates that 2.4% obtained 31-40%; 19.0% scored 41-50; 61.9% obtained 51-60%; 14.3% scored 61-70, while 2.4% obtained 71-80%.

Table 12 shows the Pearson Product Moment Correlation Analysis result for Arc 331 (History and theory of Architecture III), and Arc 311 (Architectural Design III) for 2017 -2018.

TABLE 12: Pearson's Product Moment Correlation Analysis of Students' Performance in Arc 331 (History and Theory of Architecture III) and 311 (Architectural Design III) for 2017 to 2018

		Arc 331: History and theory of architecture 2017 to 2018	Arc 311: Architectural Design 2017 to 2018
History and theory of architectural, arc 331 : 2017to 2018	Pearson Correlation	1	0.704
	Sig. (2-tailed)		0.184
	N	5	5
Architectural Design , 2017 to 2018	Pearson Correlation	0.704	1
	Sig. (2-tailed)	0.184	
	N	5	5

Source: Fieldwork (2020)

It indicates that P-value = 0.184>0.05, which shows that there is a significant correlation between Arc 331 (History and Theory of Architecture III), and 311 (Architectural Design III) in 2017 - 2018. The Pearson's correlation analysis results indicates a strong positive relationship (-0.704) between Arc 331 (History and Theory of Architecture III) and Arc 311(Architectural Design III) for 2017 - 2018.

Table 13 shows Levene's Test for Equality of Variances, the P-value - 0.550<0.05, we fail to reject the null hypothesis and conclude that the result of equal variance is assumed.

Table 13: Independent Samples Test for Equality of Variance Result of Students' Performance in Arc 331 and Arc 311 for 2017 - 2018

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
observation	Equal variances assumed	0.389	0.550	0.413	8	0.691
	Equal variances not assumed			0.413	6.420	0.693

Source: Fieldwork (2020)

Based on independent samples test which shows that P-value = 0.691<0.05, therefore we fail to reject the null hypothesis and conclude that there is no significant difference among students' performance among History and Theory of Architecture III, and Architectural Design III in 2017 - 2018.

2019 - 2020: 200 Level

A total of 65 results were returned for 200 level students in Arc 231 (History and Theory of Architecture I for 2019 - 2020 as shown in Figure 5.

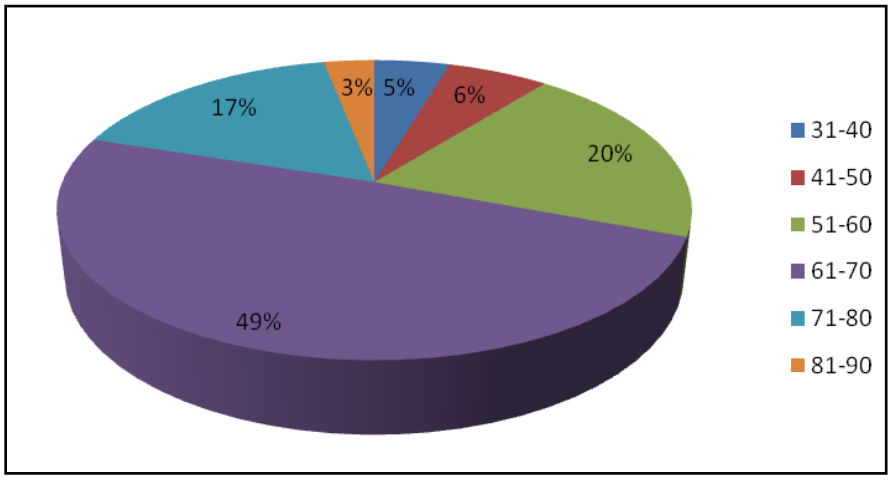

Figure 5: Students' Performance in Arc 231 (History and theory of Architecture I) in 2019 - 2020
Source: Fieldwork (2020)

It indicates that 4.6% of the students obtained 31-40%; 6.2% scored 41-50%; 13% scored 51-60%; 32% obtained 61-70%; 11% scored 71-80%; while 2% obtained 81-90%.

The students' performance in Arc 211 (Architectural Design 1) is depicted in Table 14:

Table 14: Students' Performance in Arc 211Architectural Design I in 2019 to 2020

Frequency	Percent	Valid Percent	Cumulative Percent
9	17.6	17.6	17.6
9	17.6	17.6	35.3
17	33.3	33.3	68.6
12	23.5	23.5	92.2
4	7.8	7.8	100.0
51	100.0	100.0	

Source: Fieldwork (2020)

It indicates that 17.6% of the students obtained 31-40%; 17.6% scored 41-50%; 33.3% obtained 51-60%; 23.5% of the students obtained 61-70%, while 7.8% scored 71-80%.

Table 15 shows the Pearson's Product Moment Correlation Analysis result for Arc 231 (History and Theory of Architecture I), and Arc 211 (Architectural Design I) for 2019 -2020.

Table 15: Pearson's Product Moment Correlation Analysis of Students' Performance in Arc 231 (History and Theory of Architecture I) and Arc 211 (Architectural Design I) in 2019 to 2020

		History and theory of architectural, arc 231 : 2019to 2020	Architectural Design , 2019to 2020
History and theory of architectural, arc 231 : 2019to 2020	Pearson Correlation	1	.312
	Sig. (2-tailed)		.609
	N	6	5
Architectural Design , 2019to 2020	Pearson Correlation	.312	1
	Sig. (2-tailed)	.609	
	N	5	5

Source: Fieldwork (2020)

It indicates that P-value = 0.609>0.05, which shows that there is a significant correlation between Arc 231 (History and Theory of Architecture I), and 211 (Architectural Design I) for 2019 - 2020. The Pearson's correlation analysis results indicates a positive relationship (-0.312) between Arc 231 (History and Theory of Architecture I) and Arc 211(Architectural Design I) for 2019 - 2020.

Table 16 shows the Levene's Test for Equality of Variances, the P-value - 0.242<0.05, we fail to reject the null hypothesis and conclude that the result of equal variance is assumed.

Table 16: Independent Samples Test for Equality of Variance Result of Students' Performance in Arc 231 (History and Theory of Architecture I) and Arc 211 (Architectural Design I) for 2019 - 2020

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
observation	Equal variances assumed	1.567	.242	.116	9	.910
	Equal variances not assumed			.125	6.964	.904

Source: Fieldwork (2020)

Based on independent samples test which shows that P-value = 0.910>0.05, therefore we fail to reject the null hypothesis and conclude that there is no significant difference among students' performance in Arc 231(History and Theory of Architecture I), and Arc 211(Architectural Design I) for 2019 - 2020.

2017 - 2018: 200 Level

A total of 101 results were returned for 200 level students in Arc 231 (History and Theory of Architecture I) for 2017 - 2018 as shown in Figure 6.

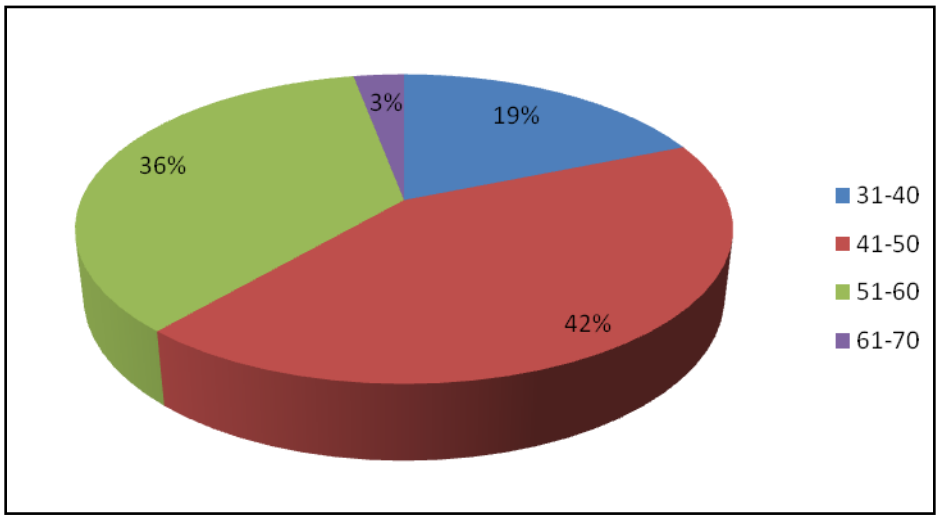

Figure 6: Students' Performance in Arc 231 (History and theory of Architecture I) in 2017 - 2018
Source: Fieldwork (2020)

It indicates that 18.8% of the students obtained 31-40%; 42.6% scored 41-50%; 35.6% obtained 51-60%; while 3% obtained 61-70%.

The frequency distribution of the performance of the students' in Arc 211 (Architectural Design 1) in 2017 - 2018 is depicted in Table 17.

Table 17: Students' Performance in Arc 211 Architectural Design , 2017 to 2018

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	31-40	18	19.6	19.6	19.6
	41-50	27	29.3	29.3	48.9
	51-60	35	38.0	38.0	87.0
	61-70	12	13.0	13.0	100.0
	Total	92	100.0	100.0	

Source: Fieldwork (2020)

It indicates that 19.6% of the students obtained 31-40%; 29.3% scored 41-50%; 38.0% obtained 51-60%, while 13.0% score 61-70%.

Table 18 shows the Pearson's Product Moment Correlation Analysis result for Arc 231 (History and Theory of Architecture I), and Arc 211 (Architectural Design I) for 2017 -2018.

Table 18: Pearson's Product Moment Correlation Analysis of Students' Performance in Arc 231 (History and Theory of Architecture I) and Arc 211 (Architectural Design I) in 2017 to 2018

		Arc 231: History and Theory of architectural 2017 to 2018	Arc 211: Architectural Design 2017to 2018
History and theory of architectural, arc 231 2017 to 2018	Pearson Correlation	1	.876
	Sig. (2-tailed)		.124
	N	4	4
Architectural Design , 2017to 2018	Pearson Correlation	.876	1
	Sig. (2-tailed)	.124	
	N	4	4

Source: Fieldwork (2020)

It indicates that P-value = 0.124>0.05, which shows that there is a significant correlation between Arc 231 (History and Theory of Architecture I), and 211 (Architectural Design I) for 2017 - 2018. The Pearson's correlation analysis results indicates a positive relationship (0.876) between Arc 231 (History and Theory of Architecture I) and Arc 211(Architectural Design I) for 2017- 2018.

Table 19 shows the Levene's Test for Equality of Variances, the P-value - 0.179<0.05, we fail to reject the null hypothesis and conclude that the result of equal variance is assumed.

Table 19: Independent Samples Test for Equality of Variance Result of Students' Performance in Arc 231 (History and Theory of Architecture I) and Arc 211 (Architectural Design I) in 2017 - 2018

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
observation	Equal variances assumed	2.315	.179	.219	6	.834
	Equal variances not assumed			.219	4.729	.836

Source: Fieldwork (2020)

Based on independent samples test which shows that P-value = 0.834>0.05, therefore we fail to reject the null hypothesis and conclude that there is no significant difference among students' performance in Arc 231(History and Theory of Architecture I), and Arc 211(Architectural Design I) for 2017 - 2018.

4. Conclusion and Recommendations

The study investigated students' performance in Architectural History and Theory and Architectural Design at various levels in Imo State University, Owerri, Nigeria between 2017 - 2020. The data were analysed using Statistical Packages for the social Sciences (SPSS). Pearson's Product Moment Correlation analysis was used to investigate the nature of relationship among students' performance in the two courses, while Independent Samples Test for equality of variances result of students' performance in the two courses for years 2017 - 2020 to conclude the findings. The study concludes that there is correlation in students' performance in Architectural History and Architectural Design at the Imo State University, Owerri between 2017 - 2020. The study further concludes that there is no significant difference among students' performance in History and Theory of Architecture and Architectural Design within the study period. History and theory of architecture stimulates critical thinking and successful translation of inner order of reasoning into tangible forms.

The implication of the findings is that architecture students must continually be encouraged to imbibe teachings in architectural history and theory, in order to perform optimally in architectural design which is the nucleus of the architect's responsibility in practice.

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