



## **Performance of Ceramic Students with Different Backgrounds at Kwame Nkrumah University of Science and Technology in Ghana**

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**Abstract:** This study assessed the performance of ceramic students with different backgrounds at Kwame Nkrumah University of Science and Technology in Kumasi, Ghana, using the cross-sectional design. A total of 170 students were sampled using a simple random sampling technique. A questionnaire yielded the Cronbach's Alpha of 0.89 which confirmed the required reliability of the instrument. Data was treated using t-test and ANOVA so as to establish the difference in performance by learners categorized according to their backgrounds. The study established no significant difference in performance between students with arts and those without arts background in SHS. The study did not establish difference in performance by students categorized according to their genders. The performance of second year students was significantly lower than that of the first and third and fourth years combined. This might be due to the fact that second years curriculum is the beginning of studio practice where students struggle to learn how to throw on the potter's wheel and begin producing arts works. The study recommends that SHS teachers should enhance the teaching strategies of arts studies at the SHS level so that students who went through the studies might even outperform those who did not take the subject at the SHS level. Students in second year of studies need more attention as they navigate their path in the manipulation of clay for them to perform better in their studies before they join the two final years of ceramic studies.

**Keywords:** Ceramics; Performance; Academic Background; Assessment; Ghana.

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## Introduction

Ceramics is commonly defined as the art that deals with the design and fabrication of objects made from fired clay (Musikant, 1991) and it is arguably the most hands-on art medium. It holds the memories of every twist, bend and fingerprint that touches it while it is malleable, making it perfect to convey emotions (Hricovsky, 2022). Like any other country, Ghana has a well-defined educational structure that shapes students from kindergarten to tertiary level. According to Bodjawah et al. (2019) art, whether visual, text or performance, plays a key role in the understanding of any subject matter. Researchers therefore need to take interest in the academic performance of artists such as ceramic artist during their tertiary education.

Hulleman et al. (2016) reiterated that for one to perform better and engage with learning and attendant issues, there must be academic background motivation. This means that artists must be on top of their practice to ensure that their education is well informing and is capable of transforming the society. To do this, there is a need to study various arts disciplines such as ceramics.

In Ghana, educational system consists of six years of primary education and three years of Junior High education after which pupils write the Basic Education Certificate Examination (BECE) before entering the Senior High Schools (SHS) for three years. At the SHS level, students specialize in General Science, Business, General Arts, Agricultural Science, Technical, Home Economics or Visual Art. These specializations define the program trajectory at the tertiary level. For example, those who studied Visual Arts at SHS could not choose science-related programs or engineering. Likewise, science students could not choose arts at the tertiary level. However, since 2013, there has been a review of admission criteria for arts related program such as ceramics that allows non-arts students from SHS to study Ceramics, the reason being that the study of ceramics has been classified under applied arts.

While Nortey et al. (2013) revealed that ceramic students struggle with key concepts of arts studies such as drawing, conceptualization and art history, Nortey and Bodjawah (2014) confirmed from empirical studies that most students in arts studio programs have enormous challenges with ideation, conceptualization and infrastructure just as understanding the clay materials. Hence, the need to assess how students with different backgrounds

perform during their ceramic studies at the tertiary level. With such transition from the senior high level to the tertiary level, there is a significant cause of anxiety and stress when students transit from senior high school to university studies. If not well managed, the anxiety and stress may affect students' performance and achievement at the tertiary level (Lowe & Cook, 2003; Yorke & Longden, 2004).

## Nature of Programs at SHS

The Senior High School (SHS) education system in Ghana is discipline-oriented. Successful candidates from the three-year Junior High School (JHS) program are stratified into a three-year discipline program at the SHS level. At the end of three years of SHS education, students sit for an external examination and only successful candidates continue with tertiary education to study a profession such as ceramics.

The programs at the SHS have core and elective subjects. The core subjects are mandatory for every student irrespective of the elective course discipline. While the elective subjects distinguish the various course disciplines, the core subjects are English, Mathematics, Integrated Science and Social Studies. For electives, in the sciences, students study mathematics, chemistry, physics and biology. Business discipline has business management, costing and accounting and the General Arts program has Economics, Geography, English Literature, Elective Mathematics, History, Twi and Government. The Home Economics discipline has Management in Living, General Knowledge in Art, Clothing and Textiles and Food and Nutrition. The Visual Art program is the only one with Fine Art subjects such as painting, picture making, sculpture, graphic design and ceramics. These subjects demand appropriate infrastructure, requisite materials, studios and equipment to facilitate the understanding and development of artistic skills. The ceramic subject, for example, requires a potter's wheel for throwing basic table wares, a studio for hand-building activities, a kiln for firing and a laboratory to run test on different clay soils.

This study is justified by three reasons. First, the results provide vital information to policy formulation on how to teach students who do not have a background in ceramics but are studying the subject. Secondly, it offers the opportunity to determine challenges faced by students of diverse backgrounds and their performance in studying the

subject. Nortey et al (2013) explained that previously, when first years under the KNUST Industrial Arts program were required to specialize in their second year, academic backgrounds played key roles in their specialization decisions whether to choose ceramics, textiles, fashion or metal product design in their second year. The study also revealed that there were less females interested in studying ceramics as opposed to textiles and fashion. Finally, it provides the opportunity for institutions running a ceramic program to be well informed on background studies and their influence on a good performance at the tertiary level. It also provides students with equitable learning opportunities. This paper, therefore, assessed the performance of students with different backgrounds in the study of ceramics at the University level.

### **Theoretical Underpinnings**

This paper is underpinned by the expectancy-value theory by Eccles and Wigfield (2002) which looks at the capabilities of students to perform a task, whether with a background knowledge or not. The theory fits the phenomenon under study because it places value on the intrinsic, utility and personal importance of students' performance. The theory interrogates such questions as "how much can one's background influence the study of ceramics" and "how much is one motivated to study ceramics." The theory relates to the study as it looks at different perspectives to background motivations and their influence on academic performance of students studying a specialized field such as ceramics. According to Kuncel et al., (2004), cognitive abilities and background knowledge are good predictors of academic success.

### **Methodology**

#### **Design**

The study employed the quantitative research approach. Particularly, the cross-sectional design was used to guide the study.

#### **Population and Sampling**

The study was conducted at the Kwame Nkrumah University of Science and Technology in Kumasi, Ghana. The target population for the study was 196 BSc and BFA ceramic students in their 1<sup>st</sup> to 4<sup>th</sup> year. A total of 170 students were sampled using a simple random sampling technique.

#### **Validity, Reliability**

The data collection tool was validated at the Departmental Board to ensure it contained relevant

items to solicit the needed responses. The survey was piloted and it yielded the Cronbach's Alpha of 0.89 which confirmed the required reliability of the instrument.

### **Statistical Treatment of Data**

Data was treated using the t-test and ANOVA so as to establish the difference in performance by learners categorized according to their academic background, gender and year of study. The first and second research questions were analyzed through t-test while the third research question was analyzed through ANOVA. The performance of students was placed into four categories: 0-49 = very low (1), 50-59 = low (2), 60-69 = high (3) and 70-100 = very high (4). The mean score was interpreted as follows: 3.50-4.00 = very high, 2.50-3.49 = high, 1.50-2.49 = low and 1.00-1.49 very low.

### **Ethical Considerations**

Ethical clearance was sought from the Department of Industrial Arts Board to secure an approval to involve ceramic students within the 2021/2022 academic year. The students were oriented on the objective of the study and right to withdraw at any time. No respondent was coerced into the study.

### **Results and Discussion**

This section presents the results and discussion of the study. Presentation of results started with sample characteristics.

#### **Sample Characteristics**

The study sampled 170 respondents of which 61 (35.88%) offered ceramics and 109 (64.12%) did not offer ceramics at the SHS level. In terms of gender, 114 (67.06%) were males while 109 (32.94%) were females. Out of the 170 respondents, 58 (34.12%) were first years, 76 (44.71%) were second years, 7 (4.12%) were third years and 29 (17.06%) were fourth years.

**Research Question 1:** What is the cumulative weight average of students under investigation based on their academic background?

This research question sought to establish the cumulative weight average of students under investigation based on their academic background: Those who studied ceramics at Senior High School (SHS) and those who did not. The research question called for testing of the following null hypothesis: *There is no significant difference in the cumulative weight average of students under investigation based on their academic background.* Table 1

indicates that 61 students took ceramic studies at their SHS level while 109 students did not take the subject. The table further indicates the mean score of 2.7049 for those who took Ceramic studies at their SHS level of education and the mean score of

2.7248 for those who did not take the subject at the SHS Level. The mean score of both groups was at the range of 2.50 to 3.49 which suggests that both groups had a high score.

**Table 1: Group Statistics on CWA Based on Academic Background**

Ceramics at JHS Level	N	Mean	Std. Deviation	Std. Error Mean
Yes	61	2.7049	.76036	.09735
No	109	2.7248	.76825	.07359

**Table 2: Independent Sample t-test on CWA Based on Academic Background**

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
CWA	Equal variances assumed	.087	.768	-.162	168	.871	-.01985	.12239	-.26148	.22178
	Equal variances not assumed			-.163	125.403	.871	-.01985	.12204	-.26137	.22166

**Table 3: Group Statistics on CWA Based on Gender**

GENDER	N	Mean	Std. Deviation	Std. Error Mean
Male	114	2.7895	.79237	.07421
Female	56	2.5714	.68376	.09137

**Table 4: Independent Sample t-test on CWA Based on Gender**

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
CWA	Equal variances assumed	.364	.547	1.762	168	.080	.21805	.12378	-.02632	.46241
	Equal variances not assumed			1.852	125.019	.066	.21805	.11771	-.01492	.45101

Table 2 further indicates a Sig. of .871 which is greater than the critical value (.05) meaning that the null hypothesis is rejected, thus maintaining that the two groups did not have a significant difference in their performance as their mean Cumulative Weighted Average scores were similar. Result shows that background information did not determine the performance of students under investigation. This is contrary to the study of Hulleman et al. (2016) which established that background knowledge determines performance of students in education, psychology and social sciences. Furthermore, Eccles and Wigfield (2002) cited the expectancy theory which made it explicit that background information having influence on performance depends on other factors such as capabilities of the students.

Therefore, the established lack of academic background influence on students' performance is in harmony with the previous literature.

**Research Question 2:** What is the cumulative weight average of students under investigation based on their gender?

This research question sought to establish the cumulative weight average of students under investigation based on their gender. The research question called for testing of the following null hypothesis: *There is no significant difference in the cumulative weight average of students under investigation based on their gender.* Table 3 indicates that 114 students were males while 56 students were females. The table further indicates

the mean score of 2.7895 for males and 2.5714 for females. The mean score of both groups was at the range of 2.50 to 3.49 which suggests that both groups had a high score.

Table 4 further indicates a Sig. of .80 which is greater than the critical value (.05) meaning that the null hypothesis is rejected, thus maintaining that the two groups did not have a significant difference in their performance as their mean Cumulative Weighted Average scores were similar. Interestingly, in other disciplines outside the arts fraternity,

studies indicated that females have a stronger motivation for academic activities than males (Asimaki & Vergidis, 2013; Carvalho, 2016). Furthermore, a review of CWAs in ceramics shows that females performed better than their male counterparts. This is contrary to what Richardson and Watt (2007) established that females in male dominated programs were more often intimidated by their male counterparts who actually performed better.

**Table 5: Descriptive Statistics on CWA Based on Year of Study**

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
1 <sup>st</sup> Year	58	2.8103	.73644	.09670	2.6167	3.0040
2 <sup>nd</sup> Year	76	2.5000	.62183	.07133	2.3579	2.6421
3 <sup>rd</sup> and 4 <sup>th</sup> Year	36	2.8333	.81064	.13511	2.5591	3.1076
Total	170	2.6765	.71834	.05509	2.5677	2.7852

**Table 6: ANOVA on CWA Based on Year of Study**

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.292	2	2.146	4.322	.015
Within Groups	82.914	167	.496		
Total	87.206	169			

**Table 7: Multiple Comparison on CWA Based on Year of Study**

(I) Year	(J) Year	Mean		Sig.	95% Confidence Interval	
		Difference (I-J)	Std. Error		Lower Bound	Upper Bound
First	Second	.31034*	.12285	.012	.0678	.5529
	Third	-.02299	.14950	.878	-.3182	.2722
Second	First	-.31034*	.12285	.012	-.5529	-.0678
	Third	-.33333*	.14256	.021	-.6148	-.0519
Third	First	.02299	.14950	.878	-.2722	.3182
	Second	.33333*	.14256	.021	.0519	.6148

\*. The mean difference is significant at the 0.05 level.

**Research Question 3:** What is the cumulative weight average of students under investigation based on their year of study?

This research question sought to establish the cumulative weight average of students under investigation based on their year of study. First and second years stood on their own while third and fourth years were combined since the two groups had the lowest number of respondents, thus, combining them would avoid them being outnumbered by the rest of groups. The research question called for testing of the following null hypothesis: There is no significant difference in the

cumulative weight average of students under investigation based on their year of study.

Table 5 indicates the mean score of 2.8103 for first years, 2.5000 for second years and 2.8333 for third and fourth years combined. The overall mean score was 2.6765 and the mean score for all groups was at the range of 2.50 to 3.49 which suggests that all groups had a high score. The Sig. of .015 in table 6 suggest a significant difference in mean scores by various groups under investigation. Therefore, the null hypothesis was rejected, maintaining that there is a significant difference in the cumulative weight average of students under investigation based on their year of study.

The multiple comparison results in table 7 indicates a significant difference between first (2.8103) and second (2.5000) year (Sig. = .012) and between third and fourth years combined (2.8333) and second (2.5000) year (Sig=.021). Therefore, second years were outperformed by first as well as third and fourth years combined. The reason for second years being outperformed by the rest levels could be that second year curriculum is the beginning of studio practice where students are required to learn how to throw on the potter's wheel and begin producing arts works. Students therefore struggle and have challenges in manipulating clay and other materials. This might have affected their output and obviously their performance. The outperformance of first over second years could be supported by James et al. (2010) who established that first-year students, compared to other academic levels, have more explicit objectives, are more consistent in working throughout the semester and they manage their academic workload more strategically, despite feeling overwhelmed by the task they have to complete.

## Conclusions and Recommendations

### Conclusions

Base on the findings, the study came up with the following conclusions:

First, though background knowledge is thought to be a determining factor for students' performance in higher levels, there was no significant difference in performance between students with arts and those without arts background in SHSs as students with other backgrounds in their SHS studies competed favorably with those that studied arts during their SHS. Therefore, SHS background knowledge did not affect the performance of students at the university level.

Unlike previous study findings, the study did not establish difference in performance by students categorized according to their genders. Therefore, gender difference did not hinder the performance of students in ceramic studies.

The performance of second year students was significantly lower than that of the first and third and fourth years combined. This might be due to the fact that second years struggled yet performed poorly since their curriculum is the beginning of studio practice where students are required to learn how to throw on the potter's wheel and begin producing arts works.

### Recommendations

The study recommends that SHS teachers should enhance the teaching strategies of arts studies at the SHS level so that students who went through the studies might even outperform those who did not take the subject at the SHS level. Students in their second year of studies need more attention as they navigate their path in the manipulation of clay for them to perform better in their studies before they join the two final years of ceramic studies.

### References

- Asimaki, A. & Vergidis, K.D. (2013). Detecting the Gender Dimension of the Choice of the Teaching Profession Prior to the Economic crisis and IMF Memorandum in Greece: A Case Study, *International Educational Studies*, 6:4, 140-153.
- Bodjawah, E.K., Nortey, S. & Bofo, K.K (2019), Modernism and Reforms in Contemporar Ghanaian Art Education, *International Journal of Education through Art*, 15:2, 45-56.
- Carvalho, R.G.G (2016). Gender differences in academic achievement: The Mediating role of personality. *Personality and Differences*, 94: 54-58.
- Eccles, J.S., & Wigfield, A. (2002). Motivational Beliefs, Values, and Goals, *Annu. Rev. Psychol*, 53, 109-132
- Hulleman, C. S., Barron, K. E., Kosovich, J. J., & Lazowski, R. A. (2016). Student motivation: Current theories, constructs, and interventions within an expectancy-value framework. In A. A. Lipnevich, F. Preckel, & R. D. Roberts (Eds.), *Psychosocial skills and school systems in the 21st century: Theory, research, and practice* (pp. 241–278).
- Hricovsky, Risa (2022) De-skilled Ceramics in Contemporary Art, *NCECA Journal*, 42, 134-136
- James, R., Krause, K, & Jennings, C. (2010). The First-Year Experience in Australian Universities: Findings from 1994-2009: Melbourne, The University of Melbourne, Centre of Study of Higher Education
- Kuncel, N.R., Hezlett, S.A., & Ones, D.S. (2004). Academic performance, Career Potential, Creativity, and Job Performance: Can one

- construct predict them all? *J. Person. Soc. Psychol*, 86, 148-161
- Lowe, H., and Cook, A. (2003). Mind the Gap: Are Students prepared for Higher Education? *J. Furth. High. Educ.* 27, 53-76
- Musikant, S. (1991). What every engineer need to know about Ceramics, New York: Marcel Dekker Publishers.
- Nortey, S & Bodjawah, E.K. (2014). Submission of Art Studio Assignments: Students Experience, *Journal of Science and Technology*, 34:3, 88-99.
- Nortey, S., Opoku-Amankwah, K. & Bodjawah, E. K. (2013). Factors affecting low ceramics specialization decisions in the KNUST Industrial Art Degree Programme, *Journal of Education through Art*, 9:2, 205-218.
- Richardson, P.W. & Watts, H.M.G. (2007). Who chooses Teaching and Why? Profiling Characteristics and Motivations across Three Australian Universities, *Asia Pacific Journal of Education*, 34:1, 27-56.
- Yorke, M. & Longden, B. (eds.). (2004). Retention and Student Success in Higher Education, Buckingham: Society for Research into Higher and Open University Press.