Demographic Factors and Students' Academic Achievement in Tertiary Institutions in Ghana: A study of Wa Polytechnic

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Abstract
Academic performance manifested in the class obtained is the indicator or the performance measure of academic achievement. However, the variation in achievement scores among students is indicative that there exist some factors that influence this situation. This study sought to investigate the influence of some demographic factors on students' academic performance in tertiary institutions in Ghana. The study used primary data collected from graduating students of Wa Polytechnic. Both descriptive and explanatory techniques were used for the study. Simple regression analysis was employed to determine among others the combined effect of age and sex on academic performance. Statistical tests of significance were performed to determine the models reliability at predicting future outcomes. Tables and graphs were used to present these findings. Key findings of the study revealed that both age and sex were positively related to the class obtained. However, the coefficient of sex was statistically significant whereas that of age was not significant. Also, an increase (decrease) in age of male will decrease (increase) academic performance by that margin more than their female counterparts. The novel contribution of this study is to examine the role of the combined effect of age and sex on academic performance. Therefore, it is fit for counselors and policy makers to consider these background attributes in assessing and projecting the outcomes of students' academic performance.
Keywords: Age, sex, demographic characteristics, polytechnics

1. Introduction
Academic performance of students in tertiary institutions in Ghana has become an issue of interest with the proliferation of private tertiary institutions. The importance of academic success cannot be undermined anywhere in the world. This is because academic success is strongly linked to the positive outcomes valued by society. With high levels of education adults who are academically successful are more likely to be employed. Tertiary education is not an end in itself but a means to an end.

Academic performance manifested in the class obtained is the indicator or the performance measure of academic achievement. Quality of education according to Nasir (2012) is mostly assessed on the basis of academic performance, and achievement scores are considered to be its primary indicators. However, the variation in achievement scores among students is indicative that there exist some factors that influence this situation. Since achievement scores alone do not provide an insight into understanding the factors responsible for success or failure, a plethora of studies have attempted to investigate this phenomenon.

The objective of this study is to investigate the influence of some demographic factors on students' academic performance in tertiary institutions in Ghana.

Existing studies have looked narrowly at the correlates of demographic factors and educational achievement. The novel contribution of this study is to examine the role of the combined effect of age and sex on academic performance.

The rest of the paper is organized as follows: Section 2 is the literature review. Following is the Methodology in section 3. The Results and discussion is presented in section 4. Lastly, section 5 is the conclusion of the study.

2. Literature Review
Research suggests that academic achievement has a relationship with some demographic charateristics. There exists a relationship with gender differences and the academic performance of male and female students (Cole and Espinoza, 2008; Jaeger and Eagan, 2007). According to Keith, et al. (2006) there exists a positive relationship between age and academic performance. However, Kaur, et. al. (2010) in their study found that age does not significantly contribute to academic performance of university students in distance learning.

Lugutera and Apam (2013) in a related study in Ghana, used the Generalised Linear Model (GLM) to study the effect of determinants on the differences among students' academic performance. They opined that the performance of students improved with decreasing age and increasing number of credit hours. They asserted further that departmental affiliation had a positive impact on students' academic performance.

In related studies, Tuttle (2004) found that students' academic performance correlates with locality of residence and household income. Similar studies found that parents' education and household income are moderate to strong predictors of academic achievement (Davis-Kean 2005). Writing on the influence of parents education on academic achievement, Acharya and Joshi (2009) found that parents' education can affect the achievement motivation in academic area. Yousefi (2010) found a positive relationship between family income and academic achievement of high school students. Nasir (2012) investigated the relationship of demographic characteristics o academic achievement. He included location of residence household income and parents' education in the study. He found out that there existed a significant correlation between academic achievement and demographic characteristics.

Cole and Espinoza (2008) in their study, used a longitudinal sample of 146 Latino students in science, technology, engineering, and mathematics majors. They found that the only significant student background variable was gender, which was positively related to students' GPA. As such, it suggests that Latino female students were more likely than their male counterparts to report good college grades. This finding is consistent with the literature on the academic performance of female students (Huang et al., 2000). According to Huang et al., although female, relative to their male counterparts, are less likely to enter science and engineering majors, female students who do apply to these majors are well prepared with regard to academics. Following empirical findings in the literature (Dennis et al., 2005; Lohfink and Paulsen, 2005), students who have highly educated parents also have higher levels of cultural capital and are believed to have higher levels of cultural congruity, which positively affects academic success.

3. Methods and Materials

The study confined itself to graduating students of the Departments of Secretaryship and management studies and Accountancy studies of Wa Polytechnic. The study made use of Primary data. The survey instrument used was a questionnaire. The study used the total graduating class of 179 students. Statistical analysis consisted of descriptive statistics and regression analysis. The data collected from the students included age, sex and the class obtained at graduation. The data was analysed using the statistical package for social sciences (SPSS) 17 edition. Simple regression analysis was employed to determine among others the combined effect of age and sex on academic performance. Tables and graphs were used to present the findings. The basic assumption of this study is a linear relationship between class obtained and demographic characteristics. This may be conceptualised as:

$$CLASS = f(AGE, SEX) \tag{1}$$

For the purpose of estimation, equation (1) may be rewritten as:

$$CLASS_t = \beta_0 + \beta_1 AGE_t + \beta_2 SEX_t + u_t \tag{2}$$

In the equation above, $CLASS_t$ is the class obtained at graduation, AGE_t is the age at completion, SEX_t is the sex of the student at completion and u_t is the error term. These demographic factors do not operate in isolation and in order to investigate the combined effect of these factors, a third variable is included. Equation (2) then becomes:

$$CLASS_t = \beta_0 + \beta_1 AGE_t + \beta_2 SEX_t + SEXAGE_t + u_t \tag{3}$$

Where $SEXAGE_t$ captures the combined effect of age and sex on academic performance as evidenced by the class obtained. Equation (3) is the estimable model to investigate the relationship.

4. Results and Discussion

Assessing normality, the results indicated age was highly skewed negatively with a value of Sex on the other hand was moderately skewed positively whereas class was approximately symmetrical. The results are shown in table 1.

Table 1: Summary Statistics of Variables

	Age	Sex	Class
Valid	179	179	179
Skewness	-1.227	0.475	0.021
Kurtosis	0.270	-1.795 -	0.241
Minimum	-5	0	1
Maximum	44	1	4

Source: Authors' construct

Considering the gender of the respondents, majority were males comprising 61.5% and 38.5% female. Table 2 depicts this situation.

Table 2: Sex of Students

	Frequency	Percent
Male	110	61.5
Female	69	38.5

Source: Authors' construct

With age, a greater number of the graduants were between 22 and 29 years. Smaller figures were recorded for older people with the oldest recorded age of 44 years. This shown in figure 1.
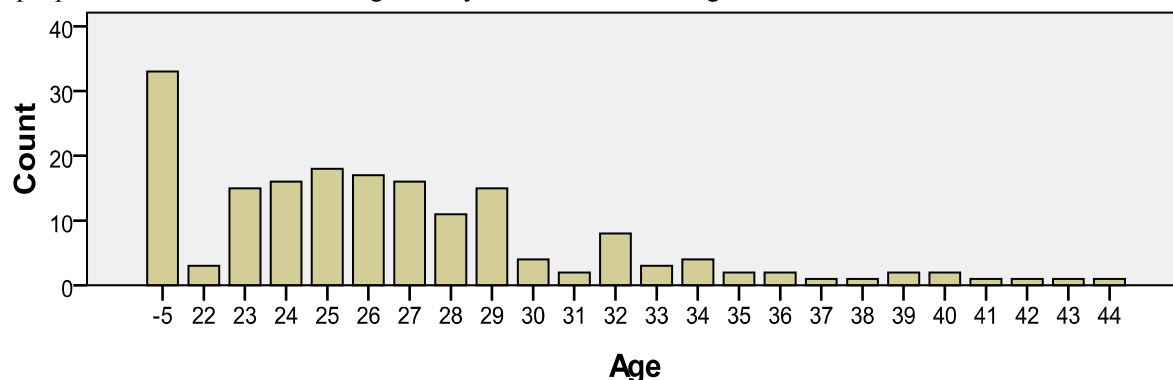

Figure 1: Ages of Students at Graduation
Source: Authors' construct

Considering the classes obtained, it was realized that smaller numbers obtained first class (2.8%) and pass (5%) divisions whereas the majority obtained second class upper (43%) and lower (49%) divisions. This is shown in table 3.

Table 3: Summary Statistics of Variables

Class	Frequency	Percent
First class	5	2.8
Second Upper	77	43.0
Second Lower	88	49.2
Pass	9	5

Source: Author's construct

An analysis of the distribution of males and females within the various classes revealed very interesting results. Within the first class range, 3.6% of the male graduants obtained first class against 1.4% for the females. For the second class upper division, the performance was much closer. This stood at 42.7% of graduating males and 43.5% for graduating females. Approximately, the second class lower division has a value of 49% for both graduating females and males. For the pass division the values are quite close with 4.5% for graduating males and 5.8% for graduating females. This is shown in table 4.

Table 4: Cross Tabulation of Class and Sex

			Sex		
			Male	Female	Total
Class	First Class	Count	4	1	5
		% within Sex	3.6%	1.4%	2.8%
	Second Upper	Count	47	30	77
		% within Sex	42.7%	43.5%	43.0%
	Second Lower	Count	54	34	88
		% within Sex	49.1%	49.3%	49.2%
	Pass	Count	5	4	9
		% within Sex	4.5%	5.8%	5.0%
Total		Count	110	69	179
		% within Sex	100.0%	100.0%	100.0%

Source: Authors' construct

Analysis of the correlation between the variables revealed that age had a low and negative correlation of 14% with class obtained. On the other hand, sex had a lower but positive correlation of 2% with class. These are shown in tables 4 and 5.

Table 4: Spearman's correlation coefficient of age and class

	Age	Class	Sig. (2-tailed)
Age	1.000	-0.140	0.061
Class	-0.140	1.000	0.061

Source: Author's construct

Table 5: Spearman's correlation coefficient of sex and class

	Sex	Class	Sig. (2-tailed)
Sex	1.000	0.028	0.707
Class	0.028	1.000	0.707

Source: Author's construct

The regression results of the model revealed interesting results. The coefficient of age had a positive coefficient of 0.001. This finding supports the claim by Keith, et al. (2006) who asserted that there exists a positive relationship between age and academic performance. It must be noted however that this coefficient is small and insignificant. This smallness and insignificance of age also supports existing literature such as Kaur, et. al. (2010) who opined that age does not significantly contribute to academic performance of university students in distance learning.

Further, sex had a positive coefficient of 0.346. This coefficient is significant at the 5% significant level. The interpretation for this coefficient is that if gender increase (decrease) by one unit, the class obtained would increase (decrease) by 0.35. Specifically, the coefficient shows by how much male academic performance would increase more than the female. In a similar vein, this finding is consistent with existing literature especially Cole and Espinoza (2008) in their study who found that the only significant student background variable was gender, which was positively related to students' GPA.

Investigating the combined effect of age and sex on academic performance, a negative coefficient of 0.013 was obtained. This value though small in size is also significant at the 5% level. The interpretation for this is that the impact of age on male's or female's academic performance is negative. It means that an increase (decrease) in age of male will decrease (increase) academic performance by that margin more than the female counterparts. The regression results are shown in table 6.

Table 6: Summary of Regression Results

Dependent Variable: Class	Coefficient	t-statistic	Sig.
Constant	2.529 (0.111)	22.762	0.000
AGE	0.001 (0.004)	0.179	0.858
SEX	0.346**(0.191)	1.81	0.072
SEXAGE	-0.013**(0.007)	-1.747	0.082

R squared=0.16, Fstat= 1.52

* and ** denote 1% and 5% levels of significance respectively. Figure in ( ) indicates standard error

Source: Author's construct.

5. Conclusion

There are usually variations in students' academic achievement and this suggests that there are some factors that influence this situation. This study employed primary data from graduating students of a single academic year. Both descriptive and explanatory techniques were employed for the study. A linear regression analysis was conducted to ascertain the marginal effects of age and gender on academic performance. The results indicated a negative correlation between age and students class obtained. Meanwhile a positive correlation existed between sex and the class obtained. Furthermore, age positively influenced academic performance though insignificantly. Sex on the other hand significantly had a positive influence on the class obtained by the students. Interestingly, the effect of an old or young male or female had a negative coefficient and indicated that older males were more

affected than older females and vice versa. Therefore, it is fit for counselors and policy makers to consider these background attributes in assessing and projecting the outcomes of students' academic performance.

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