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EDITORIAL

The Ghana Association of University Administrators (GAUA) as part of its mission to promote the advancement of higher education in Ghana and around the world provides policy alternatives for national development. This is done through research reports, policy analysis, reflective practice among others. Mindful of this, the National Executives adopted this Journal from GAUA University of Education, Winneba branch in 2019 to advance this cause. The sixth edition of the journal is thus, the "first" edition since the adoption and it also serves as a special edition to commemorate the 40th Anniversary of GAUA (1980-2020).

In this edition, Kwame Boakye, Joshua Addo, Eric Awotwe and Joyce Anastasia Sam did a comparative study of pension benefits between Ghana Universities' Staff Superannuation (GUSSS) and Social Security and National Insurance Trust (SSNIT) Schemes. The writers advocated for the boards of GUSSS to educate their members on the superior financial retirement benefits offered by the scheme as compared to SSNIT and to review the pension rights under the GUSSS.

Again, George Kwadwo Anane, Elijah Ofori-Badu and Kwame Asante also examined 'cut-off aggregates' and academic performance of students in a public university in Ghana. The paper recommends that university managers must develop or review their admission policies and factor in more inclusive parameters for admitting students into universities, especially applicants from less-endowed schools.

The issue of work-life balance among Senior Female Administrators was examined by Rebecca Asiedu Owusu. She recommends for Ghanaian women in public career spaces to be provided with conducive working environments like flexible working hours, extended paid maternity leave, paid paternity leave and further stressed for Early Childhood Centres to be sited close to office environment.

In examining cleaners' perspective of littering behaviour of students in a Ghanaian university context, Fidelis Z. Tang urged university management and student leaders to provide adequate waste bins on university campuses, especially at vantage points with notes to encourage cleanliness. This, he believes, will encourage the culture of cleanliness and shared responsibility in safeguarding the environment.

In promoting peace among student religious groups in public universities in Ghana, Samuel Marfo, Musah Halidu and John Yaw Akparep recommend that periodic education on religious tolerance should be carried out by amalgamated religious bodies and university managements to help deepen the understanding and knowledge of students about religious pluralism and the need for peaceful coexistence.

Investigating into communication challenges in a multi-campus university system in Ghana, Amatus Dinye, Emmanuel K. Boon and Job Asante advocated for the deployment of modern communication technologies to enable satellite campus administrators to communicate in real-time with their main campus and this should be part of a well-developed communication policy.

In a research into the assessment of governance challenges in higher education institutions, Charles Obeng-Sarpong, Daniel Buor and Paul Kwadwo Addo found out that external issues such as: funding, quality assurance, getting requisite academics, and internationalisation among others militate against Ghanaian universities. They therefore advanced an argument for the need to build the capacity of management and council members on quality assurance systems, effective governance and leadership.

Examining service delivery and satisfaction of students and its implications for educational administration, Regina Nuako, Kweku Appiah-Badu, Benjamin Boampong Owusu and Abraham Adusei observed that suggestions about areas of service delivery improvement provided by students to university management are often not addressed to their satisfaction. The writers recommend for the need for university management to work with students and design service improvement strategies to bring about student satisfaction.

Lastly, Samuel Marfo, Joshua Akpade and Halidu Musah investigated crash helmet and safety implications for student motorcyclists and postulate that relatively low patronage of the full-face helmets observed among students in their study requires periodic educational campaigns.

We are extremely grateful to all our contributors and to our dedicated reviewers.

Happy 40th Anniversary to GAUA!

Dr. Paul Kwadwo Addo
National Editor/Editor-in-Chief
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Correlates of 'Cut-off Aggregates' and Academic Performance of Students in a Public University in Ghana.

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Abstract

This paper contributes to the body of knowledge on the correlation between entry aggregate ('cut-off aggregate') and academic performance among undergraduate students of public universities in Ghana and makes policy recommendation on undergraduate admission policies. Universities all over the world use a set of criteria for the selection of applicants for admission. In Ghana, one criterion commonly used is the entry aggregate ('cut-off aggregate') for selecting qualified applicants. The use of such criterion is likely to exclude applicants from less endowed schools whose aggregates may not be competitive enough. This paper adopts a quantitative research design to compare 'entry aggregates' and Final Grade Point Averages. A desk analysis of academic records of all the1,064 graduates from 18 bachelor's degree programmes who were admitted from 2012 to 2014 and graduated from 2016 to 2018 were processed with Statistical Package for Social Science (SPSS) version 26 to establish correlation co-efficient. The study produced mixed findings. On one hand there was moderate relationship between entry aggregates and academic performance in Actuarial Science, Chemistry, Environmental Engineering, Mathematics, Mechanical Engineering and Renewable Energy Engineering. On the other hand, there was no significant relationship between entry aggregates and academic performance in the other twelve programmes. Findings confirm the general trend in the literature which indicates mixed results between the two variables. The paper recommends that university managers must develop or review their admission policies and factor in more inclusive parameters for admitting those into universities, especially applicants from less endowed schools. The paper further recommends that universities must concentrate more on strategies that improve the learning environment of students rather than place emphasis on entry aggregate ('cut-off aggregates').

Key words*: Public university, admission, entry aggregates, undergraduate, Ghana*

Introduction

The role of higher education institutions in research and dissemination of knowledge is very important. Various aspects of the higher education sector have been explored especially in the developing world. Critical issues include globalisation and internationalisation (Altbach, Reisberg & Rumley, 2009), access and equity (Altbach, Gumport & Berdahl, 2011) and quality assurance (Effah, 2018; Neema-Aboki, 2016; Lim, 1999). Limited access to higher education in the global south has been identified as one of the challenges facing prospective students. Access to universities by prospective applicants has been restricted by certain factors that include, inter alia, high school fees, national educational policies and family challenges. In Ghana, chief among the constraints to increasing access is the inability of successive governments to match enrolment figures with physical infrastructure and laboratories (Effah, 2018). Access to higher education still eludes many prospective applicants although improved access is assured by the 1992 Republican Constitution, which states as follows:

> Higher Education shall be made equally accessible to all, on the basis of capacity, by every appropriate means and in particular, by progressive introduction of free education. (Article 25(1) c.

One important topic albeit not too popular is the pathways to universities (Diamond & Obrien-Malone, 2018). Pathways to universities vary from country to country all over the world depending on national policy such as accreditation regimes. Diamond and Obrien-Malone (2018) state that although there are alternative means of admission into universities, secondary school education remains the dominant traditional pathway of entry into the universities in Australia. Depending on national university policies, students may enrol in universities through different modes such as technical and vocational schools, polytechnics and mature applicants as in the case of Ghana.

In Anglophone West Africa (i.e. Ghana, Nigeria, Sierra Leone, Liberia and The Gambia), the predominant pathway to universities, technical universities and polytechnics is the West African Senior School Certificate (WASSC). The West African Senior Secondary School Certificate Examination (WASSCE) is a sub-regional benchmark examination organised by the West African Examinations Council (WAEC) for students in senior secondary schools. One of the strategies used by universities to select the most qualified applicants in public universities in Ghana is through the merit system by the use of competitive entry aggregates otherwise known as "cut-off aggregates" (Anyan, 2015).

Cut-off aggregates are numerical values that are used to rank prospective applicants by adding the grades obtained in 3 compulsory core subjects, namely, English Language, Core Mathematics and Integrated Science and 3 relevant elective subjects from general arts, business, general science, agricultural, vocational (visual arts and home

economics) and technical programmes. In the current system, the minimum entry aggregates for an applicant to be admitted into a public university in Ghana is aggregate 24 or 36 (i.e. if the student scored grade C6 in 3 core and 3 elective subjects) on a scale of aggregate 6-36 according to the grading system A1-C6 in the West African Senior Secondary School Certificate Examination (WASSCE). The entry aggregate of 24 or 36 depends on how the university calculates the grading. For example, while some universities assign a single numerical value (4) for the grades C4,C5,C6 (thus, A1=1, B2=2, B3=3, C4,C5,C6=4); others use the numerical value attached to the grade in the calculation (thus, A1=1, B2=2, B3=3, C4=4, C5=5, C6=6).

In most of the public universities in Ghana, an applicant with aggregate 24 or 36 will hardly make it on the admission list for competitive programmes or a preferred programme because of intense competition from the many suitably qualified applicants with better aggregates in the range of 6-12. This situation negatively affects students from schools in rural areas due to the huge chasm between the availability of teachers and infrastructure in urban and rural areas. The reality is that, students who come from rural schools are naturally disadvantaged because the majority of them are not able to compete on the same pedestal with their counterparts from schools in urban areas.

Consequently, there have been questions among parents, applicants, university authorities and policy makers on the correlation between entry aggregates used by students to secure admission into universities and their actual academic performance. While some people argue that cut-off aggregates form an objective way of selecting the best applicants, others opine that cut-off aggregates are only indicative and do not determine the performance of applicants after admission.

Bratti and Staffolani (2006) observe that the measurement of a student's prior educational performance is the most important indicator or determinant of his or her future academic performance. There have been divergent views regarding this position as the case may be different from one student to the other. One significant study on the subject was undertaken by Thiele, Pope, Singleton & Stanistreet (2016) in the University of Liverpool. Their study revealed that school grades in isolation were representative of 'true academic potential' by comparing group differences in attainment at school compared to university. The study found a strong and significant predictor between school grades (UCAS Tariff Points) and academic performance. Similarly, Klomegah (2007) in a study on predictors of academic performance of university students found that there was a strong positive correlation between self-efficacy and course grade and a strong and positive correlation between high school grade point average (GPA) and academic performance. In Tanzania, Kapinga and Amani (2016) found a positive correlation between entry points and students' final academic performance and a positive correlation between communication skills and students' final academic performance among 304 undergraduate students in the Mkwawa University College of Education (MUCE). Although Kyoshaba (2009) found the existence of a significant relationship between students' 'A'-level and Diploma

admission points and academic performance, there was no relationship between mature age points and academic performance.

On the other hand, some researchers disagree or do not establish any relationship at all between entry academic performance on future academic performance at higher education institutions. For example, evidence in the literature (Huw, Reddy & Talcott, 2006) disagree with the view that academic performance is determined by prior academic performance. In their study on the relationship between previous academic performance and subsequent success at university, they found that subjects studied at 'A' level and grades obtained did not predict academic performance at university. This confirms an earlier view expressed by the Academic Admission Council at Oregon State University (2003) which disagrees with the view that academic performance is determined by prior academic performance. It observes that traditional measures of academic potential, such as grade point average or 'A'-level grades did not predict academic performance at university. The studies examined the effect of prior academic performance on future academic performance or achievement at higher education institutions or the relationship between prior academic performance and future academic performance or achievement at higher education institutions using the entry grades/aggregates in some subject(s) to predict the future performance of the students. The gap in these studies is that they did not compare the entry grades against the overall performance/achievement using the final grade point average at the end of the students' studies. This study attempts to fill this gap by establishing the correlation between students' prior performance in terms of entry aggregates and their cumulative performance at the end of their entire programme of study using the final grade point average.

Evidence from the literature (Gomes, Tavares & de Azevedo, 2011; Farooq, Chaudhry, Shafic & Behanu, 2011; Ali, Haider, Munir, Khan & Ahmed, 2013) suggests that several factors apart from entry performance influence students' academic performance or achievement in schools, colleges and universities. For example, Issahaku (2017) suggests that some of the major factors among undergraduate students include student effort, previous or prior educational performance, self-motivation, the social-economic status of the students' parents, the students' age, number of hours of study per day, admission points, different entry qualifications, tuition trends and the students' area of residence (rural or urban), class attendance, and sufficient sleep. The underlying thrust among these scholars seem to suggest that competitive entry aggregates used by universities to decide the suitability or otherwise of prospective applicants for admission may not have any direct relationship with their actual performance at the university.

As an emerging public university that seeks to create both physical and procedural access to prospective applicants, especially those from less endowed secondary schools, we investigated the relationship between entry aggregates and student performance, taking the University of Energy and Natural Resources in Ghana as a case. This study primarily explored the correlation between entry aggregates used for university

admissions and the final grade point averages obtained by undergraduate students at the end of their study. The final grade point average is a computed figure out of all grade points of the courses taken divided by the cumulative credit load. The final grade point average indicates how well or high a student scored in all courses and it is used to evaluate the student's success during the entirety of the student's degree programme as well as reflects the weight of the degree obtained. The study made recommendation on the use of entry aggregates in admission into public universities in Ghana.

Hypothesis

The following hypotheses were tested:

Ho = 0: There is no significant relationship between entry aggregate and class obtained in university

H1 ≠ 0: There is a significant relationship between entry aggregate and class obtained in university.

Literature Review

Entry aggregates and Student Performance: A Systems View

In the course of the study, we adopted the systems theory (von Bertalanffy, 1968) to report on the relationships between entry aggregates and students' academic performance of undergraduates. Dunlop (1958) explains the systems theory as a unified set of aggregates of interacting components or parts that are interrelated and interdependent to the extent that a change in one part of the system affects the other parts of the whole to which they belong. Katz and Kahn (1966) state that "systems theory is basically concerned with problems of relationship, of structure and of interdependence. This places significant emphasis on transactions across boundaries between the system and its environment and between the different parts of the system". The systems theory acknowledges key features of a system as inputs, throughput/processes, outputs and feedback. In a university, the performance of undergraduates has a relationship with several other factors such as entry results, socioeconomic background of parents and learning environment (Issahaku, 2017). Inputs refer to the energy and raw material transformed by the system. Ina university, these include entry grades, entrance examinations scores and certificates used by students for enrolment. Outputs are the products or services which are churned out by the system through the processing of human, financial and physical resources. The throughputs of the system refer to the processes adopted to convert resources from the environment into products that are usable by either the system itself or the environment. Thus, physical infrastructure, laboratories, lecturers and administrative support staff and services at the disposal of students are critical to their success.

Predictors of future performance among Undergraduates: Evidence from Ghana

There are few known studies in Ghana on the relationship between admission entry aggregates and academic performance among undergraduates. However, there is literature on the relationship between subjects studied at the senior secondary school level and the effect of that on the current performance of students, differences in

academic performance of students in distance learning and on-campus programmes (Osei and Mensah,2011) and the background factors which affect students' academic performance (Issahaku, 2017). Aidoo-Buameh and Ayagre (2013) studied the effect of entry grades on academic performance of undergraduate accounting students of Central University College and concluded that there was a relationship between Core Mathematics and Accounting at pre-university level and performance of undergraduate students reading Accounting. No correlation, however, was found between pre-university English and their university level performance.

Osei and Mensah (2011) examined the differences in academic performance of students in distance learning and on-campus programmes in a Computer Engineering programme at the Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. The findings of the study suggested no significant differences of academic performance measured in Cumulative Weighted Average (CWA) between distance and on-campus students. However, there were statistically significant differences between the two groups in 20 of the 43 courses with the on-campus students scoring higher marks than the distance learning students. The researchers also found weak correlation between age, admission aggregates and CWA scores of on-campus and distance learning students in the two separate learning environments. The lack of a statistically significant correlation between the variables suggests that age and admission aggregates were not strong predictors of CWA scores in the two learning modes.

Issahaku (2017) assessed the extent to which background characteristics, students' attitudes to learning, and students' use of social media influenced academic performance among undergraduates in Ghana. It was hypothesized that previous performance, hours of study, family income, having a personal study schedule, attending lectures regularly, participating in class discussions, taking notes during lectures, use of alcohol, and use of social media, among other factors will influence a student's grade point average (GPA). The correlation analysis revealed that only hours of study was strongly related to current GPA. Thus, the more a student studied, the higher their GPA. All the other factors including entry performance did not have a significant relationship with GPA. The work by Issahaku (2007) is one of the significant investigations into the factors that influence academic performance among undergraduate students in Ghana.

The research work on predictors of future performance among undergraduates in Ghana did not compare the relationship between the entry grades at enrolment and the final grade point average at the end of the programme to establish a relationship among students who have graduated from Ghanaian universities nor explore the lessons the universities can learn from the study and the implications for future admissions into the universities. This study seeks to fill that gap and contribute to the debate on the entry grades and overall impact on students' academic achievement. The methods adopted in carrying out this study are discussed in the next section.

Materials and Methods

The University of Energy and Natural Resources is a public funded institution of higher learning and research established by Act 830 of 2011. The University is located in the Bono Region in the middle belt of Ghana. In this study, we adopted a quantitative research design by generating numbers (statistics) to make conclusions about the correlation between entry aggregates and academic performance. The researchers used secondary data from the Admissions Unit under the Academics and Students' Affairs Division. This involved the retrieval of entry aggregates on yearly basis and matching them with the graduating performance of students in the corresponding years. The researchers employed a step by step procedure in data collection and processing (See Figure 1).

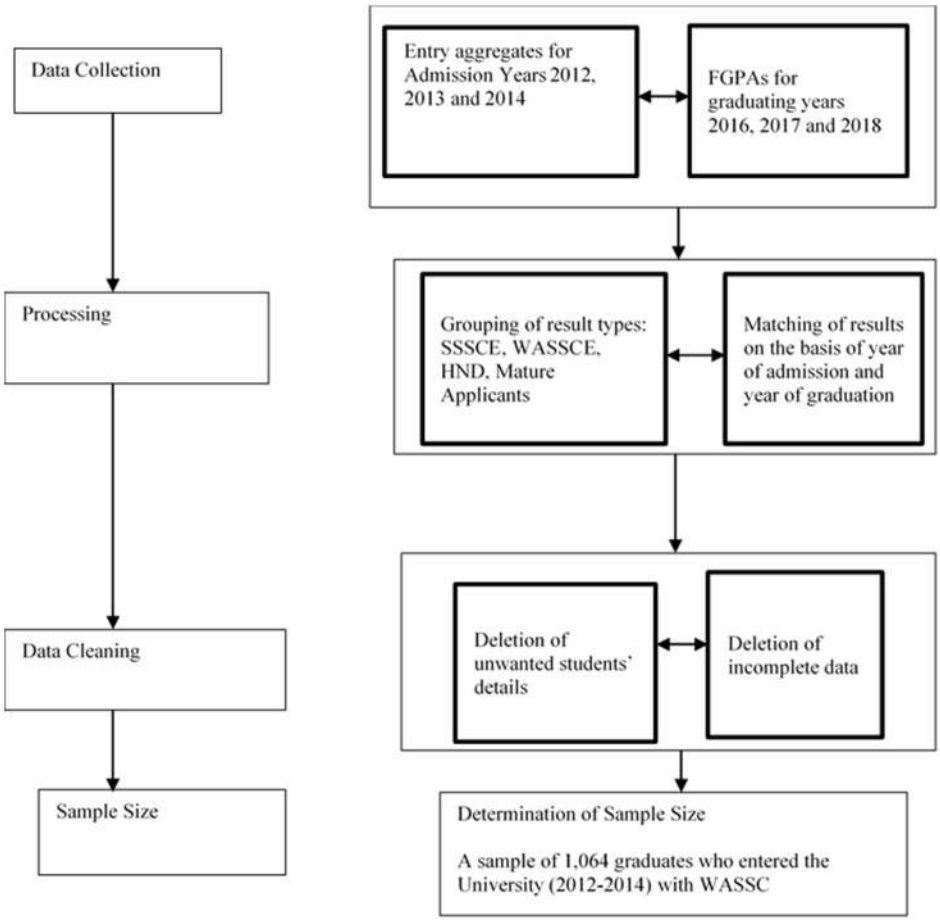

Figure 1: Data Collection and Processing Procedures
Source: USIS, 2020

First, we obtained data on entry aggregates and final grade point average (FGPA) of graduates from the University Students' Information System (USIS). The entry

aggregates were grouped into holders of Senior Secondary School Certificate (SSSC), the West African Senior School Certificate (WASSC), Higher National Diploma (HND) holders and Mature Entrance Applicants. We adopted descriptive statistics to answer the question "Is there a correlation between entry performance and graduating performance?" Data analysis was done using SPSS (version 23). The entry requirements used for the analysis are based on grades obtained by applicants in six best subjects from the WASSCE. The WASSCE remains the most conventional benchmark for selecting applicants for admission in most tertiary institutions across West Africa. The West African Senior Secondary School Examination (WASSCE) is a sub-regional standardized examination undertaken by senior high school students in Anglophone West Africa made up of Ghana, Nigeria, Sierra-Leone, The Gambia and Liberia.

In Ghana's current education system, the students attending Senior High Schools, or Technical and Vocational Schools sit for the WASSCE after completing a 3-year Senior High School education. Holders of HND obtain their diplomas from polytechnics or technical universities after completing a 3-year post Senior High School education or Vocational and Technical (VOTECH) education. Mature applicants, per the admission requirements by the National Accreditation Board (NAB) of Ghana, are applicants who do not have or may have passes in the relevant subjects but are 25 years old at the time of applying for admission or will be 25 years by 1st September of the academic year in which they intend to enrol. Mature Applicants are required to pass Mature Entrance Examination in Mathematics, English Language and Aptitude Test conducted by the University (National Accreditation Board, 2019).

During the processing of the data, the researchers focused on WASSCE holders because they formed about 95% of all applicants that get admission into the University. Moreover, the data was grouped under year of admission and year of completion beginning from the Admission Years 2012/2013 – 2014/2015 and completion years 2016-2018, representing three batches of graduates from the University. The entry aggregates and final grade point average of the graduates were obtained from the University Students' Information System (USIS). For each student the entry aggregates and the Final Grade Point average were matched. The researchers omitted variables that were not important to this research such as students' names, ID numbers, date of birth and Senior High School attended. The researchers further cleaned inconsistencies and errors by checking every student's detailed information row-by- row.

The target population of the study consisted of all undergraduate students of the University of Energy and Natural Resources who graduated from 2016 to 2018. Stratified sampling procedure was adopted in selecting sample units into the study since the study cuts across various year groups from the inception of the university. Each year represented a stratum. The data was first separated by year group or year of admission. Only graduates that pursued first-degree programmes who entered the University through the WASSCE pathway were selected. Every dataset contained some errors such as errors that occurred in data entry and mistakes in recording. Errors and

inconsistencies were detected, identified and corrected. Undergraduates that pursued first-degree programmes with some details missing were omitted since there were no imputations for missing values in the dataset. If a student registered for more than six subjects at the SSSCE/WASSCE, only the best six grades were taken into consideration provided that Mathematics, English and Social Studies or Integrated Science were included in these six subjects. The variables that were used were the FGPA and aggregate from the best six WASSCE grades. A sample of 1,064 graduates from 2016-2018 from 18 undergraduate programmes from the sciences, agriculture science, engineering, natural resource management and management sciences were selected for the research.

The P-value is the smallest value of (significance level) that leads to the rejection of the null hypothesis. The p-value is usually set at 0.05. If the p-value is less than 0.05, the null hypothesis is rejected and concluded that a significant relation exists, and if the p-value is greater than 0.05, we fail to reject the null hypothesis and conclude that no significant relationship exists.

The Pearson's Moment Correlation Coefficient is a statistical technique that can show whether and how strongly pairs of variables are related. The main result of a correlation is called the correlation coefficient (or "r"). It ranges from -1.0 to +1.0. The closer r is to +1 or -1, the more closely the two variables are related. If r is close to 0, it can be concluded that no relationship exists between the variables. If 'r' is positive, it means that as one variable gets larger the other gets larger. If 'r' is negative it means that as one gets larger, the other also gets smaller (often called an "inverse" correlation).

While correlation coefficients are normally reported as r = (a value between -1 and +1), squaring them makes them easier to understand. The square of the coefficient (or r squared) is equal to the percentage of the variation in one variable that is related to the variation in the other. A correlation report can also show a second result of each test - statistical significance. In this case, the significance level tells how likely it is that the correlations reported may be due to chance in the form of random sampling error.

The correlation between two or more variables reflects the degree to which the variables are (un)related. Anderson (1998) describes correlational research as one way of describing in quantitative (numerical) terms the degree to which variables are related. That is, correlation studies investigate a number of variables believed to be related to an important variable such as academic performance. When the relationship is between two variables, it is known as simple correlation and when the relationship is between three or more, it is called multiple correlation. It is assumed that the two variables are random in nature where their outcome cannot be predicted. More importantly, it is also assumed that the independent variable is measured with negligible error. The strength of prediction from a multiple regression equation is measured by the square of the multiple correlation coefficient, R2.

Results and Discussions

Results of the study are categorised under entry aggregates and university performance among 18 undergraduate programmes in Agriculture and Technology, Natural Resources, Engineering, Sciences and Management Sciences. Computations of Pearson correlation analysis between entry aggregates for admission and final grade point averages are presented in Table 1.

Table 1: Computations on Trend in Entry Aggregates and Graduating Performance

School/Programme	Pearson (r)	*P-Value*	N	Aggregate (μ)	FGPA (μ)
School of Agriculture and Technology					
BSc. Agriculture	-0.123	0.615	19	26.9	2.58
BSc. Agribusiness	0.018	0.961	10	24.3	2.20
School of Engineering					
BSc. Agricultural Engineering	-0.051	0.771	35	22.5	3.2
BSc. Petroleum Engineering	0.198	0.403	20	12.2	2.05
BSc. Computer Engineering	0.046	0.866	16	16.9	2.94
BSc. Electrical & Electronic Engineering	0.228	0.077	61	12.3	2.69
BSc. Mechanical Engineering	0.279	0.012	81	16.9	2.73
BSc. Renewable Energy Engineering	0.498	0.000	145	15.3	2.68
BSc. Environmental Engineering	0.498	0.000	94	19.1	2.89
School of Natural Resources					
BSc. Fire & Disaster Management	0.400	0.140	15	26.7	2.73
BSc. Natural Resources Management	0.233	0.000	224	23.5	2.89
School of Sciences					
BSc. Actuarial Science	0.409	0.002	54	19.4	2.88
BSc. Statistics	0.093	0.681	22	24.5	2.91
BSc. Mathematics	0.331	0.005	69	21.2	3.01
BSc. Information Technology	-0.043	0.802	37	23.6	3.05
BSc. Computer Science	-0.053	0.722	48	19.9	3.25
BSc. Chemistry	0.503	0.001	40	23.6	3.23
School of Management Sciences					
BSc. Resource Enterprise & Entrepreneurship	0.317	0.006	74	23.1	3.01
Total			**1,064**		

Alpha level (α) = 0.01

Source: Authors' Computations, 2020

Results from the study showed mixed results about entry aggregates and final grade point averages (FGPA) obtained by graduates. In some programmes in the Sciences and

Engineering (Actuarial Science, Chemistry, Environmental Engineering, Mathematics, Mechanical Engineering and Renewable Energy Engineering) there were significant levels of relationships having a Pearson correlation co-efficient of 0.409, 0.503, 0.498, 0.331, 0.279 and 0.498 with a p-value of 0.002, 0.001, 0.000, 0.005, 0.012 and 0.000 respectively. Since the p-value was less than the significant level ($\alpha = 0.01$), the sampled programmes in Sciences and Engineering contained sufficient evidence to reject the null hypothesis. The average entry aggregate for these programmes is normally around aggregate 20-24. The study revealed that although there was evidence of a relationship between entry aggregates and FGPA of graduates, the results depicted a weak relationship among graduates from Actuarial Science, Chemistry, Environmental Engineering, Mathematics, Mechanical Engineering and Renewable Energy Engineering. The findings confirm the evidence in the literature (Kapinga and Amani, 2016; Chathuranga, 2016; Ogbonnaya, Okpuruka, Iheanacho & Ndu (2014) that there is a correlation between school academic performance or entry qualification and tertiary level scores of students.

On the other hand, among programmes such as Electrical and Electronic Engineering, Computer Engineering and Petroleum Engineering, where the University places greater emphasis on competitive cut-off points, there was no evidence of a relationship between entry aggregates and FGPAs (see Pearson correlation co-efficient of 0.228, -0.046 and 0.198 with a p-value of 0.077, 0.866 and 0.403 respectively). In the Sciences, Computer Science also showed a correlation co-efficient of -0.053 and a p-value of 0.722. Since the p-value was greater than the significant level ($\alpha = 0.01$), the samples contained sufficient evidence to fail to reject the null hypothesis and conclude that there was no significant relationship between entry aggregates and Final Grade Point Averages in Electrical and Electronic Engineering, Computer Engineering, Petroleum Engineering and Computer Science in the Sciences. Interestingly, these are programmes on which the University places premium competitive cut-off aggregates (mean aggregate =12). Based on the average of the 4 programmes in Engineering, we conclude that graduates complete with an average of Second-Class Lower contrary to expectation of First-Class Honours or Second Class Upper based on the entry results. The results indicated that there was no relationship between entry aggregates and FGPAs of graduates in Electrical and Electronic Engineering, Computer Engineering, Petroleum Engineering and Computer Science.

The findings confirmed the literature (Obioma and Salau, 2007; Agbo, 2003) that low correlation exists between entry qualification and university academic performance. For example, Obioma and Salau, (2007) found that the entry qualifications of students measured by their grades from the West African Examination Council (WAEC), the National Examination Council (NECO) and Joint Admissions and Matriculation Board (JAMB) examinations had low correlation with their first and final year's performance in the universities. Similarly, Agbo (2003) conducted a study on different science subjects at university level and identified low correlation between entry qualifications and students' performance.

Conclusion and Implications for Practice

The study investigated the relationship between admission entry aggregates and performance of undergraduate students. The results were mixed across graduates from the sciences, engineering and agricultural sciences. While there was some degree of relationship between admission cut-off points and performance of students, the general observation pointed to a 'no correlation' between admission aggregates and academic performance of graduates. We recommend that university managers and admission officers reduce the level of emphasis they place on cut-off points during admissions and focus on improving teaching and learning variables such as the quality of teaching and the availability of learning infrastructure and laboratories. However, for competitive programmes, we suggest that a level playing field such as the use of a short aptitude test for entry, in which case there will be no emphasis on only WASSCE aggregates. It is further recommended that admission policies in universities be made flexible to factor in applicants from less endowed senior high schools as they are mostly placed in disadvantaged positions in the competitive admission cut-off-point regime in public universities.

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