

GRADUATE TRACKING OF KUMASI TECHNICAL UNIVERSITY ALUMNI: THE CASE OF CIVIL ENGINEERING DEPARTMENT

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ABSTRACT

Kumasi Technical University exists to provide quality teaching, learning and research in engineering, science, technology and entrepreneurship to promote industrial development in Ghana. Since 2006, the Civil Engineering Department (CED) has utilized Competency-Based Training (CBT) concept of teaching and learning and as a result, has become an excellence center for the concept, theory and application of CBT for other departments in the university to emulate. Since the CED commenced Higher National Diploma and Bachelor of Technology (Top up) programmes in 1997 and 2009 respectively, there has been no tracer survey conducted on graduates. The objective of this paper is to track graduates to determine employability, progression to higher studies and to evaluate the CBT concept of teaching and learning. Data obtained from both print and online questionnaires were organised by MS Excel and analysed using IBM SPSS Statistics 22.0. It was ascertained that skills needed for industry performance were duly acquired through the programmes run. In addition, further study and project specialization significantly affected employment of graduates. It was concluded that though the CBT mode of training may be responsible for equipping graduates with adequate skills for the job market, it could be enhanced with research component to benefit graduates for further study. The study recommended that standard construction software be incorporated in the delivery of the Civil Engineering programme. Subsequently, the survey could be replicated in other departments and Technical Universities to inform facilitators and decision-makers.

Keywords: Technical University, Competency-Based Training, Tracer survey, Graduate Tracking, Civil Engineering.

INTRODUCTION

Kumasi Technical University (KsTU) formerly Kumasi Polytechnic exists to provide quality teaching, learning and research in engineering, science, technology and entrepreneurship to promote industrial development in Ghana (Kumasi Technical University, 2020). The Civil Engineering Department (CED) in KsTU, since its establishment in 1997, has run Higher National Diploma (HND) programme and trained many professionals in all the its disciplines. Since 2006, the Civil Engineering Department (CED) has utilized Competency-Based Training (CBT) concept of teaching and learning and as a result, has become an excellence center for the concept, theory and application of CBT for other departments in the university to emulate. (FET-KsTU, 2020). CBT allows students to undertake a six-month industrial attachment training with any reputable establishment thus enhancing their technical knowhow, practical skills and knowledge, and a better understanding and appreciation of the theory learnt (FET-KsTU, 2020; Acquah, Frimpong, & Borkloe, 2017). CBT has thus created an avenue to achieve a highly knowledgeable and skilled workforce for socio-economic development. In 2009, the CED commenced its Bachelor of Technology (BTech) Top Up programme to upgrade HND graduates and also address the progression gap created under the HND system.

The advantages of CBT training are many and varied. It enhances interaction between trainers, learners and industry, improves learning quality of hands-on practical skills, increases employability of learners through cross-training and skill acquisition, and students can fit squarely into target-specific training needs of industry. Amidst the advantages lies the need to validate the impact that civil engineering graduates make in the industry. The principal aim of this study is to track graduates to determine employability, progression to higher studies and to evaluate the CBT concept of teaching and learning.

Many universities and tertiary institutions have carried out tracer studies on its graduates for many years to grapple with the intricate characteristics of the employee workforce. Ramirez, et. al. (2014), conducted a graduate tracer study for the Rizal Technology University (RTU) in the Philippines and found that graduates claim of knowledge, academic-acquired skills and competencies contribution to job performance was corroborated by the Chi-square goodness of fit which proved a significant relationship between graduates' fields of specialization and their occupations after graduation. The study concluded that RTU produces marketable and appropriately trained graduates who possessed the skills and competencies necessary to succeed in a competitive job world.

Rewarding salaries and benefits; the curriculum and instruction for general education; professional subjects; student services; and faculty instruction were found to be relevant in meeting graduates' profession demands. (Maderazo, 2016). Graduates had also gained work-related values such as love for God, honesty and truth, professional integrity and leadership which were found to be very relevant in the practice of their professions.

Eighty five percent of computer science graduates who responded to the study by Macatangay (2013) were gainfully employed with the majority having professional, technical and supervisory positions. The 85% landed their first course-related jobs in less than a year and stayed for more than a year and were mostly motivated by salaries and benefits. The biggest challenge to finding jobs was lack of work experience. Dotong et.al. (2016) studied employability of engineering graduates in a private University from 2009 to 2012 and revealed they were highly employable with a 95.54 percent employment rating, regular status and presently working as associate professionals in the Philippine manufacturing companies related to other college degrees who found their first job as walk-in applicants and stayed for more than three (3) years.

In addressing emerging and complex nature of 21st century challenges like unemployment and poverty, higher education institutions must distinguish themselves as one of the major stakeholders to effect transformation. Higher education institutions are a vital and strategic part of national development through their essential functions of instruction, research, extension and production (Adelaida, 2014). They must therefore be able to train their students to fit well into the job market by giving them the requisite skill that the labour market requires. This was noted by Bratucu and Boscor, (2011) that the development of life-long learning systems, knowledge of the economy and evolution of jobs and professional trends as well as the institutions' particular needs were what was needed to meet the requirements of the labour market.

The interrelationship between higher education and the world of work has been researched in the last couple of years to the extent that the ability of an institution to ensure employability has become an indicator of institutional quality in some instances (Maharaso, 2001). The common requirements of the labour market identified by most researchers for sustenance in

the job market are communication skills, teamwork, problem-solving and decision-making skills, application of numbers, information technology, personal values, improving own learning and performance, hard work, honesty and love for truth, professional integrity, supportiveness, love for God, punctuality, efficiency and courage, determination and perseverance. (Soderbom, 2001; Lister and Donaldson, 2003; Zaharim et al., 2012; Yusoff, et. al, 2012; Loretto, 2012, Laguador & Dotong, 2013). Soderbom, (2001), noted however that, the role of industrial engineers in all elements in an economy is vital.

The main purpose of the study, therefore, is to ascertain the extent to which Civil Engineering graduates of KsTU possess career growth competencies and skill needed in industry, assess the relationship between the programme and current careers and use the information gathered to evaluate current teaching and learning methods to enhance delivery and quality of the programme. It is expected that the results of this study will enrich curriculum development that will meet employer needs in the Civil Engineering and related industrial disciplines in Kumasi and Ghana.

METHODOLOGY

Already designed questionnaires were emailed to all graduates on the email databank repository google forms. The google forms were resent via WhatsApp and Facebook messenger platforms while a few copies were printed and kept in the Departmental office for completion. Printed questionnaires were also sent to some organizations to increase coverage. The instruction on the google form was that each recipient sends out the forms to as many in the graduating class as possible. The questionnaires were designed in such a way that they would be easily filled out and returned via mail to the corresponding email. The google form platform also received some of the filled questionnaires.

Before sending the google forms via email, telephone calls were made to graduates to confirm email addresses, seek approval for the survey and solicit participation in the survey. After the google forms were sent, follow up phone calls were made to improve response rate. At the end of the survey period, 257 completed forms were returned. Completed questionnaires were collated and analysed using SPSS.

To satisfy the authors of the 257 samples returned, the sample size formula by Yamane (1967) was adopted thus;

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

Where

- N = finite population size,
- e = maximum acceptable margin of error,
- n = desired sample size.

With a finite population of 500 and a 5% margin of error, the desired sample size obtained was 223. This meant that the 257 returned responses were enough for the study.

RESULTS AND DISCUSSIONS

The results discussed below are responses from 257 completed questionnaires discussed under demographic, programme details and curriculum and are presented in the proceeding sub-sections. The Chi-square test compared on the variables showed acquired competencies from the school, further study and the project specialization affected employment significantly.

Demographics

Discussions on demographics centred on age distribution, gender and marital status of respondents. From Fig. 1, majority of respondents (96%) are aged 24-35 with only 2% being female (see Fig. 2).

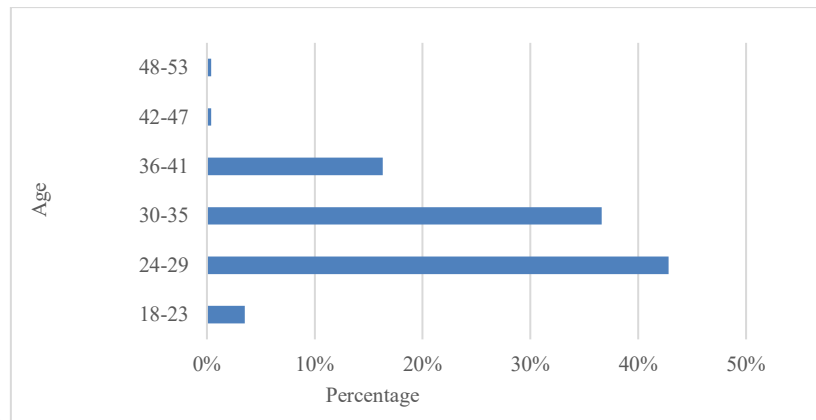


Figure 1: Age of respondents

A very small fraction (0.8%) were in the 42-53 bracket. Only 2% of the respondents were females (See Fig. 2). This buttresses the fact that Civil Engineering, a branch of construction, is still dominated by men in tertiary institutions in Ghana (Ayarkwa et. al., 2012).

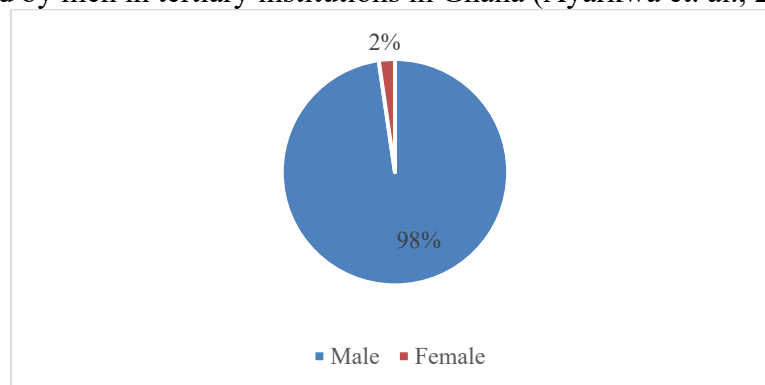


Figure 2: Respondents' Gender Spread

The ratio of married to single was 51:49 as can be seen in Fig. 3.

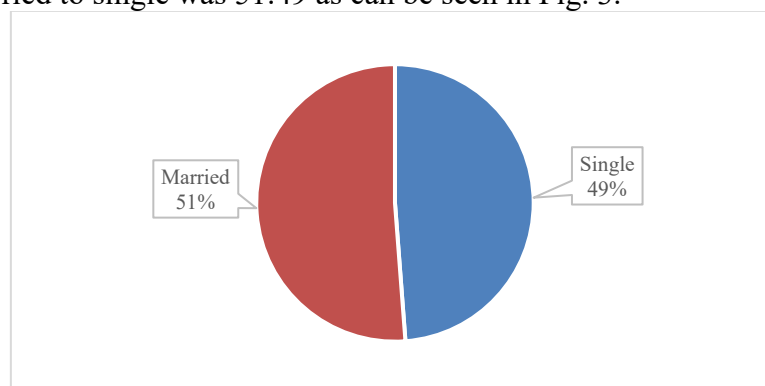


Figure 3: Marital Status of Respondents

General Programme Details

Program split

At the time of the study, the Department had graduates from two programmes; HND Civil

Engineering and BTech Civil Engineering Top-up.

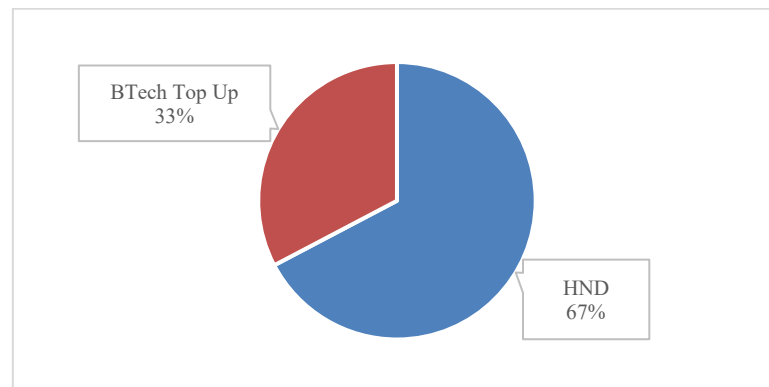


Figure 4: Program split of Respondents

Responses indicate 67% were HND graduates (Fig. 4). This could be attributed to the fact that there are 7 years more HND graduates than their BTech counterparts. The 33% response rate from the BTech graduates indicate the fact that the BTech may be more preferred over the HND and that more attention could be given the programme or simply that the HND graduates could not be bothered.

Completion Year

Strange though as it may seem, 62% of BTech graduates declined to respond when they completed their education while 17% of HND graduates declined (See Fig 5). In a similar tracer study by Ramirez et. al. in 2014, 39% of the graduates also failed to comment on the year of completion.

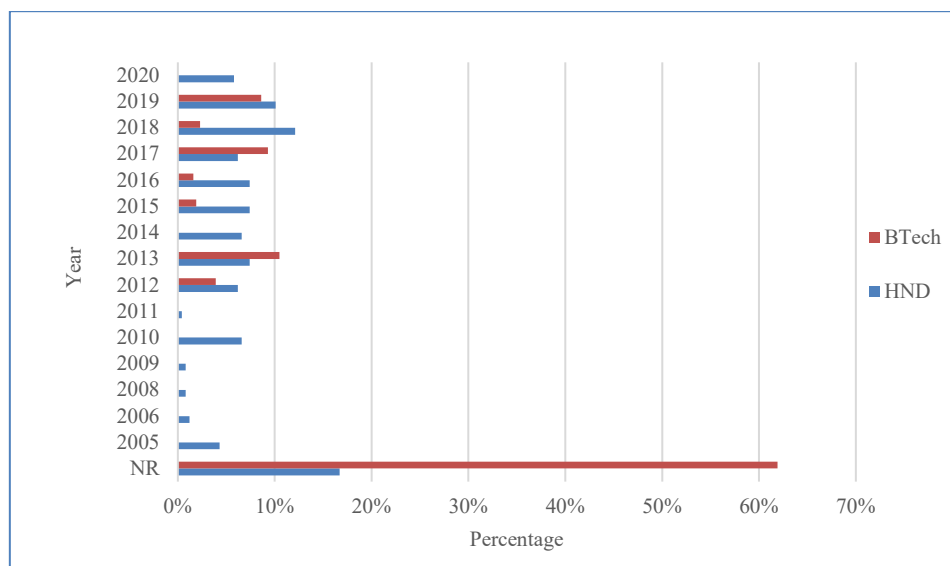


Figure 5: Respondent's Year of Completion

Project Area Breakdown

The project area split in order of ranking are structures, water and sanitation, roads and geotechnical engineering for HND graduates and structures, geotechnical, roads and water and sanitation for BTech graduates as shown in Fig. 6. It can be deduced that both HND and BTech graduates preferred to major in Structural Engineering while studying. Several reasons could

be attributed to this trend such as learners finding the course easier, the facilitator friendly or the fact that they may perceive structural engineering to have more job prospects on completion.

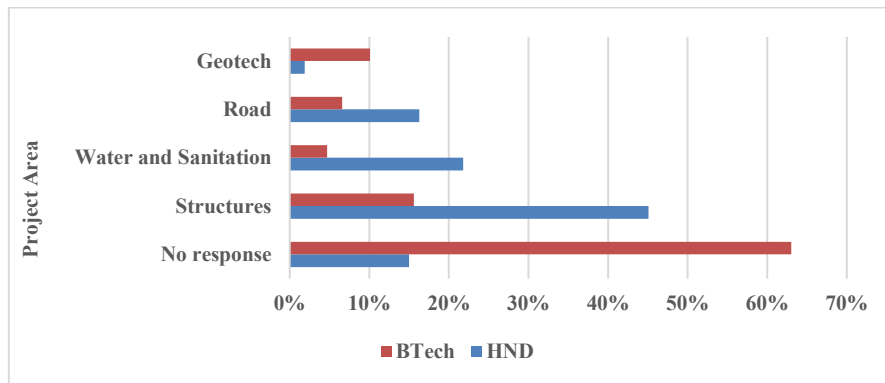


Figure 6: Project area Breakdown of Respondents

100% of the BTech graduates who had done their project work in Geotech were employed and 95%, 88% and 75% had their project work in structures, road and water and sanitation respectively. The HND graduates had majority of the respondents (83%) who were employed do their project in road while only 20% of those specializing in Geotechnical engineering employed. That of water and sanitation was 32% and 70% for structures.

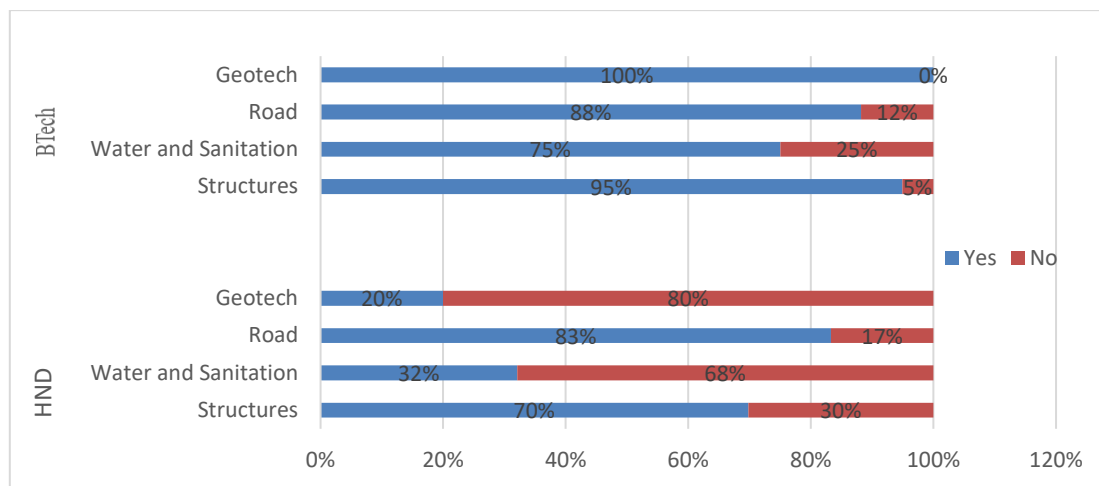


Figure 7: Relationship between project area and employment

Sources of Funding

The ranking from Fig. 8 shows that 44%, 43%, 10% and 3% of the respondents were catered for by their parents, themselves, relatives and other sources respectively. Over the years, it has been observed that self-funding of most Technical University students has led to lack of concentration in the lecture halls, non-attendance of classes and eventual poor academic performance.

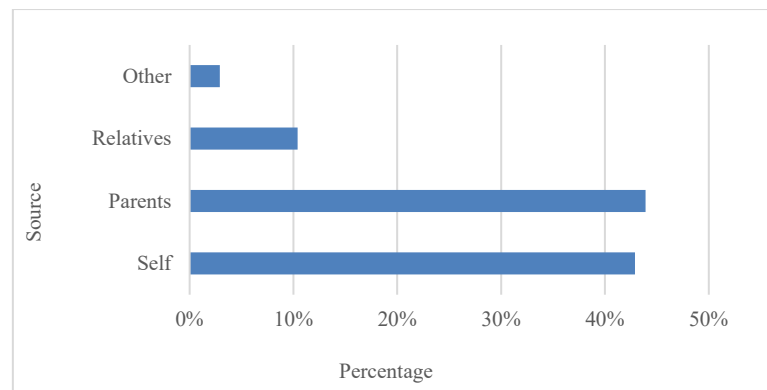


Figure 8: Respondents Source of Funding for Program

Reasons for Pursuing Civil Engineering Programme

The questionnaire explored the reasons why graduates chose to pursue the Civil Engineering programme. Many reasons were cited and notable among them were strong passion for the profession, prospects of career advancement, inspired by role models, prospect of attractive remuneration, already in the industry and influence from parents and relatives in this order 28%, 14%, 10%, 8%, 7% and 3% respectively. Some 10% of the respondents believed that they would be immediately employed when they pursued Civil Engineering while another 4% believed that it was the right route for the opportunity to move abroad.

In a similar study, affordability, availability of course, influence of parents, strong passion for the profession, career advancement, role model inspired were those that were cited as contributing most to the reasons why graduates chose their respective courses in education and business management (Corachea and Bartolay, 2012). This implies that the factors affecting reasons for choosing a particular program in the tertiary education are similar across the different programmes offered.

Further Studies

From Fig. 9, 38% of respondents had acquired other tertiary level qualifications, professional or work-related training programme (s) including advanced studies upon graduation. According to a study by Dotong et. al. (2016), 43% of graduates traced had obtained further studies upon completion.

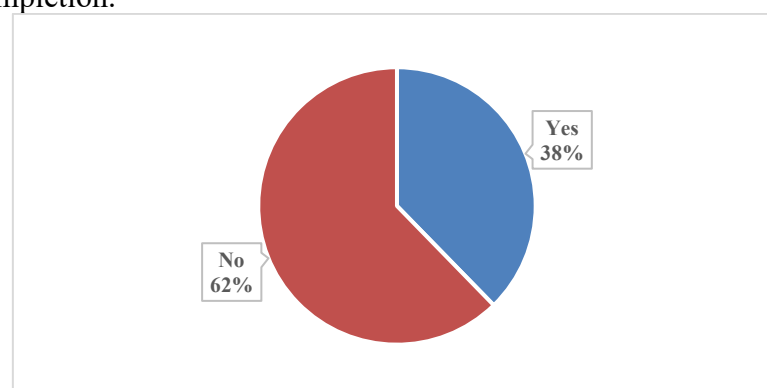
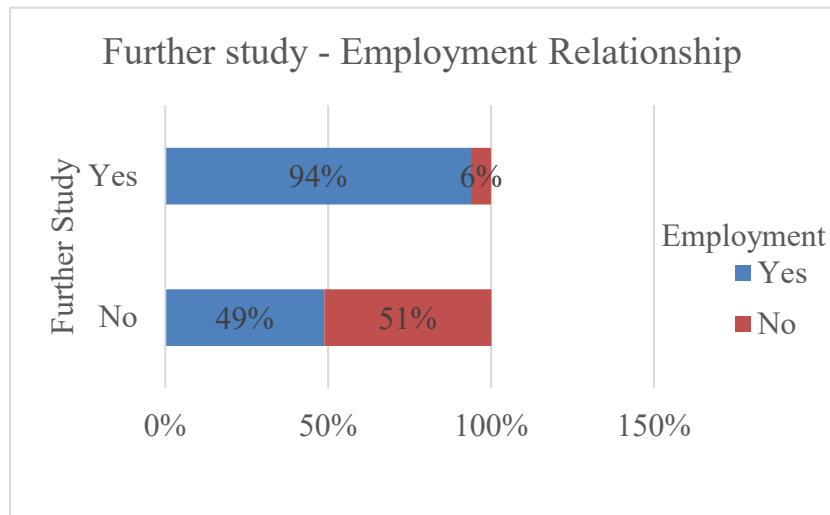


Figure 9: Attainment of Other Tertiary Level Qualifications

Varied reasons were attributed for further study and it included strong passion for the profession, career advancement prospects, inspiration by a role model and better remuneration. The impact and influence of role models cannot be downplayed. However, a minute fraction (0.2%) furthered their studies because of lack of immediate employment. Of the 38% that had

pursued further studies, 72% had done their master's degree programmes while 3% failed to respond. 81% of the HND graduates had gone ahead to do master's degree programme. 94% of those who had furthered their studies were employed while 49% who were employed had not furthered their study. Only 60% of the HND graduates were employed while 91% of the BTech graduates had jobs.



Graduate Employment

About a third (66%) of the respondents were employed at the time of the tracer survey. The study further assessed the relationship of first employment to the relevance of the Civil Engineering programme and only 12% had their first jobs not related while 18% failed to respond (Fig. 10).

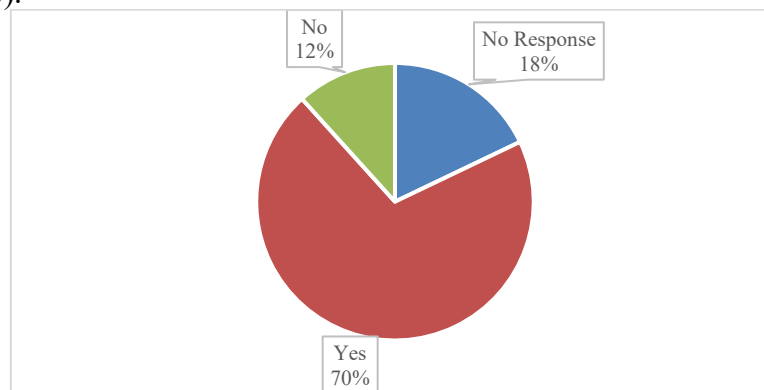


Figure 10: Relationship of first Job to Civil Engineering

Most respondents got to know of their first jobs through recommendations (25%), information from friends (21%), response to job advertisements (20%) and industrial attachment linkages (18%). Very small proportions had their first jobs through national service postings (1.4%) and family businesses (0.9) while 2% got their first jobs as walk-in applicants. That notwithstanding, majority (58%) started looking for their first job after completing school, 23% while in school and 12% when about completing.

Out of the 66% employed respondents, 19% stayed in their first jobs for less than three (3) years, 14% for less than two (2) years and 13% between (1) to six (6) months. Only 3% had spent from three to four years in their first jobs. Job attrition reasons were found to include

career challenges (42%), salaries and benefits (36%) while 18% stated that their reason was related to special skills.

Of the employed graduates, 57% are in construction companies and the rest are scattered in various industries such as education, mining, agriculture, electricity, retail and wholesale among others.

Fig. 11 shows the spread of useful skills and competencies acquired through school that enabled them to perform well in their jobs. The notable useful skill and competency were problem-solving skills followed by communication skills and critical thinking skills. Entrepreneurship was not seen to be a skill that highly impacted their ability to perform on the job.

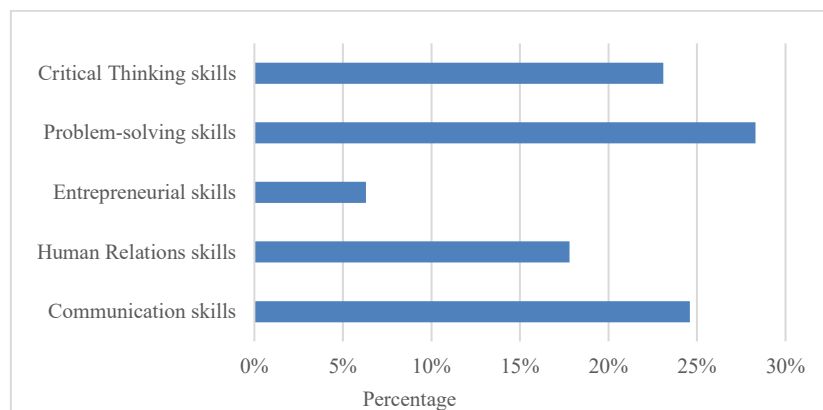


Figure 11: Useful Skills Acquired from School Relevant to Job

The most important reason respondents cited for staying on their particular job was that the jobs were related to their programme of study (37%). Other reasons included relation to special skill and a great challenge in their careers. On challenges graduates face at the workplace, the results indicated that 43% felt they lacked practical skills, 40% lacked the skill of using construction software and other structural analysis design skills while 5% indicated they lacked communication skills. A small percentage (4%) indicated they lacked computer programming and skills in estimation and quantities.

Graduate Unemployment

The reasons for graduate unemployment are varied. In this tracer study as can be seen from Fig. 12, the highest-ranked reason was no job opportunity (54%) which was followed by “could not

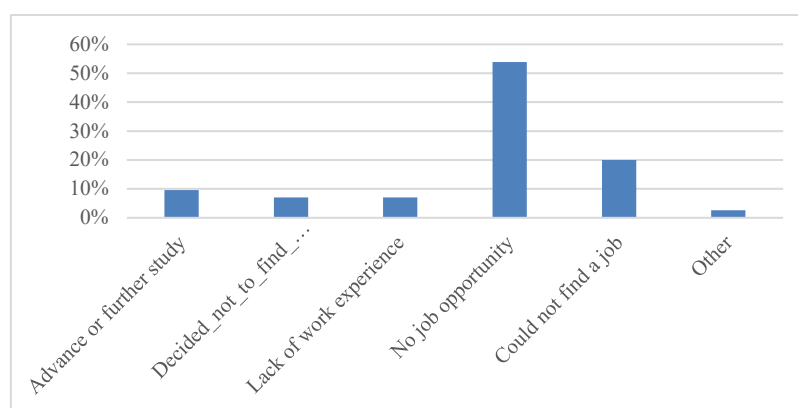


Figure 12: Reasons for Graduate Unemployment

find a job". Quite interestingly, 10% were out of job because they chose to further their studies. Seven percent each was attributed to those who decided not to seek for jobs and those who lacked work experience.

Graduate Earnings

The initial monthly earnings of 40% of respondents range GHC500.00 to GHC1000.00 whereas 31% ranges GHC1000.00 and GHC1500.00. About seven percent had salaries above GHC1500 while 22% receive less than GHC500.00. See Fig. 13.

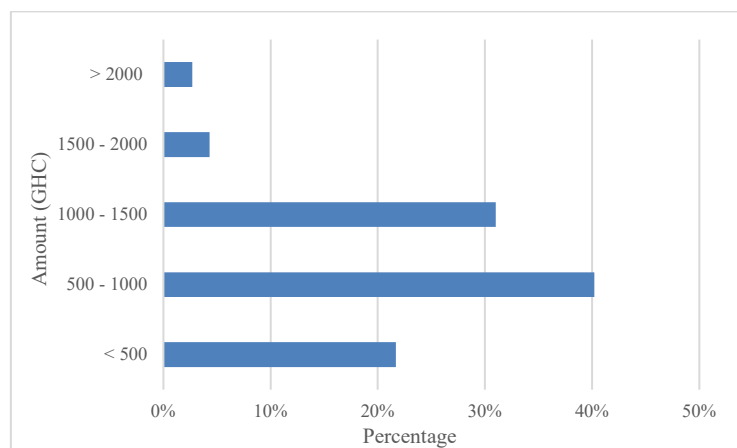


Figure 13: Salary Range of Graduates

The results indicate that earnings of most graduates fall within the range of living wages using a minimum wage of GHC11.82 per day. That aside, 49% of respondents remain unmarried and hence, monthly income may be practical and convenient enough for sustenance.

Curriculum

Relevance

The survey looked into the relevance of the curriculum to the jobs that have currently employed graduates. Only 15% responded that the curriculum was not relevant while 7% failed to respond.

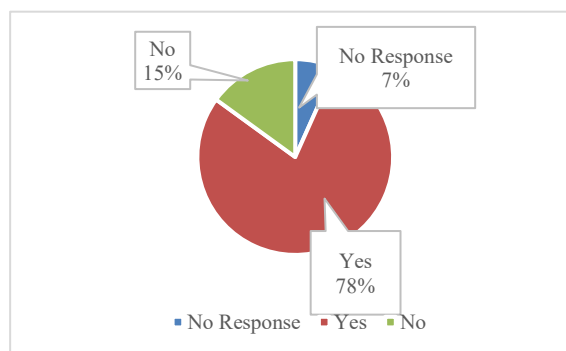


Figure 14: Relevance of Curriculum to Job

Of the respondents that found the curriculum relevant, 41% had applied their school acquired knowledge in about 51-75% of their activities, 23% had applied 76-100%, 15% of them applied 26-50% and 11% had applied 25%.

Weaknesses and Challenges of Program

Every program undoubtedly has challenges and weaknesses. As can be seen in Fig. 15, the impression of most graduates was the fact that the Civil Engineering programme did not concentrate much on construction software (27%). Another 17% indicated that some facilitators lacked the required teaching skills and competencies related to their areas of teaching.

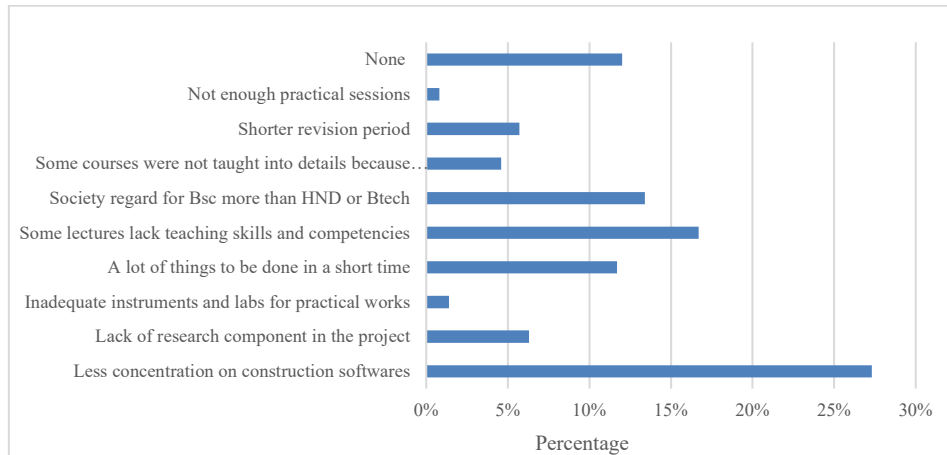


Figure 15: Weaknesses and Challenges of Program

Some 13% of respondents cited society's regard for BSc over HND or BTech graduates as a very worrying trend. Only 1% each, saw not enough practical sessions and inadequate instruments and labs for practical works as weaknesses in the programmes run in the Department. Again, 5% said some courses were not taught into details because of time limitations and 6% indicated a lack of research component in the project work and shorter revision periods as weaknesses.

CONCLUSIONS

The study is a summary of findings from 257 HND and BTech (Top Up) graduates from 2005-2020. It can be concluded that the Civil engineering programme is still dominated by men and structural engineering is an area of choice for most of the graduates. Some 43% of the graduates had to pay for their own education and most of them were influenced by their strong passion for the profession to select the programme. The follow-up study indicate that 38% have completed further studies and 66% are gainfully employed with 57% in the construction industry while only 11% had their first jobs not related to the Civil Engineering programme. Fifty-four percent of the unemployed cited no job opportunities as the reason why they had no jobs. From the study, majority of students were able to build their competencies using their school-based knowledge. Skills needed to perform in the industry were satisfactorily acquired. The study showed acquired competencies from the school, further study and the project specialization affected employment significantly. The challenges identified in the curriculum was lack of concentration on current construction software and lack of research component in project work by students.

RECOMMENDATIONS

Efforts should be made to encourage female students to enroll unto the programme.

The department should strengthen linkages with industries to provide ready market for the graduates for employment. Entrepreneurship education should be intensified to help students start their own companies to curb the unemployment challenges.

Current construction softwares be incorporated in the teaching of the Civil Engineering programme.

Research component be incorporated into the curriculum to enable the graduates to be more competitive on the job market.

The survey should be replicated in other departments and the graduates tracked continually to enhance constant linkage between the departments and the graduates. It could help provide avenue for places for attachment and employment for students when such graduates are gainfully employed or set up their own companies. Graduates who lack employment could be helped when employment opportunities come up.

The public must be educated on the CBT concept of teaching and grading.

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