

Effect of technical university students' language proficiency on their academic performance measured by their final cumulative grade point average

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Abstract

The importance of language in Technical and Vocational Education and Training (TVET) cannot be over-emphasized. Although TVET focuses on skill acquisition, the desired skills cannot be acquired, if students are not proficient in, and cannot fully comprehend, the language of instruction during lectures and examinations. It was for this reason that, the current study looked at the effect of students' language proficiency on their academic success as measured by their final cumulative grade point average (CGPA) using multilevel modelling techniques. Gender differences in the students' academic success were also explored. The study was based on a data-set of 17,714 students (5,882 female and 11,832 males) from one Ghanaian Technical University in Ghana. It was observed that communication skills course grades, the proxy measure of their language proficiency, accounted for 15% of the total variance in the students' CGPA. This confirms the important role language plays in TVET. The study findings are expected to assist TVET stakeholders in systemically re-orienting the minds of TVET students towards proficiency in the language of instruction.

Keywords: academic success; cumulative grade point average; proficiency in English; multilevel modelling; TVET

Introduction

Technical and Vocational Education and Training (TVET) is steadily gaining popularity both locally and internationally with many governments prioritizing it for education and national development (Marope et al., 2015). It has also become part of the operational priorities of the G20, the Organization for Economic Co-operation and Development (OECD), and many multilateral organizations such as the International Labour Organization (ILO), United Nations' Educational, Scientific and Cultural Organization (UNESCO) etc. (Paryono, 2017). Currently, the Ghanaian governments is investing a lot in TVET for

the reason that it is highly strategic. As argued by Amedorme & Fiagbe (2013), no country can develop without quality TVET given that it is able to: (a) Impart individuals with skills and knowledge necessary for becoming productive members of society. (b.) Reduce unemployment especially, for those who cannot succeed academically. (c) Improve the economic development of a nation by reducing poverty i.e., it equips individuals with employable skills that can enable them to establish their own businesses and if possible, employ others (Adogpa, 2015).

TVET in Ghana started early in the 19th century. By the year 1925, five Technical

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Schools (TI) offering various courses in woodwork, metalwork and brickwork were operational in the country (Foster, 1965). Currently, three different forms of TVET are functional in Ghana – the informal, non-formal and formal systems. The informal system is aimed at helping individuals acquire a wide range of skills and knowledge from designated training venues in or outside the home; mostly through traditional apprenticeships programmes. The non-formal system has clearly defined learning objectives and is delivered through seminars, workshops and short courses but is often not certified. The formal system on the other hand, is usually institutional based, graded and certified. Formal TVET in the past has grown from Technical Schools to Technical Institutes, Polytechnics and now fully fledged Technical Universities (Amedorme & Fiagbe, 2013).

TVET in Ghana however, has not been without challenges. A major challenge has been the mismatch between what employers expect and what graduates can provide. Several factors including poor teaching and inappropriate learning environment and materials are believed to be responsible (Feast, 2002; Hill, Storch and Lynch, 1999). Nonetheless, other researchers contend that students' struggle with the language of instruction is another important factor i.e., the difficulty of grasping TVET concepts, knowledge and skills in a language student cannot fully comprehend might have contributed to the observed mismatch (Amedorme & Fiagbe, 2013; Feast, 2002).

This latter reason stems from the language policy in Ghana, which has had a chequered history. Previously, the policy was that, the mother tongue (L1) should be the medium of instruction from kindergarten to primary three after which English becomes the medium of instruction (from primary four).

The current policy however is, English should be the medium of instruction from the start. The change in policy was necessitated by claims that: (1) Some teachers continued with the L1 even up to primary six. (2) And there were inadequate teaching materials in the L1.

The multilingual situation in the country, especially in urban schools further made the previous policy difficult to apply – teachers were often not literate in the L1 since they might not necessarily speak the L1 of the community where they teach (Owu-Ewie, 2006). This is because Ghana has 16 regions and 216 administrative districts and a total population of about 24,233,431 drawn from more than a hundred ethnic groups - each with its own unique language and culture. The official language however, is English (Ghana Statistical Services, 2011; Anyidoho & Dakubu, 2008). According to Bodomo, Anderson & Dzahene-Quarshie (2009: 360). The term multilingual is applied to 'countries with one official or government language, usually an imposed colonial language which is not spoken by the majority of the population. Such is the case of most of the so-called developing countries of Africa, Asia and Latin America. Often there are large numbers of indigenous languages in addition to the imposed colonial-turned-official language'.

Another argument was that, at the point of transition from L1 to L2 pupils had not mustered up the L1 effectively as the transition is often premature and abrupt. The early-exit makes it difficult for pupils to understand the complex workings of their L1 in order to efficiently transfer into the L2 (Benson, 2000). This transition process is important because when schools provide children with quality education in their L1, they give them knowledge and literacy that help them make the English they hear and

read more comprehensible (Carter et. al., 2020). Debates about the change are still on-going. For instance, Skutnabb-Kangas, (2000) argues that denying the Ghanaian child the use of his/her native language in education is committing the crime of 'linguistic genocide' given that the level of first language proficiency has a direct influence on second language development and cognitive and academic growth (Baker, 2001). Second language acquisition research also supports the view that, the level of proficiency in the L1 has a direct influence on the development of proficiency in the second language and that a disruption in first language development has in some cases, inhibited second language proficiency (Lewelling, 1991).

While these debates are on-going, students continue to grapple with the language the educational system has chosen to use as a measure of their success and academic progression to the next level. For example, a good pass in English is a key admission requirement for entry into any Ghanaian tertiary education system (University or College). A credit in English for instance, is required by Ghanaian Technical Universities (GTUs) into bachelor programmes. The frustration of prospective students from Technical Schools is explained by Apraku (2011). According to him, technical students still have to write and pass English in the Secondary School Examinations before getting admission into the TUs given that English is the medium of instruction for the transfer of ideas and knowledge in the classroom. This is done to ensure that admitted students have the requisite English proficiency level to successfully complete their discipline specific programmes (Adogpa, 2015).

This stringent admission requirement notwithstanding, there is a high degree of

agreement among University lecturers that students often do not have the requisite language proficiency to survive and most importantly excel in their chosen academic fields (Feast, 2002). Complains about student's low English proficiency level, as they participate in class discussions and write assignments and examinations have also been reported severally in staff common rooms and at department/faculty meetings (e.g. during award meetings). This challenge is purported to have continued even after students have gone through the compulsory English course (Communication Skills) meant to further support tertiary students in their academic pursuits. Communication Skills (CS) is a two-semester compulsory undergraduate first-year course, aimed at further equipping students with the level of English required for the successful completion of discipline specific programmes.

Unfortunately, the perception of some TVET students concerning language courses in general is very disappointing. As pointed out by Aina, Ogundele & Olanipekun (2013), many TVET students have the mentality that language should not be emphasized in TVET, given that its focus is on the acquisition of practical scientific knowledge involving the special use of creative minds, manipulative skills and attitudes often gained through a lot of laboratory and workshop practice; and not language. What many of these students however, fail to understand is that, language proficiency is necessary, if they are to: (a) Understand and digest course materials. (b) And communicate effectively in class discussions, presentations, assignments, examinations, to mention but a few (Win and Miller 2005; Jalili-Grenier and Chase, 1997). Besides, students are likely not to do well if they do not understand instructors or cannot answer questions, do homework or respond

to examination questions in the language of instruction (Feast, 2002).

Interestingly, a growing number of studies suggest a link between academic success and language proficiency; though some contradictory evidence also exist. In other words, while some studies claim a positive association, others see a negative association between academic success and language proficiency (Wongtrirat, 2010; Kerstjens et al., 2000; Hill et al., 1999; Ayer et al., 1992). For instance, Feast (2002) when investigating the impact of the International English Language Testing System (IELTS), on academic performance (GPA) in *Australian* universities found a significant but weak positive relationship between English proficiency as measured by IELTS scores and international students' performance (GPA). Oliver, Vanderford and Grote (2012) in another large-scale quantitative study involving 5,675 undergraduate and postgraduate students found a weak but significant relationship between IELTS scores and Weighted Average Marks (WAMs) of undergraduate non-English speaking background students. García-Vázquez et al. (1997) examined the strength of the relation between proficiency in English and Spanish and academic success among *Mexican and American* students. The study showed that English proficiency influenced scores on standardized tests and GPA.

Other studies however, have found no statistically significant relationship between IELTS and academic performance (Gibson and Rusek, 1992; Rusek, 1992) or were inconclusive (Dooley 1999). Ayer and Quattlebaum (1992) in a study involving 67 Asian Engineering master students at Tennessee Technological University argued that, English proficiency measured by Test of English as a Foreign Language (TOEFL)

scores was not an effective predictor of academic achievement. Krausz et.al (2005) when examining the relationship between academic performance and TOEFL scores among international Master of Business Administration Accounting students, similarly contended that TOEFL scores were not associated with academic performance.

Of course, studies examining the impact of language proficiency on international students' academic performance abound, as shown above. However, Dooley (1999:115) recommends that each institution should conduct its own studies concerning the link between language proficiency and academic success and make decisions about acceptable levels of language proficiency because of the difficulty involved in generalizing findings from different contexts.

Another issue informing this study is that similar studies in the past have focused on international students and not on local students and TVET in particular. It was therefore necessary to focus on TVET in Ghana at the higher education level. Specifically, the study focused on the impact of language proficiency (measured by communication skills course grades) on students' academic performance (measured by their CGPA). Moreover, new methodologies that aid a better understanding of the issue are available. For instance, the use of multilevel statistical techniques can aid the calculation of the proportion of total variance in the students' CGPA attributable to language proficiency. The overall purpose of the study was to look at the effect of language proficiency on academic success (CGPA). The study was therefore guided by the following research questions:

1. Are there gender differences in TVET students' academic

performance in terms of their graduating classes or CGPA?

2. To what extent does TVET students' language proficiency (measured by their communication skills course grades) affect their academic performance (measured by their final cumulative grade point average (CGPA))?

Methodology

A case study approach was taken to ensure an in-depth knowledge is gained. GTU is one of the first three TVET institutions in Ghana and therefore an experience trainer in TVET. In other words, it typifies a Technical University in Ghana. Granted, the case study approach limits the study findings to GTU nevertheless, many valuable lessons including the need to look within institutions rather than between institutions can be learnt.

The study was based on a secondary data-set from one GTU students' academic records. The data-set was made up of three student cohorts (2015/2016 – 2017/2018) and a total of 17,714 students from all five faculties of the university. Specifically, the data-set contained the following student information: Registered number, faculty, department, programme, gender and Cumulative Grade Point Aggregate (CGPA) as well as raw scores in first and second semester Communication Skill (CS). The data was accessed after permission was granted by the administrative owners of the data-set (GTU Management).

The data-set was analyzed using multilevel statistical techniques aided by MLwiN 2.4 software. The use of multilevel modelling brought several advantages to the study. For example, students were nested within departments in recognition of the hierarchy inherent in the data-set. The techniques

further allowed the study to analyze simultaneously the influence of individual factors (Mauny et al., 2004). Compared to a more traditional regression model, the principal advantage of multilevel modelling is that, unexplained variances can be explained using explanatory variables (Belaïd, Roubaud & Galariotis, 2019). In the analysis students' CGPA served as the predicted while CS score served as the predictor variable. In all, two linear models were fixed using a two-level model with department at level 2 and student at level 1. The first model had no explanatory variable and was used to estimate 'raw' performance (CGPA). The second model builds on the first and second semester Communication Skills (CS1 and CS2) respectively. This model was used to estimate the effect of language (CS) on CGPA.

Results

The study involved a total of 17,714 students; made up of 5,882 (33%) females and 11,832 (67%) males. The majority (46%) obtained second class lower division (CGPA of 2.0 – 2.9) with a very few of them (7%) obtaining first class honours (CGPA of 4.0 – 5.0). While a very insignificant number (1%) went home with pass certificate (CGPA below 1.5 – 1.0), a few (17%) also had a pass (CGPA of 1.5 – 1.9) as presented in Table 1.

Table 1 Distribution of students obtaining the various graduating classes by Gender

Class ¹ \ Gender	First Class		Second Upper		Second Lower		Third Class		Pass		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Female	223	3.80	1412	24.00	2941	50.00	1235	21.00	71	1.20	5882	33.20
Male	982	8.30	3798	32.10	5171	43.70	1798	15.20	83	0.70	11832	66.80
Total	1205	6.84	5210	29.44	8112	45.63	3033	17.25	154	.84	17714	100.00

¹Class: 4 – 5 First Class; 3 - 3.9 Second Upper; 2 - 2.9 Second Lower, 1.5 - 1.9 Third Class, and 1 - 1.49 Pass

Source: Secondary data from GTU (2015/2016 – 2017/2018).

Figure 1 shows the distribution of male and female students obtaining the various graduating classes in the period. Comparatively from Figure 1, the males appear to be doing well generally perhaps, because of their large numbers. For example, the proportion of males who obtained first class honours (8%) was double the proportion of females who obtained same honours (4%).

However, the proportion of females in the second-lower and third-class categories (i.e., 50% and 21% respectively) were higher than the proportion of males obtaining these classes (44% and 15% respectively) as shown in Figure 1. The descriptive statistics of the students' final cumulative grade point average (CGPA) were $M = 2.60, SD = 0.72$ for the males and $M = 2.82, SD = 0.79$ (see Table 2) suggesting the males outperformed the females. To see whether the observed differences are statistically

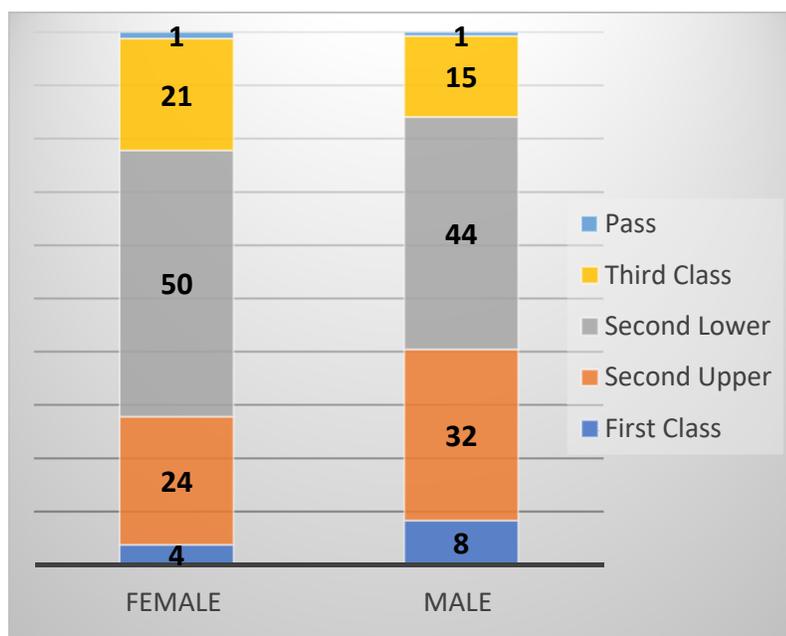


Figure 1 Distribution of students' graduating classes by gender

significant, an independent t-test was used to test the null hypothesis that, there are no gender differences in the CGPA of the students. The results are presented on Table 2.

The results from Table 2 indicate the t-value of 16.577 at 17713 degrees of freedom was observed to be statistically significant at 0.05 significance level (significance is 0.00), suggesting that there is a significant difference between male and female students in terms of CGPA (See Table 2). Hence, the null hypothesis is rejected and the alternative

From the variance part of the model, the between-department and within-student variances were 0.231 and 0.486 respectively and both were significant at 0.05 significance level. The total variance explained by Model 1 was 0.717 (0.231 + 0.486). The Variance Partition Coefficient (VPC) was therefore 32% (0.231 /0.717 × 100%). In other words, 32% of the total variance in the students' CGPA was due to differences between departments. The within student variance on the other hand, was 68% (0.486 /0.717 × 100%). This indicates that

Table 2 The results of the t-test for equality of means

	Mean	Std. Deviation	t	Df	Sig. (2-tailed)
Male	2.60	0.72	-16.577	17713	.000*
Female	2.82	0.79			

*significant at 0.05 level

hypothesis, which says there are gender differences in the CGPA of the students is accepted.

Effect of language proficiency (CS) on academic performance (CGPA)

The estimates of Model 1 can be found on Table 3. The Model has two components the fixed and the random/variance parts. The fixed effect is the constant or slope while the variance component indicates how well a department is doing compared to other departments within the same university. From the fixed part of the model, the estimated average CGPA across all departments was 2.414. This average was statistically significant at 0.05 significance level (significance was based on whether or not the estimated value was 1.96 times larger than the associated standard error Gutting et al., 1998). Per the grading system of the University, this suggests that the average student graduated with second class lower division.

68% of the variances in the students' CGPA was due to differences within students. Comparatively, much of the differences in CGPA laid within students not departments (see Table 3)

The estimates of Model 2 are presented on Table 4. The total variance accounted for by language (CS2) was 15%. This means that language is responsible for 15% of the total variance in the students' performance. Thus, language to an extent, makes important contribution to student performance. The average CGPA across all departments, after controlling for Communication skills (CS1), was 2.439. A comparison of Model 2 and Model 1 in terms of equivalent values shows that the between department variance increased from 0.231 to 0.241. The percentage variance attributable to departments was therefore 40%. The difference within students however, dropped from 0.486 to 0.366; indicating that still

Table 3 Model 1: The Null Model ('raw' CGPA)

	CGPA
Fixed Part (Coefficient)	
Cons /Intercept	2.414 [0.089] *
Random Part	0.231 [0.063] *
Variances between departments	
Variances between students	0.486 [0.007] *
Total	0.717
% Differences between departments	32
% Differences between students	68

*significant at 0.05 level

much (60%) of the differences in CGPA was within students.

The view that, language may be an important predictor of student performance was also supported by the slope of the Model2. The slopes were 0.011 (CS1) and 0.022 (CS2) respectively indicating a direct relationship between language proficiency and CGPA. Thus, a unit increase in CS1 increased the students' CGPA by 0.011 units. A unit increase in CS2 similarly increased the students CGPA by 0.022. It could therefore, be argued that impact of language proficiency on performance became more as the students' progressed in their study of the English language.

Discussion

This section focuses on the implications of the study for practice in higher education. To begin with, it is important to mention that, student performance is influenced by many factors one of which is the language of instruction. As demonstrated by this study, the contribution of language to CGPA in the study's context was quite substantial – a whopping 15%. This clearly point to the important role language plays in success in TVET. The estimated effect of language in the study's context however, is comparatively higher than what has been found by some previous studies. For instance, an earlier study by Kerstjens et al. (2000) at the Royal Melbourne Institute of

Table 4: Model 2 - Controlling CS1 and CS2

	CGPA
Fixed Part	
Cons/ Intercepts	2.439 [0.009] *
CS1	0.011 [0.001] *
CS2	0.022 [0.001] *
Random Part	
Variances between departments	0.241 [0.064] *
Variances between students	0.366 [0.005] *
Total	0.607
% Differences between Departments	40
% Differences between students	60
% Total differences explained	15

*significant at 0.05 level

Technology (RMIT) found International English Language Testing System (IELTS) score to be accounting for 9% of the total variation in the academic performance of the Higher education group. Speculatively, it is possible that influence of language on performance in TVET and perhaps in a multilingual country like Ghana is higher. This view is supported by Djihed (2013), who when investigating the reading difficulties of Algerian students concluded that most of the students suffered from linguistic handicap – a dominant reason for poor reading comprehension and academic performance.

Perhaps, this explains the reason why a good pass in the language of instruction is a key requirement for admission into any tertiary institution in Ghana. As explained by Jadie et al. (2012), a low proficiency in the language of instruction can be a barrier to learning and subsequently academic success in that, one needs to be adequately proficient in the language of instruction in order to understand lessons, course content, course materials including text books, ask or answer questions in the classroom, answer oral, practical and written examinations and understand academic work in general; regardless of the discipline. Students who have language problems may therefore, not be able to do well academically. For instance, students with language challenges can even perform poorly in Mathematics (Aina et. al, 2013).

This notwithstanding, others have argued that language proficiency should not be emphasized in TVET because the focus is on employable skills acquired through a lot of workshop and laboratory work practice involving the special use of manipulative skills, creative minds, and attitudes (Ogundele, 2010). Another claim is that TVET students need skills that are self-

fulfilling, not the grammar of an imposed language that inhibits technological advancement and national development (Aina et. al. 2013). These claims are however, refuted by Adogpa, (2015) who argues that language plays a key role in instruction in that, the desired skills cannot be acquired if a student has difficulty with the language used to instruct students on how a practical activity should be carried out. Challenges with language also have implications for skill acquisition and performance at work. The argument is that, when people are instructed in a language that is already a barrier, the consequence is a push of ill-equipped trainees to a terminal point and hence, the possible mismatch between what students can offer and what employers expect. TVET students therefore, need to be proficient in the language of instruction in order properly understand the course content and succeed academically.

To further address the above issue, some have called for an overhaul of the TVET sector. Boateng (2012), citing Lillies and Hogan (1983), recommends a whole school curriculum re-orientation in the Ghanaian educational system. Previously, students did not study English as a subject in TVET pre-tertiary institutions. Also, although currently English is being studied, it is studied only as part of a general course. As such the English learnt is not as detailed as what is studied in the regular secondary schools. This notwithstanding, TVET students are taught and examined theory and practical work in English and this can be frustrating at times (Adogpa, 2015). Another suggestion for addressing the issue has been to further improve the teaching of English in TVET institutions (Amedorme, & Fiagbe, 2013). Apraku (2011) further recommends that higher education institutions have to take a second look at the entry requirement for TVET students who excel in their areas of

specialization but may be deficient in English. He contends that many brilliant TVET students may divert as a result of frustration with language issues if the issue is not addressed.

Conclusion

The study looked at the relationship between proficiency in the language of instruction and academic success in TVET. A major finding was that the language of instruction is an important predictor of academic success; having accounted for 15% of the total variance in the students' performance. Although the general perception among some TVET stakeholders is that, language should not be emphasized in TVET, the discussions above have demonstrated that proficiency in the language of instruction is important even in areas of skill acquisition.

Recommendation

The study findings and the discussions so far suggest the need to re-look at the language policy in the country as well as the language curriculum in TVET institutions in order to provide more support for TVET students in particular. Of special importance, is the need to fight the perception that language is not important in TVET.

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