DO ENTREPRENEURIAL SKILLS ACQUIRED FROM TECHNICAL SUBJECTS HELP SECONDARY SCHOOL GRADUATES IN SELF-EMPLOYMENT IN KENYA?

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ABSTRACT
We ran logistic regression on a data from a sample of 186 teachers and 393 secondary school graduates in order to explore the relationship between entrepreneurial skills acquired by graduates from technical subjects taught in secondary schools in Kenya and the graduates' self-employment. The study was carried out in Mombasa and Bungoma counties with the secondary school graduates of 2009, 2010 and 2011. We find that the odds ratio of a secondary school graduate starting a business from the entrepreneurial skills acquired while at school increase by approximately three times if they acquired business planning skills from the technical subjects. Since each student takes at least one of the 10 technical subjects on offer, we recommend that in the light of these findings, the teaching of technical subjects at secondary school level should be strengthened with more practical work being required of the students to equip them with the necessary skills for further training at tertiary level or the world of work after secondary school.

Key words: *Entrepreneurial skills; Technical subjects; Secondary school graduates; Self-employment*

1. Introduction

Skill acquisition is the process of acquiring or gaining effective and ready knowledge in developing ones aptitude and ability in a particular field. Skill acquisition in Kenyan secondary education level was meant to equip students with more practical and less theoretical knowledge on income generating skills. Mbionwu (2008) noted that, when youths are given adequate training in skills, they could be self-employed after schooling; hence they become active partners in both community and national development. Equal to this, effective training of students in skill acquisition provides a platform for technological excellence in the face of the globalization of the world economy. Supporting this view Ottah (2008) stated that, employment requirement in most establishments was changing every day due to technological impact as such our educational system has a daunting task to equip consumers of education with the required marketable skills.

A study by Olufunke, Kayode and Okununga (2012) was designed to investigate the acquisition of entrepreneurial skills via the provision and utilization of facilities and equipment in Lagos State Public Junior Secondary Schools. The findings of the study by Olufunke et al (2012) revealed that,

from the provision of facilities, students were able to acquire entrepreneurial skills moderately; also that the more the students utilized the provided facilities, the more they acquired the entrepreneurial skills. The study recommended that schools should be provided with more facilities and equipment so that the graduates of Junior Secondary Schools would be able to acquire entrepreneurial skill for sustainability.

The UNESCO (2003), while addressing the need for fostering entrepreneurship mind sets and promoting entrepreneurship education among the youth, recommended TVET as a sure way out of poverty facing the youth worldwide today. It was a fact that the society needed men and women that were capable of establishing businesses that would help cushion the adverse effects of mass unemployment and poverty which entrepreneurial skills in TVET affords. Entrepreneurial studies allowed the beneficiaries to consider various occupational possibilities, the work required, available rewards, necessary training and relative advantages and disadvantages of each (Nwoye, 2011).

Introducing entrepreneurial studies as an explicit goal in the curriculum was a clear signal that it was important for every student. Moreover, it would make it easier for teachers to spend teaching hours on the subject. A general trend should be on how to shift national curriculum from content to competences. This process would strengthen competency-based teaching and learning to make it easier for entrepreneurship to be included in the school programmes. It was important that schools extend entrepreneurial training to all fields of study in TVET. This, Dike (2009) opined, would enable graduates of TVET to make intelligent use of the product of technology and develop better entrepreneurial skills to become more innovative workers. Persons who had passed through TVET programme became more dutiful and conscientious in their duties. TVET reduced unemployment in the society (Oranu, 1991).

In a country like Kenya where there is high rate of unemployment, likely brought about by the inability of the government to create jobs for the teaming youth (Muhammed, 2010), meant that entrepreneurship in TVET could be employed to develop saleable skills in the youth so that they could become easily self-employed or employable after graduation. The promotion of entrepreneurial studies would create opportunities for employment with subsequent income multiplier effects for the surrounding community. If job creation and entrepreneurial activities were carefully co-ordinated, then it would be argued that increased entrepreneurship would no doubt help the most disadvantaged in the labour market. To Maigida, Saba and Namkere (2013) the promotion of entrepreneurial skills in TVET should form an array of developmental programmes and policies in technical and vocational institutions.

Skill did not depend solely upon a person's fundamental, innate capacities but had to be developed through training, practice and experience an individual acquired. Skill according to Bolt-Lee and Foster (2003) was the art of possessing the ability to power, authority, or competency etc, to do the task required of an individual on the job. Two fundamental issues were used when a skill was to be acquired. According to Okoro and Ursula (2012), the first was the conditions which promoted acquisition and the second being the change that would occur when the skill was acquired.

There were many processes of acquisition and development in achieving entrepreneurial skills. Okoro and Ursula (2012) outlined the four main stages of acquisition and development of entrepreneurial skills to include:
   (i). Analyze and identify the current and foreseeable skill needs in business, in terms of

management, administrative and technical skills and relative importance of these.

(ii). Identify the entrepreneur's own personal goals, objectives and analyze and evaluate his/her own skills and resources in relation to these.

(iii). Produce a realistic personal development plan for the potential entrepreneur

(iv). Monitor on-going performance on follow-up of the entrepreneur once the business has started and progress made towards developing the new skills that had been previously identified as necessary for the success of the business.

Luthje and Frank (2002) put forward that a positive correlation exists between education and business creation. Based on Timmons and Spinelli (2004) and others who are of the opinion that entrepreneurship can be learnt, Kuratko (2003) observes the decision by many tertiary institutions in Nigeria to design and implement relevant entrepreneurship teaching programme. Entrepreneurial training and education encourages Nigerian to become jobs creator rather than job seekers. It also equips them with skills for constant improvement and innovations in their undertaken.

It is commonly believed that Entrepreneurship education is an absolute imperative that would make a positive contribution to improving the entrepreneurial orientation of the people. Wiklund (1999) postulated that entrepreneurial orientation consist of two components, namely, action orientation, which results in actual entrepreneurial behaviour; and mental orientation or way of thinking of the small business manager, which is not necessarily put into action. According to Alberti, Sciscia and Poli (2004), for effective Entrepreneurship education there should be a relationship between the goals of Entrepreneurship programme, the audiences to which the programme is delivered, the contents of the Entrepreneurship courses or modules, the method of delivery or pedagogy, and finally, the assessment that will be used. This study therefore sought to determine the extent to which entrepreneurial skills acquired from technical subjects have helped in self-employment among the secondary school graduates (SSG) in Kenya.

2. Methodology
2.1. Research Design

The study utilized an exploratory-descriptive survey design. Nieswiadomy (2008) observed that exploratory research design is used when there is limited knowledge in the topic under study. Descriptive survey research design was also chosen because it involves collecting data in order to test the hypotheses or answering questions concerning the current status of the subjects of the study (Kerlinger, 2000; Cohen & Manion, 1994; Gay, 1992). They further note that the design seeks to identify the nature of factors involved in a given situation, determine the degree in which they exist and discover the links that exist between them. The research design was relevant in this study because it aided the researcher in examining SSG' behaviour, attitudes, opinions and perception on how the acquired entrepreneurial skills have helped them in self-employment. The study was carried out in Mombasa and Bungoma counties in Kenya comprising of a total of 14 districts which have secondary schools that offer technical subjects.

2.2. The Sample size and Sampling Procedure

In an ideal situation, data should have been collected from the whole target population in the two counties - Mombasa and Bungoma. But since the population was too large and scattered it was prohibitively expensive to use the whole population in the study. It was also not necessary and practical to make a list of the entire population. Under these circumstances, using Krejcie and Morgan (1970) table for determining sample sizes from any given population, a sample of 186 teachers and 375 SSG were selected from a target population of 367 teachers and 14,590 SSG who

sat for their Kenya Certificate of Secondary Education (KCSE) in the years 2009, 2010 and 2011 in technical subjects. The sample size of the SSG was increased by five percent, hence 393, to take care of any questionnaires that would have gotten lost during data collection. Probability proportional to size (PPS) sampling technique was then used to determine the sample size per County, subject and gender for the SSG. Thus the sub sample proportions for the SSG by gender and subjects and that of teachers who teach technical subjects by county and sex were as shown in the Table 1.

Table 1: Study sample of secondary school graduates and teachers who teach technical subjects by county and sex

| Category | Study Population | | | | Total |
| | Bungoma County | | Mombasa County | | |
	Male	Female	Male	Female	
Teachers	114	50	7	15	186
SSG	173	169	27	24	393

Snowball sampling techniques was used to trace the respondents. For the teachers, stratified random sampling technique was used. These enabled teachers teaching different technical subjects to be represented in the study in addition to having an equal chance of being picked on as respondents.

2.3. Data collection instruments
Questionnaires were used to collect data from SSG and teachers of technical subjects. Given that the respondents were literate and had no problem in reading and answering the questionnaire, it was of great importance to use a questionnaire to save on time when the sample size was as big as 393 and 186 for SSGs and teachers respectively. The questionnaires for the SSG and teachers generated their personal data and opinions on how the entrepreneurial skills acquired by the graduates from technical subjects have helped them in self-employment.

2.4. Model specification
The outcome variable is dichotomous asking whether the respondent's current business results from entrepreneurship skills acquired from technical subject in secondary school (1=yes; 0=no). The preferred regression technique for modeling this kind of outcome variable is logistic regression (LR). The goal is to find the best fitting model to describe the relationship between the outcome variable and a set of explanatory variables. Garson (2012) observes that logistic regression generates the coefficients of a formula to predict a logit transformation of the probability of presence of the characteristic of interest:

$$logit(p) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + \cdots + b_kX_k$$

where *p* is the probability of the presence of the characteristic of interest. The logit transformation is defined as the logged odds:

$$odds = \left[\frac{p}{1-p}\right] = \frac{probability\ of\ presence\ of\ characteristic}{probability\ of\ absence\ of\ characteristic}$$

and

$$\log(odds) = logit(P) = \ln\left(\frac{P}{1-P}\right)$$

3. Results

The SSG in the two counties (Mombasa and Bungoma) were requested to rate the extent to which entrepreneurial skills acquired from technical subjects had assisted them in self-employment. Using four-point rating scale (1 = not useful, 2 = less useful, 3 = useful, 4 = very useful), the SSG were asked to rate the usefulness of the entrepreneurial skills in self-employment. The results are summarized in Table 2. Majority of the SSG in Bungoma County (72.12%) rated business planning skills as being useful or very useful in their self-employed businesses. The same applied to marketing skills (78.18%), book keeping skills (71.82%), costing and pricing skills (70.91%), inventory keeping skills (67.27%), public relations skills (61.82%) and Time management skills (67.27%). Though the majority of the SSG in Bungoma County rated all the entrepreneurial skills as useful or very useful, a few rated business planning skills (27.88%), marketing skills (21.82%), book keeping skills (28.18%), costing and pricing skills (29.09%), inventory keeping skills (32.73%), public relations (38.18%) and Time management (32.73%) as either less useful or not useful at all in their self-employment.

Table 2: A table showing secondary school graduates rating of the usefulness of entrepreneurial skills by county

Rating	County	Business Planning skills		Marketing skills		Book keeping skills		Costing and pricing skills		Inventory control skills		Public relations skills		Time management skills	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Not useful	Bungoma	36	9.16	24	6.11	39	9.92	45	11.45	46	11.7	57	14.57	32	8.14
	Mombasa	10	2.55	5	1.27	8	2.04	6	1.53	9	2.29	7	1.79	10	2.55
	Sub total	46	11.71	29	7.38	47	11.96	51	12.98	55	13.99	64	16.37	42	10.69
Less useful	Bungoma	56	14.25	48	12.21	54	13.74	51	12.98	62	15.77	67	17.14	76	19.34
	Mombasa	6	1.53	7	1.78	20	5.09	7	1.78	22	5.6	7	1.79	24	6.11
	Sub total	62	15.78	55	13.99	74	18.83	58	14.76	84	21.37	74	18.93	100	25.45
Useful	Bungoma	136	34.61	145	36.9	147	37.4	146	37.15	143	36.39	120	30.69	99	25.19
	Mombasa	28	7.12	27	6.87	29	7.38	28	7.12	28	7.12	17	4.35	20	5.09
	Sub total	164	41.73	172	43.77	176	44.78	174	44.27	171	43.51	137	35.04	119	30.28
Very useful	Bungoma	102	25.95	113	28.75	90	22.9	88	22.39	79	20.1	84	21.48	123	31.3
	Mombasa	19	15.7	24	6.11	6	1.53	22	5.6	4	1.02	32	8.19	9	2.29
	Sub total	121	30.79	137	34.86	96	24.43	110	27.99	83	21.12	116	29.67	132	33.59
Grand total		393	100	393	100	393	100	393	100	393	100	393	100	393	100

Note: Freq. = Frequency, % = Percentage

The same applied to SSG in Mombasa County who also pointed out that all the entrepreneurial skills - business planning skills (74.60%), marketing skills (80.95%), book keeping skills (55.56%), costing and pricing skills (79.37%), inventory keeping skills (50.79%) and public relations (77.78%) - as either useful or very useful. Majority (53.97%) of the SSG in Mombasa County believe that time management was either less useful or not useful at all. A fairly good number of the SSG (44.44%) in Mombasa County believe that book keeping is either not useful or less useful.

Descriptive statistics on entrepreneurial skills taught in technical subjects and those acquired by secondary school graduates

To understand the distribution of the variables involved in determining the objective of this study, the mean, standard error of the mean (se (mean)), standard deviation (SD), variance and range of all the variables involved were determined and summarized in Table 3. Thus, as measures of central tendency provided a summary of the whole data, measures of dispersion (Standard deviation, Variance and Range) were computed to understand the variability or spread of distribution of variables. These analyses were enhanced by chi-square tests to determine the extent to which each of the acquired entrepreneurial skill had helped the secondary school graduates in self-employment. This was meant to assist the researcher to determine the variables that were significant and had a moderate or strong relationship between them and the way they had contributed to the success of businesses of SSG.

As can be seen in Table 3, majority of the SSG acquired marketing skills (mean = 0.598; SD = 0.491), book keeping skills (mean = 0.720; SD = 0.500), inventory keeping skills (mean = 0.715; SD = 0.452) and time management skills (mean = 0.669; SD = 0.471). This shows that though there seemed to be some disparities among the counties (Bungoma and Mombasa) in terms of imparting and acquiring of the entrepreneurial skills among students, those who acquired the skills as a result of being taught a technical subject were many and did cut across all the skills.

Table 3: Descriptive statistics for selected variables of interest

Variable	Mean	Se (mean)	SD	Variance	N	Min	Max
I acquired business planning skills	0.468	0.025	0.500	0.250	393	0	1
I acquired marketing skills	0.598	0.025	0.491	0.241	393	0	1
I acquired book keeping skills	0.720	0.023	0.450	0.202	369	0	1
I acquired costing and pricing skills	0.504	0.025	0.501	0.251	393	0	1
I acquired inventory keeping skills	0.715	0.023	0.452	0.204	392	0	1
I acquired public relations skills	0.420	0.025	0.494	0.244	393	0	1
I acquired time management skills	0.669	0.024	0.471	0.222	393	0	1
Rating of business planning skills	2.916	0.049	0.964	0.929	393	1	4
Rating of marketing skills	3.061	0.045	0.884	0.782	393	1	4
Rating of book keeping skills	2.817	0.047	0.938	0.880	393	1	4
Rating of costing and pricing skills	2.873	0.049	0.966	0.933	393	1	4
Rating of inventory keeping skills	2.718	0.048	0.953	0.907	391	1	4
Rating of public relations skills	2.780	0.053	1.047	1.095	393	1	4
Rating of time management skills	2.868	0.051	1.001	1.003	393	1	4

Note: Se (Mean) = Standard error of the mean, SD = Standard deviation, N = Sample size, Min = Minimum, Max = Maximum

A majority of the SSG also rated as useful to their businesses, all the entrepreneurial skills: business planning skills (mean = 2.916, SD = 0.964), marketing skills (mean = 3.061; SD = 0.884), book keeping skills (mean = 2.816; SD = 0.938), inventory keeping skills (mean = 2.718; SD = 0.953), public relations skills (mean = 2.780; SD = 1.047) and time management skills (mean = 2.868; SD = 1.001). This was done after being requested to indicate the usefulness of each entrepreneurial skill using a four-point rating scale (1 = not useful, 2 = less useful, 3 = useful, 4 = very useful) in running of the self-employed business.

Chi-square results
In order to determine which variables to pursue in the logistic regression, we ran chi-square tests between the respondents' current business and selected variables of interest that we hypothesized would have some association with this current business. Table 4 presents these results.

Table 4. Chi-square results for the association between the respondents' current business and selected variables of interest.

Association between	χ^2	p	df	Cramer's V	n
Graduate's current entrepreneurial business and pricing skills	8.676	.008	1	.15	391
Graduate's current entrepreneurial business and business planning skills	24.841	<.001	1	.25	391
Graduate's current entrepreneurial business and inventory skills	3.710	.054	1	.10	391
Graduate's current entrepreneurial business and marketing skills	9.552	.002	1	.16	391
Graduate's current entrepreneurial business and financial skills	6.976	.008	1	.13	391
Graduate's current entrepreneurial business and public relations skills	7.927	.005	1	.14	391
Graduate's current entrepreneurial business and time management skills	6.016	.014	1	.12	391
Graduate's current entrepreneurial business and time graduates' county	7.486	.006	1	-0.14	391
Graduate's current entrepreneurial business and graduates' school location	7.238	.007	1	.14	391
Graduate's current entrepreneurial business and graduates' gender	0.001	.980	1	-0.001	391
Graduate's current entrepreneurial business and type of school	24.341	<.001	4	.25	391
Graduate's current entrepreneurial business and KCSE year	18.498	<.001	2	.22	391
Graduate's current entrepreneurial business and technical problem solving	12.580	<.001	1	.19	367
Graduate's current entrepreneurial business and use of technical books	8.090	.004	1	.14	389
Graduate's current entrepreneurial business and teacher's guidance	25.638	<.001	1	.26	391

Note. df=degrees of freedom; n=cases with no missing data for the variables; Cramer's V: weak association=.00-.19; moderate association=.20-.49; strong association=.50-1.00

From these results, the only variables that at least have a moderate relationship (as measured by Cramer's V) with the graduates' current entrepreneurial business are business planning skills; the secondary school where the graduate sat for KCSE; the year the graduate sat their final examination for Kenya Certificate of Secondary Education (KCSE) and whether the graduates were guided by their teachers in utilizing entrepreneurial skills for business.

Logistic regression
We fit a logistic regression model (LRM) to estimate the effect of the entrepreneurial skills acquired in secondary school on the respondents' current entrepreneurial business. The outcome variable is the current business resulting from the entrepreneurial skills acquired in school (1=yes acquired; 0=not acquired). The explanatory variable is acquisition of business planning skills (1=yes acquired; 0=not acquired). Of the seven key areas of skill acquisition, only business planning skills had a moderate relationship with the graduates' current entrepreneurial business (χ^2 (1) = 24.84, p<.001, Cramér's V = 0.25, N=391). Table 5 presents the results of the logistic regression.

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Table 5: Logistic regression coefficients of whether the current business results from the entrepreneurial skills acquired from the technical subjects (n=393, 95% confidence interval in brackets [ ])

	Current business results versus the acquired entrepreneurial skills	
	Model 1	Model 2
Business planning skills	2.87***[1.89-4.37]	2.57***[1.62-4.08]
Type of school: Single sex boarding (ref)		
Mixed day		1.26 [.69-2.27]
Mixed boarding		1.58 [.56-4.41]
Single sex day		.99 [.45-2.16]
Mixed day & boarding		.42** [.23- .79]
Guided by teachers on skills utilization		2.57*** [1.63-4.06]
KCSE year- 2009 (ref)		
KCSE year- 2010		.66 [.37-1.19]
KCSE year 2011		.33**[.17-.63]
Pseudo R2	0.05	0.14

**p<.01, ***p<.001

In model 1, we fit a bivariate association between the outcome and explanatory variable. In model 2, we account for the other covariates that had a moderate relationship with the response variable. These variables are: the secondary school where the graduate sat for KCSE (1=Single sex boarding; 2=Mixed day; 3=Mixed boarding; 4=Single sex day; 5=Mixed day & boarding); the year the graduate sat their final examination for Kenya Certificate of Secondary Education (KCSE) (1=2009; 2=2010; 3=2011) and whether the graduates were guided by their teachers in utilizing entrepreneurial skills for business (1=yes; 0=no).

In model 1, the odds of the respondent's current entrepreneurial business having resulted from the business planning skills acquired from taking a technical subject in school increase by 2.85 times ($p<.001$). This effect is still large, 2.57 ($p<.001$) even after accounting for the covariates introduced in model 2. Because of resource inputs, contextual factors, location and availability of teachers, certain schools do not offer certain technical subjects. For instance, schools located in urban settings are likely not to offer agriculture which requires arable land for practical work and examination. Because of this pre-disposition, we introduced as a covariate, the type of the former school of the graduate.

Adjusting for other covariates in the model, the results suggest that in reference to graduates from single sex boarding schools, the odds of engaging in entrepreneurial self-employment reduce by 0.42 ($p=.007$) for graduates from mixed day and boarding schools. But if the graduates were guided by their teachers on utilization of entrepreneurial skills in business while still in school, the odds of engaging in entrepreneurial self-employment increase by 2.57 ($p<.001$). Consistent with what we expected, the results suggest recent graduates are unlikely to be engaged in entrepreneurial self-employment. The sample had graduates of 2009, 2010 and 2011. In reference to graduates of 2009, the odds of engaging in entrepreneurial self-employment for those who graduated in 2011 reduce by 0.33 ($p=.001$). In reference to the graduates of 2009, the odds also reduce for the graduates of 2010 by a factor of 0.66 ($p=.172$), although this result is not statistically significant.

4. Discussion and Conclusion

According to the findings, the effect of business planning skills on business start-up among the SSG was large and significant. This finding corroborates with the finding of Akpotowoh and Amahi (2006) who established that the skills acquired in any of the area of business related progamme promotes training in entrepreneurship as well as equip graduates with requisite skills to establish and run small businesses of their own. It also corroborates with the findings of Erhurum (2007) who also noted that most entrepreneurial skills come by learning and practicing. The study established that the acquired business planning skills play a very crucial role in the start-up and running of business among the SSG of technical subjects. We suggest therefore that there should be some form of school-work-based learning incorporated in schools as an integral part of the entrepreneurial skills development strategy in form three and four in technical subjects. Specifically, the schools should provide real-world examples on how the students would apply what they learn as well as in-class instruction which should be relevant to the student's needs. Toward this, teachers should perhaps be encouraged to blend theory with practice because theories alone cannot serve any useful purpose especially in technical subjects. But it is worrying that of the seven skills expected from learning technical subjects, only business planning had some moderate relationship with involvement in entrepreneurial self-employment. The rest had weak relationships. This suggests that the skills acquired from the technical subjects did not aid the graduates in entrepreneurial self-employment. This is worrying and we recommend that the teaching of these subjects needs to be re-looked at so that students acquire the intended skills that will benefit them after secondary school if they choose to be self-employed or engage in business entrepreneurship.

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