The effect of Competency Based Training on Innovation and Entrepreneurship Skills in Ghana: A case study on Takoradi Polytechnic Engineering Students

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ABSTRACT

Worldwide, governments are preoccupied with creation of employment to ensure that all their citizens have an income and a livelihood. The level of unemployment and underemployment amongst the youth in Africa is growing, as population increase is becoming a serious problem. Youth unemployment is predicted to be detrimental not only to the economy but also to society, leading to social unrest, usage of drugs and unwanted pregnancies among others. The youth need an educational foundation that gives them the qualities skills that will ensure them have a good income and a livelihood. The teaching of entrepreneurship or innovation skills at the tertiary institutions in Ghana is very crucial to harness this dream. The study objective is to explore students' challenges about entrepreneurship concepts and justify its impact on Polytechnic engineering students in Ghana after graduation. The result indicates that the continuous teaching on an instruction-based approach of learning has effect on the innovation and entrepreneurship competencies for polytechnics' engineering students in Ghana. To provide ongoing feedback on how students can effectively apply entrepreneurial skill after graduation, the study recommends competency based learning as the best option for Ghana and Africa.

Keywords: Entrepreneurship, Innovation, Competencies, Engineering Education

1. INTRODUCTION

Worldwide, governments are preoccupied with creation of employment to ensure that all their citizens have an income and a livelihood. The level of unemployment and underemployment amongst the youth in Africa is growing, as population increase is becoming a serious problem. Youth unemployment is predicted to be detrimental not only to the economy but also to society, leading to social unrest, usage of drugs and unwanted pregnancies among others. The youth need an educational foundation that gives them the qualities skills that will ensure them have a good income and a livelihood. Traditionally programmes in engineering have focused very strongly in so-called hard competences. The focus of the education has been in professional skills and a little attention has been paid on innovation and entrepreneurship competences. However, recently many reports have indicated that the importance of innovation and entrepreneurship competences should be acknowledged in the education and the programs should be developed to this direction (Tekes, 2005).

Innovation and entrepreneurship are vital for economic growth (Schumpeter, 1934). Entrepreneurship and innovation are central to the creative process in the economy and to promoting growth, increasing productivity and creating jobs. Flexibility, creativity, negotiation, among other competences had become necessary and engineering education therefore has an obligation to meet students' expectations with regard to preparation for the economy in which they will operate (Edwards et al, 2009). Bordogna (1997) identifies integration, analysis, innovation and synthesis, and contextual understanding as key capabilities for engineering students. Rugarcia, Felder,Woods, & Stice (2000) proposes independent, interdependent, lifetime learning skills, problem solving, critical and creative thinking skills for engineering students.

Dodridge (2003) also classifies knowledge and understanding and skills. Dodridge (2003) as well as Mason (1999) identify practical skills, multiskilling, computer literacy, communication skills, management skills, personal skills, and problem solving skills as the most important skill deficiencies amongst engineers. Hoscette (2002) and Erlendsson (2001) identify some workplace defects and leading causes of failures in engineering. As per their observation, the major concerns are passivity, non-responsiveness, uncritical thinking, technical incompetence, inept or poor communication skills, poor relations with the supervisor, inflexibility, poor and lax working habits, and too much independence. In the taxonomy of innovation and entrepreneur competences, Edwards et al. (2009) considers

teamwork, communication and organizing skills as very essential. For some time entrepreneurship was considered un-teachable, but international experience demonstrates that elements of entrepreneurship can be taught and learned (Jones and English, 2004).

The European Commission defines entrepreneurship as "the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organization" (European Commission, 2006, p.6). A convenient definition of innovation from an organizational perspective is given by Luecke and Katz (2003) as the successful introduction of a new thing or method. Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services.

Young people need an educational foundation that gives them the qualities, skills and understanding to take these challenges in their stride (European Commission, 2004).

In Ghana, ambitions to improve entrepreneurial behaviour amongst students and the starting up of new businesses after graduation are high on the agenda of the Ghanaian Government. This concept has important consequences for the pedagogical climate at the Ghanaian tertiary institutions. The study objective is to explore students' challenges about entrepreneurship concepts and justify its impact on Polytechnic engineering students in Ghana after graduation. It is hope that this paper would help to address these challenges in the current curricular in engineering education in Ghanaian Polytechnics and provide ongoing feedback on how students can effectively apply entrepreneurial skill after graduation.

2. METHODOLOGY

Takoradi Polytechnic in Takoradi, Ghana was used as a case study to explore students' challenges about entrepreneurship concepts and justify its impact on Polytechnic engineering students in Ghana after graduation. The research involved students of School of Engineering (Building Technology, Civil, Electrical/Electronics, Mechanical and Furniture/Design Departments) from Takoradi polytechnic who have completed their entrepreneurship studies. Civil Engineering department students normally work with active methodologies such as Competency – Based Learning, while other departments use Traditional-Based Learning methods. Our original hypothesis was that Civil Engineering students should most likely have developed competences such as Team Work, organizational and management Skills and Creativity. A structured questionnaire was used to elicit personal demography such as gender, and year of completion. Information on what the students understand by "innovation"? , their perception of the entrepreneurship course, what importance do students attribute to entrepreneurship and to what extent do students perceive that innovation and entrepreneurship competences are developed or improved by engineering education?. The data was analyzed using the Statistical Package for the Social Sciences (SPSS). The results were presented using descriptive statistics.

3. RESULTS

Table 1 illustrates the demography of respondents of 450 students from Takoradi Polytechnic School of Engineering who have completed their entrepreneurship studies.

Table 1: **Demography of Respondents**

Department	Frequency	Percent
Mechanical	97	21.6
Electrical	58	12.9
Civil	30	6.7
Building	254	56.4
Furniture Design	11	2.4
Total	450	100.0

Table 2 illustrates both students who work with competency-based learning and traditional-based learning and their understanding of the word innovation.

Table 3 shows students perception of entrepreneurship course. Unfortunately, most of the students are calling for the change of the traditional-based learning to competency-based learning.

Table 4a below shows the curiosity or interest of students in entrepreneurship. In Table 4b, students provided information on how they would secure finance when they are to start up their own businesses.

Table 5 illustrates students' perception on the contribution of engineering education to acquire/develop some innovation and entrepreneurship competencies. Students were made to answer this question: Have you received courses/training about the following competencies? Using response scale M (much), S (a little bit) and N (never). It was observed that teamwork, problem solving and leadership indeed play important roles in students' future career. The results show clearly that these competences are being considered in both cases.

Table 2: **Students Understanding Of "Innovation"**

Department	Have you heard the word "innovation" before? (%)		Do you understand the word "innovation"? (%)	
	Yes	No	Yes	No
Mechanical Eng , Electricals Eng , Building Technology, Furniture Design N=420	91.8	8.2	75.6	24.4
Civil Engineering N=30	100	Nil	80.0	20.0

Table 3: **Students' Perception of Entrepreneurship Course**

Department	Have you completed your entrepreneurship studies? (%)		If yes, has the course made or is the course making a difference in your life? (%)		Are you satisfied with the level of training? (%)		Do you prefer that the traditional-based approach of teaching be changed to competency-based approach? (%)	
	Yes	No	Yes	No	Yes	No	Yes	No
Mechanical, Electrical, Building, Furniture N=420	85.4	14.6	79.6	20.4	56.8	43.2	75.1	24.9
Civil N=30	92.6	7.4	77.8	22.2	63.0	37.0	65.5	34.5

Table 4a: **Students' Curiosity/Interest in Entrepreneurship**

Department	Are you curios/interested in having more knowledge on entrepreneurship? (%)		Have you thought of starting your own business or ever becoming an industrialist? (%)	
	Yes	No/I have never thought about it	Yes	No/ I have never thought about it
Mechanical Eng , Electricals Eng , Building Technology, Furniture Design N=420	88.9	11.1	83.0	17.0
Civil Engineering N=30	89.7	10.3	82.8	17.2

Table 4b: **Source of Finance**

S/N	Item	Frequency	Percent
1	Own resource (e.g. Personal saving)	210	46.7
2	Assistance from family and friends	63	14.0
3	Bank loan	72	16.0
4	Assistance from venture capital fund	10	2.2
5	Private institution	19	4.2
6	Credit union	10	2.2
7	Others (e.g. Susu contribution, etc)	66	14.7
	Total	450	100

Table 5: **Students' Perceptions about Their Innovation and Entrepreneurship Competencies**

Competence	Mechanical, Electrical, Building, Furniture Design N=420			Civil Engineering N=30		
	M	S	N	M	S	N
Teamwork	62.3	33.1	4.6	69.0	27.6	3.4
Problem solving	52.3	44.1	3.6	50.0	42.9	7.1
Creativity	57.7	33.7	8.6	39.3	57.1	3.6
Leadership	58.8	34.8	6.4	50.0	42.9	7.1
Project management	44.9	46.6	8.5	37.9	55.2	6.9
Communication skills	56.3	37.0	6.7	32.1	60.7	7.1
Organizing skills	47.9	42.5	9.6	39.3	53.6	7.1
Negotiation skills	40.4	45.5	14.0	42.3	53.8	3.8
To Set up a business	49.2	36.4	14.4	29.6	59.3	11.1

4. DISCUSSONS

The level of unemployment and underemployment amongst the youth in Africa is growing, as population increase is becoming a serious problem. Youth unemployment is predicted to be detrimental not only to the economy but also to society, leading to social unrest, usage of drugs and unwanted pregnancies among others. The youth need an educational foundation that gives them the qualities skills that will ensure them have a good income and a livelihood (Tekes, 2005).. The teaching of entrepreneurship or innovation skills at the tertiary institutions in Ghana is very crucial to harness this dream. Out of a total of 450 students from Takoradi Polytechnic School of engineering questioned, almost all of them indicated that they have successfully completed their entrepreneurship course. Many of them were not satisfied with the level of entrepreneurship training and the course has not made any difference in their lives. Majority of the students are of the view that the traditional-based approach (current teaching method) of teaching of the entrepreneurship course should be changed to competency-based approach (practical/field teaching method). This approach will give practical meaning to the course. Many of the students also indicate their curiosity or interest in having more knowledge on entrepreneurship and are willing to start their own business. The students believe that their source of finance would mainly come from their own resource (e.g. personal saving). Mechanical, electrical, building and furniture/design students does not have difficulties in these competencies but civil engineering students report difficulties in assimilating entrepreneurship competencies into their core practice where teaching is not explicit.

5. CONCLUSIONS AND RECOMMENDATIONS

From the results of the studies, it can be concluded that most of the students from the Takoradi Polytechnics School of engineering in Ghana who have completed entrepreneurship course are not satisfied with the level of entrepreneurship training and were of the view that a change in the teaching delivery methods would go a long way to help them to start their own business. This paper has analyzed the innovation and entrepreneurship competencies which should be included in engineering education in Ghanaian Polytechnics since it would enhance entrepreneurship education in engineering syllabus and help to promote employment, growth and development. The authors recommend that there should be more practice than theory programs in terms of teaching delivery methods, curricula, workshops and seminars of entrepreneurship education in Ghanaian Polytechnics. A further detailed investigation of wider sample, covering more groups of students may be carried out.

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