THE TEACHINGSTRATEGIES AND THE LEARNING SKILLS OF THE STUDENTS IN THE FIELDS OF MATHEMATICS AND SCIENCE TOWARDS ENTREPRENEURIALS SKILLS DEVELOPMENT

LONEZA G. CARBONEL, PhD
GRACE JOY P.DOCTOR, PhD
IMELDA C.AGBISIT, PhD

ABSTRACT. This paper dealt with the different strategies for promoting entrepreneurial skills to the students in the fields of Science and Mathematics. It also identified the skills needed in pursuing Science and Mathematics courses. This descriptive research included 90 students taking Science and Mathematics subjects in the College of Liberal Arts. The study found the respondents' strong agreement on the different strategies used in the promotion of entrepreneurial skills, which include encouraging them to be resilient, risk-taker, persistent, and hardworking. Teachers are encouraged to teach Mathematics and Science students using the following strategies: using the questioning method, writing assignments, leading students to think critically, scientific knowledge-based learning, decision-making through correct reasoning, and participating actively in science and mathematics activities. It also revealed that the different skills needed in entrepreneurial activities are the ability to solve problems, to learn and act independently, to plan a solution, to analyze and plan further action, to set goals and act creatively, to assess and classify information, to take the initiative and responsibility, and to cooperate and work in a team. The correlation between the strategies employed in promoting the entrepreneurial skills of students, and the skills development is high positive correlation and is found to be significant. It is important to note that the strategy used in promoting entrepreneurial skills of the students is significant also in the skills development of the students.

KEYWORDS: Entrepreneurial skills, Scientific Knowledge, Problem Solving Skills

INTRODUCTION

In the academic world today programs offered by colleges and Universities are indeed the heart of formal trainings that students are motivated to enroll in college but it seems that their skills are not really regarded as the main reason in studying. Most students now who graduated from high school are not career guided before that most College graduates are not prepared for employment and does not match the job requirements.

Despite vigorous entrepreneurship initiatives unleashed by the Government through its organizations like Universities in the different parts of the Country, Department of Science and

Technology , the Technical Education Centers and Entrepreneurship Institutes and the Universities across the globe, their assimilation and adaptability of concept of entrepreneurship by students differ from one another. One of the reasons, among others, is the impact of branch of study they undergo during their college days. It is given to understand that the course content of some branches motivate its students to take up entrepreneurship and making them as mere job-seekers.

The study, based on Behavioral Event Interview (BEI) by Wang Hu (2012), has interviewed a total of 12 students or graduates who're starting an undertaking from 11 venture enterprises. Through coding analysis, the study finds that 7 dimensions of entrepreneurial competencies are the obvious relationship competency, resources integration competency, innovation competency, and entrepreneurial aspiration competency, entrepreneurial perseverance competency, and entrepreneurial learning competency. On that basis, the future studies can develop measuring scale of the entrepreneurial competencies of college students to advance the related theories and empirical researches.

This paper analyzed the factors that two dimensions such as: as to what type of entrepreneurial skills the students generally possessed and the other deals with measuring how these students differ over the possessed entrepreneurial skills based on their branch of study.

CONCEPTUAL FRAMEWORK

This study adopted the idea similar to the concept of outcome-based or student-centered education which focuses on the quality and value of the output of education as the means of acquiring knowledge and skills among the learners. If it is to make a success for growth and employment, the educational system needs to stimulate mindsets of young people, encourage innovate business start-ups, and foster a culture that is friendlier to entrepreneurship and to the growth of small and medium-sized enterprises (SMEs). The important role of education in promoting more entrepreneurial attitudes and behaviors is now widely recognized. However, the benefits of entrepreneurship education are not limited to start-ups, innovative ventures and new jobs. Entrepreneurship refers to an individual's ability to turn ideas into actions and is therefore a key competence for all, helping young people to be more creative and self-confident in whatever they undertake.

At higher education level, the primary purpose of entrepreneurship education should be to develop entrepreneurial capacities and mindsets. In this context, entrepreneurship education programs can have different objectives, such as a) developing entrepreneurial drive among students (raising awareness and motivation) ; b) training students in the skills they need to set up a business and manage its growth; c) developing the entrepreneurial ability to identify and exploit opportunities. Graduates' start-up is one of a range of possible outcomes.

"The secret to the foundation (knowing about you) is asking the right questions. "Steiner said. "These are questions that are usually not asked. College is a great place for that to happen if students will only take the time to sit and think. "Hackbert said developing entrepreneurial qualities is a deliberate process, and the skills are as important for employees as they are for employers. "Employees create value for their enterprise through the implementation of new ideas, "Hackbert said. " An entrepreneurial skill set can take an inventor's product and turn it into an actionable enterprise. These are the entrepreneurial traits and we now know they can be taught systematically and efficiently. 'For young entrepreneurs-those just leaving college and opening business of their own-the idea of learning entrepreneurial skills in a college setting has merit. It means less of a learning curve and more safety when their fledgling business reaches rough waters.

The report of UNESCO revealed that the shortcomings of education system in the region include gaps in the quality of education offered to the different socioeconomic groups and to those who live in rural and urban areas, and the relative low quality of education-particularly the lack of emphasis on fostering skills that enable students to use what they know to solve new problems, for work and entrepreneurship, and for leadership, independent thinking and lifelong learning.

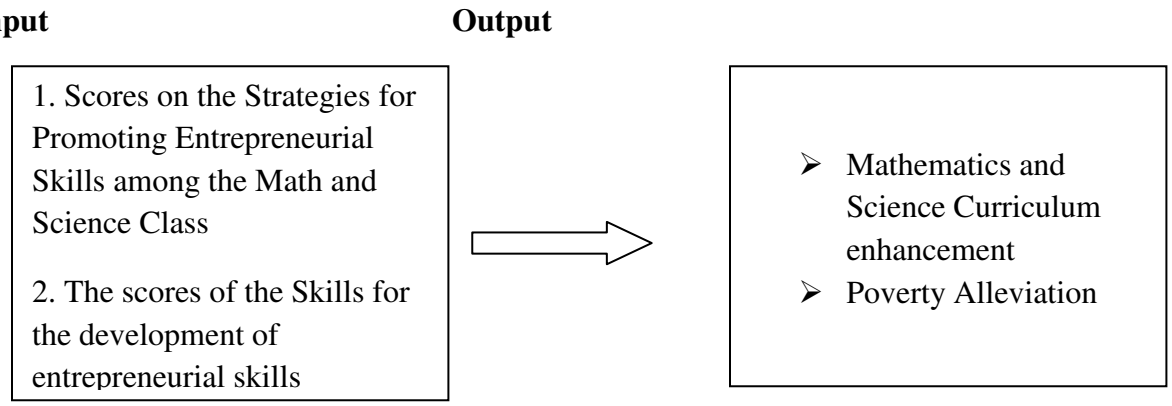
New thinking is necessary to improve the effectiveness of teachers and school leaders, to make curriculum more relevant to the current demands of citizenship and work, and to successfully engage the attention and imagination of students. We should not conflate "old thinking" with government action and "new thinking" with private action; both public and private interventions can be ineffective as well as innovative. What is needed is innovation-the generation of novel approaches to meeting the education needs of the population in Latin America in ways that can be sustained and reach scale.

Thus today's educational system is trying to consider and adopt a system which the skills and interest of students are very much considered like that of the K-12 system because in the system it evolved acquisition of both theoretical and applied (skill learning) know how. The students are expected to have fully acquired the right skills and have mastery on the course that they have chosen to pursue in order that they can produce something that can help raise their economic needs through self-entrepreneurship or by being employed.

Teachers and teacher training can, directly or indirectly, affect the capacity and performance of school organization. A good teacher training program enables a teacher to support and adopt innovations and changes to move in line with changing world. Aviram and Richardson (2004) considered teacher education and training to be important initiatives for bringing about change in the school environment. However, Moore (2004) emphasized the

acquisition of performance of schools in terms of classroom management, long and short-term planning, recording and reporting on students' performance and creating a positive environment which accepts change. As students have different potential and psychological attributes and come varied socio-economic backgrounds, teachers need to learn the art of dealing with a diverse student's body with different home and school experience (UNESCO, 2001). Newman, King and Youngs (2002) focused more precisely on knowledge of education. However, schools function for the overall development of students and teachers require a wide variety of competencies and skills for professional efficacy. Therefore, according to Chatterjee (2007), any teacher training programme should begin by identifying the competencies, skills, knowledge and attitudes which are necessary for teachers; and, likewise, Sigh and Nath (2005) were concerned with developing skills, knowledge and positive behavior in teachers.

The framework of this study adopted the input-output paradigm is shown below:



Scope and Delimitations of the Study

The study shall be limited to the assessment and correlation of the entrepreneurial skills and motivation factors of the students in Mathematics and Science at Kalinga State University.

Significance of the Study

This study intends to look into the entrepreneurial skills and motivation factors of students who are enrolled in Mathematics and Science in order to provide information as basis for a better curriculum development in the future.

OBJECTIVES

This study focused on the assessment on the Skills for the Promotion of Entrepreneurial skills and the identification of skills as well as the skills needed to develop entrepreneurial skills

Motivation among the students in Mathematics and Science Classes at the College of Liberal Arts,Kalinga State University, Tabuk City.

Specifically, it aimed to seek answers to the following objectives:

1. To determine the level of skills in the promotion of entrepreneurial skills among thestudents who were engaged in Mathematics and Science Classes.

2. To identify the skills in promoting entrepreneurial skills as determined by the two groups of respondents (Mathematics and Science Classes).

2.1 Is there a significant difference on the scores of the two groups of respondents on the identified skills in promoting the entrepreneurial skills in Mathematics and Science?

Hypothesis: There is no significant difference on the scores of the two groups of respondents on the identified skills in promoting the entrepreneurial skills in Mathematics and Science.

3. To identify the skills in developing entrepreneurial skills among the students who are engaged in mathematics and science classes.

METHODOLOGY

The descriptive method of research and quantitative approach was used in the conduct of the study. It looked into the survey of the strategies in the promotion of entrepreneurial skills, the identification of skills needed in developing theentrepreneurial skills of students in the Mathematics and Science Classes at the College of Liberal Arts ,Kalinga State University.

Respondents

The respondents of this studycomposed of the two sections enrolled in Mathematics and Science classes at the College of Liberal Arts.A total of 90 students was used as respondents. There were 41 Mathematics students and 49 students Science who evaluated and scored the different strategies in promoting the entrepreneurial skills among them.

Data Gathering Procedures

This study made use of survey questionnaire. It gathered information's on the mean scores of the strategies in promoting entrepreneurial skills of students and the skills for developing entrepreneurial skills for the entire set of respondents.

Treatment of Data

The respondent's responses were described based on the counts under the categories of respondents' mean scores on the promotion of their entrepreneurial skills which are categorized as: SA-strongly agree A-agree, D-Disagree and SD – Strongly disagree. The data for the scoring of the Strategies for Promoting Entrepreneurial Skills are summarized using the frequency and

rank for the scores of the two classes in Math and Science. The correlation was used to test the relationship between the scores of the two groups of classes (respondents). Lastly, the frequency table was used to determine the scores of the respondents on the Skills for developing entrepreneurial skills.

Statistical Tools

The Statistical tool like the mean was used to describe the scores of the entire respondents on the strategies in the promotion of entrepreneurial skills for the students.The correlation was used to test the relationship between the scores of the two groups of classes (respondents). And the t-test was used to find out the significant relationship between the scores of the two groups of respondents (the Math and Science Class).

Results and Discussions

The portion summarizes the data presentation, interpretations, and discussions.

Table 1. Mean Scores of Students in the Strategies for Promoting Entrepreneurial Skills for Mathematics and Science Classes.

Strategies	Mean Score	Description	Rank
1.Encouraging students to use evidence based reasoning for decision making	3.27	Strongly agree	13
2.Encouraging science and mathematics students to participate actively in complex scientific and mathematics activities	3.30	Strongly agree	12
3.Teaching students science and mathematics to enable them think critically	3.41	Strongly agree	7
4. Making Science and mathematics students develop fundamental understanding of nature(scientific knowledge)	3.44	Strongly agree	11
5. Encouraging students to be:			
a. Persistent	3.54	Strongly agree	2
b. Self-confident	3.38	Strongly agree	9
c. Patient	3.34	Strongly agree	11
d. Inquisitive	3.39	Strongly agree	8
e. Risk takers	3.51	Strongly agree	4
f. Resourceful	3.38	Strongly agree	9
g. Hardworking and	3.49	Strongly agree	6
h. Resilient	3.56	Strongly agree	1

6.Using Cooperative learning strategies	3.37	Strongly agree	10
7.Teaching science and mathematics using questioning method	3.50	Strongly agree	5
8.Engaging students in writing assignments	3.52	Strongly agree	3
Overall mean	3.43	Strongly Agree	

1.00-1.74 SD, 1.75-2.49D, 2.50-3.25A, 3.26-4.00SA

The table reflected that the mathematics and science classes generally" strongly agree "on the different skills in engaging entrepreneurial skills to be integrated in their subjects. However, among the skills being surveyed, the students strongly agree that resiliency must be first encouraged to them as shown by the highest mean score of 3.56. Secondly," persistency "should also be encouraged to the students. The third rank as reveled in the table is "engaging students in writing assignments. It is being noted in the table that all the skills were marked as "strongly agree" like risk takers, the strategies like: "teaching science and mathematics using questioning,

Table 2.The Distribution of Respondents According Subjectson the Strategies for Promotion of Entrepreneurial Skills in Mathematics and Science Classes

Strategies	Math 11 Class Frequency N=41	Rank	Science Class Frequency N=49	Rank
1.Encouraging students to use evidence based reasoning for decision making	45	14	54	9
2.Encouraging science and mathematics students to participate actively in complex scientific and mathematics activities	54	8	60	7
3.Teaching students science and mathematics to enable them think critically	53	9	75	1
4. Making Science and mathematics students develop fundamental understanding of nature (scientific knowledge)	60	6	66	4
5. Encouraging students to be:	75	2	73	2
a. Persistent	71	3	50	12
b. Self-confident	60	6	62	6

c. Patient d. Inquisitive e. Risk takers f. Resourceful g. Hardworking and h. Resilient	66	4	73	2
	65	5	53	10
	45	13	51	11
	50	11	65	5
	51	10	58	8
	48	12	60	7
6.Using Cooperative learning strategies	78	1	68	3
7.Teaching science and mathematics using questioning method	40	15	50	12
8.Engaging students in writing assignments	55	7	68	3

The table reflected the scores in the strategies in the promotion of entrepreneurial skills among the students in Mathematics and Science Classes and the following strategies were identified by the Mathematics Students such as: Using cooperative learning ,encouraging students to be persistent, patient, Inquisitive, self-confident. The following strategies are also considered: engaging students in writing assignments, making science and mathematics students develop fundamental understanding of nature, encouraging science mathematics students to enable them think critically**,**Teaching students science and mathematics to enable them think critically,

Table 3 . The Regression Correlation of the Scores of between the Mathematics and Science Class as to the Strategies in the Promotion of Entrepreneurial Skills of the Students

Variables	Correlation	R square	t-test	p-Value
Math Class	0.41	.17 or 17%	1.69	0.11209
Science Class				

Low + Correlation and significant at .05 level of Significance

The correlation of the scores between the two groups (math and science class) of classes on the strategies in the promotion of entrepreneurial skills is .41 which means low to moderate correlation and it is significant, at 0.05, level of significance.

Table 4.Scores of the Respondents on the Skills for the Development of entrepreneurial competencies for students in Science and Mathematics

Skills for Developing Entrepreneurial	Frequency	Percent	Rank
Ability to learn and act independently	79	88	1
Set goals and act in a creative way	69	77	4
Ability to analyse and plan further action	75	83	3
To take the initiative and responsibility	67	74	6
Cooperative and work in a team	66	73	7
Assess and classify the information	68	75	5
Find the problem and plan the solution	78	87	2

The table reflected that among the skills evaluated,most of the skills were identified by at 70 % of the 90 student respondents. However, the skill on the "ability to learn and independently "is ranked first followed by "find the problem and the plan the solution, "ability to analyse and plan further action," assess and classify the information,"etc..As seen these skills are considered by the students.

Conclusion

From the results of the study it can therefore be concluded that:

The mean scores of students in the strategies for promoting entrepreneurial skills for Mathematics and Science Classes are described as "strongly agree." The strategies identified by the Mathematics and science Students are: Using cooperative learning and encouraging students to be persistent, patient, Inquisitive, self-confident. There is low to moderate correlation between and it is significant at, 0.05, level of significanceon the strategies in the promotion of entrepreneurial skills. Most of the students identified the skills needed in developing entrepreneurial skills.

Recommendations

From the findings of this study, the following are recommended:

1. The different strategies and skills are identified by the students and are important and thus, it must be included in the syllabi in the Mathematics and Science Class.

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