Faculty of Natural and Applied Sciences Journal of Mathematics and Science Education
Print ISSN: 2814-0885 e-ISSN: 2814-0931
www.fnasjournals.com
Volume 5; Issue 1; December 2023; Page No. 22-29.

LECTURERS' ENTREPRENEURIAL COMPETENCIES IN SCIENCE TEACHER EDUCATION PROGRAMMES IN RIVERS STATE TERTIARY INSTITUTIONS

***[1]Chinda, W., & [2]Etokeren, I.S.**
[1]Department of Chemistry, Ignatius Ajuru University of Education, Port Harcourt, Nigeria
[2]Department of Science Education, Faculty of Education, Rivers State University, Port Harcourt, Nigeria

***Corresponding author email**: worokwu.chinda@iaue.edu.ng

Abstract
The problem of unemployment in developing and underdeveloped countries of the world has been a recurrent decimal and global challenge over the years. Therefore, it becomes highly imperative for stakeholders to focus on equipping graduates in all disciplines with the appropriate skills necessary for personal job creation and self-employment. Accordingly, this study examines lecturers' entrepreneurial competencies in science teacher education programmes in Rivers state tertiary institutions. A descriptive survey design was adopted using 46 Universities and Colleges of Education Science Education Lecturers as a sample. The instrument was the "Entrepreneurial Competencies Questionnaire" (LECQ) developed by the researcher and validated by two other Science Education Lecturers with a reliability coefficient of 0.79 determined by the test-retest method. Research questions were answered using mean and standard deviation while hypotheses were tested at 0.5 level of significance using a t-test. The findings of the study revealed a low extent of lecturers' competencies in developing new products or market opportunities, building new environments, initiating investor relationships, defining core purpose, coping with unexpected challenges, developing critical human resources, fostering students' self-efficacy, creating authentic learning environments, creating collaborative learning environments and developing and coaching experiential learning. No gender-related significant difference in entrepreneurial competencies existed. In conclusion, there is a low extent of lecturers' entrepreneurial competencies among science education lecturers. It was recommended that training should be organized by government or cooperate bodies to enhance lecturers' entrepreneurial competencies and also make funds should be made available for further research on entrepreneurship.

Keywords: Entrepreneurial competencies, Tertiary institutions, Science Education and Teacher programmes

Introduction

Entrepreneurship education in teacher education as one of the evolving matters in Science and technology can assist in solving the problems of unemployment in recent times. According to Etokeren and Chinda (2022) the term 'entrepreneurial education' encapsulates both 'enterprise education' and 'entrepreneurship education. Enterprise education' advances a student's capability to create and relate ideas with insignificant risk, while 'entrepreneurship education' develops a resourceful student who can recognize prospects to generate value and grow resistance to failure (Hardie et al., 2022). Entrepreneurship education lays greater emphasis on opportunity recognition, experimentation, real-world applications, innovation and coping with failure (Lackéus 2015). Therefore, it can be considered to be an important vehicle for developing young people and communities who can contribute to economic growth and employment (Wibowo & Saptono 2018).

Entrepreneurship is defined as the individual capacity to discover a business idea and transmute it into practice (European Commission,2011). It is an entrepreneurial action that encompasses resources through a plan and a quantifiable method to attain a goal of economic profits. Dike and Anwiri, (2020). However, defines entrepreneurship from an economic viewpoint as concentrating on new economic prospects and the introduction of novel ideas in the market by recognizing opportunities, collecting needed resources, applying action plans, and making profits. An entrepreneur is a creative person who creates new enterprises and stimulates the economy. Characteristics identified by a variety of writers on the subject of entrepreneurship or enterprise are Innovation, autonomy/independence, belief in control of one's destiny, creativity, determination, flexibility, Goal-oriented, hard work, imagination thinking,

initiative, leadership quality, optimism, perseverance, problem-solving ability, futuristic confidence and individuality and more (European Commission 2011).

Entrepreneurship consists of three aspects which include creative force, sense, and intention. Creative force creates the characters of innovative, creative, careful, organized, broadening insight, problem solver, and reflective. Sense aspect creates the characteristics of confidence, wanting to gain profit, ability to serve, truthful, determined, optimistic, and sharp to chances while intention creates the character of bravery, risk-taking, hard work, cooperation, responsibility, listening to input, able to negotiate, discipline, and dynamic (Konokman & Yelken, 2014). Entrepreneurship education presents benefits suitable in today's society where there is an unprecedented rate of unemployment among Nigerian graduates. It is highly beneficial to students' teachers, businesses, and the government. Therefore, an entrepreneurial educator must possess the potential to use relevant pedagogical methodologies in preparing students to meet the economic demands of job creation to cope with the associated limited job opportunities for graduates in various disciplines. Resources and training are required for the implementation of pedagogies that will challenge student ideals and build entrepreneurial intent (Saptono, 2018). entrepreneurship education can be improved by increasing schools' external networks with local businesses to enable relevant economic issues to be addressed in schools,

Furthermore, entrepreneurship programs should be geared towards a culture of entrepreneurship, requiring the use of active learning techniques that assist students to be accountable for learning to experiment, push limits and learn about themselves. Elements of entrepreneurial learning, include experiential, social interactive, observational, and insightful learning. However, entrepreneurial skills and attitudes call for innovative pedagogies. i.e. experiential learning, such as project-based activities, and active learning strategies. Reflection and generalization stages in this type of education are important, without insightful experience students cannot draw lessons from their experiences. Entrepreneurship in tertiary education is intended to enable staff and students to demonstrate enterprise, discovery and creativity in inquiry, teaching and studying using knowledge across boundaries. In the field of science, entrepreneurship education creates an inventive learning domain in science lessons which promotes the employment of science graduates (Deveci & Seikkula-Leino, 2018; Melnikova et al., 2017). Educational orientation in the 21st century concentrates on three aspects such as; critical thinking and problem-solving (expert thinking), communication and cooperation, and ingenuity and innovation (Deveci, & Cepni, 2017.). The combination of entrepreneurship in science teacher education programmes contributes immensely by instilling the entrepreneurial character in students, therefore, science learning must become a significant and beneficial experience for the students to provide solutions to problems in daily life, especially economic problems. To achieve an effective science teacher education programme attention has to be directed to the development of a science teacher education curriculum for entrepreneurial skills acquisition.

Integration is prototypical of entrepreneurship character and science learning is established after the nature of science learning perception and entrepreneurship. This combination is perceived from the following representation. The two ideas are essential to be integrated into science learning to accomplish substantial and valuable learning outcomes. Achor and Wilfred-Bonse (2013) maintained that there is a need for a model of entrepreneurship procedure incorporation in the science of learning as the spirit of integration of religious values and virtue improvement values that are almost required in all subjects in school. Entrepreneurial actions on science subjects are actions to support the understanding of concepts as well as the application form of the concept. This activity will feel more meaningful and useful because students are enthusiastically involved and gain economic benefits. In chemistry, various skills could be developed. Such skills include extraction of dyes and indicators from plant parts, production of tie and dye cloth, soap making, perfume production, polish making, wine brewing production of bottled and distilled waters, pesticides, pomade making, vegetable oil, battery charging, vulcanizing, repairs of some simple electrical appliances like pressing iron, handsets, fans and generators (Dike & Anwiri,,(2020).

Entrepreneurial education plays an essential role in the development of entrepreneurial mindsets in students (Europe Union, 2011). According to social learning theory, human behaviour is transmitted principally through experience to role models, that is, modelling phenomena. Teachers identified by students as models in an educational context may play a particularly important role in student's learning process. Etokeren and Chinda (2022) opined that entrepreneurship education helps science education undergraduates: have practical entrepreneurial skills with positive attitudes and business capabilities, recognize decent business opportunities, be resourceful and inventive, manage small-scale industries and take risks in business to guarantee self-employment and self-reliance. This validates the assertion of Indonesia (2013) that it is very vital for an educational institution that untaken an entrepreneurship program to be concerned about the entrepreneurial competencies possessed by the lecturers. The implication is that

Cite this article as:
Worokwu, C., & Etokeren, I.S. (2023). Lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State tertiary institutions. *FNAS Journal of Mathematics and Science Education, 5*(1), 22-29.

there is a need for entrepreneurship education to emphasize increasing lecturers' entrepreneurial competencies to ensure that students are motivated towards becoming entrepreneurs. This can be achieved by serving as a role model. Furthermore, teachers need to be fortified with the correct skills, knowledge and approaches to be able to provide their students with the new curricula, pedagogies and learning settings to acquire entrepreneurial competencies. Consequently, the entrepreneurial teacher and the entrepreneurial school are inseparable (Indonesia, 2013).

Xiang (2009) defines competencies in terms of the possession of characters, abilities, and knowledge. It is the higher-level features including disposition traits, expertise and knowledge, which can be seen as the capability of the entrepreneur to accomplish a task effectively. There are six major competency areas: opportunity, organizing, strategic, relationship, commitment, and conceptual competencies (Xiang, 2009). The six scopes of competencies recommended by Zhou and Zhu(2010) consist of developing new products or market opportunities, building new environments, initiating investor relationships, defining core purpose, coping with unexpected challenges, and developing critical human resources. However, Fang and Chen(2019). identified six competencies which include entrepreneurial knowledge, career adaptability, occupational self-efficacy creative thinking, networking skills, and teamwork skills. Nab and Lans (2017) in another study identified five mean areas of entrepreneurial competence which include: opportunity competence, social competence, strategic business competence, industry-specific competence, and entrepreneurial self-efficacy. Entrepreneurial competencies can best be attained through lifelong accurate projects, on convincing and open-ended responsibilities that challenge students with themselves, with the market and with their endowments, allowing learning from failures and crossing boundaries (Indonesia, 2013).

Nab and Lans (2017) identified five mean areas of entrepreneurial competence which include opportunity competence, Social competence, Strategic business competence, Industry-specific competence and entrepreneurial self-efficacy. There are few studies on the entrepreneurial competencies of lecturers. Indonesia (2013), examined the level of lecturers' entrepreneurial competencies from the student's perspective using 217 semester 4 university undergraduates in Indonesia. The tool was an improved questionnaire on Entrepreneurial Self Efficacy (ESE) . The result of this study revealed that 89.86% of the learners were seen as medium, high and very high lecturers' entrepreneurial competencies. Only very few students perceived low and very low lecturers' entrepreneurial competencies. Founded on the analysis of each dimension of lecturers' entrepreneurial competencies, the dimension of starting investor relationships attained the highest level, and coping with unanticipated challenges recorded the lowest level. The study of Fang and Chang (2019) on the entrepreneurial climate where 255 teachers from five different vocational schools in the Netherlands served as a sample revealed that only occupational self-efficacy was not significantly related to entrepreneurial behaviour. This study, therefore,

Etokeren and Chinda (2022) studied the implications of integrating entrepreneurship education into science teacher education programmes towards employment generation for national growth and development. The sample comprised of 311 science education students from Rivers State Tertiary institutions, and the study adopted the descriptive survey design. The study was guided by three research questions and two hypotheses. Experts in Science Education and Measurement and Evaluation validated a 15-item questionnaire titled "Implications of Integrating Entrepreneurship Education into Science Teacher Education Program. Employment Generation Questionnaire." The reliability coefficient of 0.79 was obtained via. Pearson Product Moment Correlation coefficient To answer research questions, mean and standard deviation were used to answer the research question while the z-test was used to test the hypotheses at a 0.05 level of significance. The study's results show that entrepreneurship education helps science education undergraduates: have practical entrepreneurial skills with affirmative attitude and business abilities, recognize decent business opportunities, be resourceful and inventive, succeed in small-scale industries and take risks in business to guarantee self-employment and self-reliance. This aids in the decline of unemployment and poverty levels and inspires the national development of Nigeria. There was no significant gender difference in the effect of entrepreneurship education on the employment generation of science education undergraduates. It was recommended among others that lecturers must stimulate science education undergraduates to cultivate entrepreneurial aptitudes, and science education graduates must be provided incentives to start small businesses after graduation.

Statement of the Problem

Nigeria is one of the developing nations of the world that has been beleaguered with the problems of the high rate of employment among thousands of graduates that are rolled out into the labour market every year to compete in the labour market for employment in the limited job opportunities in private and public establishments. An attempt by the government to remedy this ugly situation and proffer a solution to the ravaging effect of the unemployment

problem is demonstrated in the compulsory integration of entrepreneurship education and making it a compulsory course at all levels of education and across all disciplines. This is accompanied by the building of entrepreneurship centres across various campuses in all tertiary institutions to ensure students' acquisition of different entrepreneurial abilities that will empower them to generate jobs for themselves and become self-employed after graduation. Ideally, entrepreneurial education plays an essential role in the development of such entrepreneurial mindsets in students, as such teachers need to be prepared with the appropriate entrepreneurial abilities, knowledge and aptitudes to deliver their students with novel programs, pedagogies and learning environments that facilitate the acquisition of entrepreneurial skills by students. Entrepreneurial competencies of the teacher and the concept of entrepreneurship education are inextricable entities necessary for the efficacious integration of entrepreneurship education initiated by the government. The question therefore is what is the extent of lecturers' entrepreneurial competencies in science teacher education programmes?

Aim and Objectives of the Study

This study examined lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State, Nigeria. Precisely, the study tends to determine:

1. lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.
2. male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.
3. university and College of Education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

Research Questions

1. What is the extent of lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State?
2. What is the extent of male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State?
3. What is the extent of university and college of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State?

Hypotheses

H_{O1}. There is no significant difference between the extent of male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

H_{O2}. There is no significant difference between the extent of university and colleges of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

Methodology

This study adopted a descriptive survey design. The population and the sample comprised 46 Science Education lecturers in the two Universities and one College of Education in Rivers State. The instrument was "The Entrepreneurial Competencies Questionnaire" (LECQ), rated on a four-point rating scale: Very High Level (VHL), High level (HL) Low Level (LL), and Very Low Level (VLL) developed by the researchers. The face and content validity of the instrument was determined by two science education lectures and one lecturer in the Measurement and Evaluation Department. A test-retest was carried out for the instrument and the reliability coefficient of 0.79 was calculated using the Pearson Product Correlation Coefficient (PPMC) formula. Research questions were answered using mean and standard deviation while hypotheses were tested at 0.5 level of significance using a t-test. Items with a mean rating of 2.5 and above were considered high level while those with a mean rating below 2.5 were considered low. Also, the null hypothesis was accepted when the calculated value of t was less than the table or critical value and rejected when the calculated value of t was greater than the table or critical value

Results

Research Questions 1: What is the extent of lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State?

Cite this article as:
Worokwu, C., & Etokeren, I.S. (2023). Lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State tertiary institutions. *FNAS Journal of Mathematics and Science Education, 5*(1), 22-29.

Table 1: Mean and standard deviation of responses on the extent of lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

S/N	Entrepreneurial Competencies	Mean	SD	Dec.
1	Developing new products or market opportunities	1.63	0.97	Low
2	Building new environment	1.01	1.13	Low
3	Initiating investor relationship	1.31	0.86	Low
4	Defining core purpose	1.67	0.99	Low
5	Coping with unexpected challenges	1.00	1.01	Low
6	Developing critical human resources	1.21	1.08	Low
7	Fostering students' self-efficacy	1.41	1.00	Low
8	Creating authentic learning environments	1.32	1.11	Low
9	Creating collaborative learning environments	1.11	0.56	Low
10	Developing and coaching experiential learning.	1.42	0/78	Low
	Mean	**$\bar{\chi}$ of $\bar{\chi}$ = 1.39**		

From Table 1, the mean responses of science education lecturers on the extent of entrepreneurial competencies in all items are less than 2.5. therefore, they are rejected. The items and mean responses are: developing new product or market opportunities 1.63, building new environment 1.01, initiating investor relationship 1.31, defining core purpose 1.67, coping with unexpected challenges 1.00, developing critical human resources 1.21, fostering students' self-efficacy 1.41, creating authentic learning environments 1.32, creating collaborative learning environments 1.11, developing and coaching experiential learning 1.42.

Research Question 2: What is the extent of male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State?

Table 2: Mean and standard deviation of responses on the extent of male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

		Male, N = 16			Female, N= 30		
	Entrepreneurial competencies	**Mean**	**SD**	**Dec.**	**Mean**	**SD**	**Dec.**
1	Developing new products or market opportunities	1.98	1.06	Low	1.76	1.11	Low
2	Building new environment	0.74	1.11	Low	1.22	1.01	Low
3	Initiating investor relationship	1.87	0.97	Low	1.56	0.75	Low
4	Defining core purpose	1.13	1.01	Low	1.45	0.88	Low
5	Coping with unexpected challenges	1.99	0.96	Low	1.34	0.67	Low
6	Developing critical human resources	1.17	1.12	Low	1.21	0.99	Low
7	Fostering students' self-efficacy	2.11	0.99	Low	2.11	0.87	Low
8	Creating authentic learning environments	1.67	1.10	Low	2.10	0.79	Low
9	Creating collaborative learning environments	1.98	0.78	Low	0.99	0.96	Low
10	Developing and coaching experiential learning.	2.13	0.88	Low	0.87	0.78	Low
	Mean of mean		**1.68**			**1.46**	

Cite this article as:
Worokwu, C., & Etokeren, I.S. (2023). Lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State tertiary institutions. *FNAS Journal of Mathematics and Science Education, 5*(1), 22-29.

From Table 2, the mean responses on the extent of male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State were less than 2.5, which represents a low extent. The items and their respective mean were: developing a new product or market opportunities1.98 and 1.76, building new environment 0.74 and 1.22, initiating investor relationships 1.87 and 1.56, defining core purpose 1.13 and 1.45, coping with unexpected challenges 1.99 and 1.34, developing critical human resources 1.17 and 1.21, fostering students' self-efficacy2.11 and 2.11, creating authentic learning environments1.67 and 2.10, creating collaborative learning environments 1.98 and 0.99, developing and coaching experiential learning 2.13 and 0.87,

Research Question 3: What is the extent of university and colleges of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State?

Table 3: Mean and standard deviation of responses on the extent of university and college of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

		University N = 35			College of Education N = 11		
S/N	**Entrepreneurial Competencies**	**Mean**	**SD**	**Dec**	**Mean**	**SD**	**Dec**
1	Developing new products or market opportunities	1.11	0.67	Low	1.43	0.92	Low
2	Building new environment	1.45	0.99	Low	1.34	1.10	Low
3	Initiating investor relationship	2.14	1.02	Low	1.22	0.66	Low
4	Defining core purpose	1.67	0.84	Low	1.37	0.45	Low
5	Coping with unexpected challenges	1.15	1.02	Low	1.24	0.87	Low
6	Developing critical human resources	1.45	0.87	Low	1.20	1.11	Low
7	Fostering students' self-efficacy	2.34	0.77	Low	2.11	0.79	Low
8	Creating authentic learning environments	1.78	1.21	Low	2.31	1.13	Low
9	Creating collaborative learning environments	2.10	0.88	Low	2.13	1.00	Low
10	Developing and coaching experiential learning.	1.56	0.78	Low	1.89	0.89	
	Mean of mean	**1.67**			**1.62**		

From Table 3, the mean responses of male and female lecturers in all items on the extent of university and college of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State were less than 2.5, which represents a low extent. The items and their mean responses were: developing new product or market opportunities 1.11and 1.43, building new environment1.45 and 1.34, initiating investor relationships 2.14 and 1.22, defining core purpose1.67 and 1.37, coping with unexpected challenges 1.15 and 1.24, developing critical human resources 1.45and 1.20, fostering students' self-efficacy 2.34 and 2.11, creating authentic learning environments1.89 and 1.76, creating collaborative learning environments1.78 and 2.31, developing and coaching experiential learning. 2.10 and 2.13, developing new product or market opportunities 1.56 and 1.89

H_{O1}. There is no significant difference between the extent of male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

Table 4: t-test analysis of mean response on the extent of male and female lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

Gender	N	$\overline{X}$	SD	Df	t-cal.	t – critical	Sig. level	Decision
Male	16	1.96	1.101					
				44	0.569	1.960	0.05	Accepted
Female	30	2.09	1.123					

Cite this article as:
Worokwu, C., & Etokeren, I.S. (2023). Lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State tertiary institutions. *FNAS Journal of Mathematics and Science Education, 5*(1), 22-29.

Table 4 shows that the calculated value of t = 0.569, is less than the critical value of 1.960. Therefore, the null hypothesis states that there is no significant difference between the extent of male and female science education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State. This implies that male lecturers do not differ from their female counterparts on the extent of entrepreneurial competencies in science teacher education programmes differ

H_{O2}. There is no significant difference between the extent of university and college of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

Table 5: t-test analysis of response of mean responses of university and college of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State.

Type of Institution	N	$\overline{X}$	SD	Df	t-cal.	t – critical	Sig. level	Decision
University	35	1.21	2.567					
					0.675	1.960	0.05	Accepted
College of				44				
Education	11	2.00	1.734					

Table 5 above shows that the calculated value of t-ratio = 0.675 is less r than the critical value of 1.960. Therefore, the null hypothesis, which states that there is no significant difference between the extent of university and college of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State is accepted. This implies that university and college of education lecturers do not differ in entrepreneurial competencies.

Discussion

Evidence from this study revealed a low extent of lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State. Specifically, there was a low extent of lecturers' competencies in developing new products or market opportunities, building new environments, initiating investor relationships, defining core purpose, coping with unexpected challenges, developing critical human resources, fostering students' self-efficacy, creating authentic learning environments, creating collaborative learning environments and developing and coaching experiential learning. This finding does not corroborate the results of the study of Indonesia (3013) on the level of lecturers' entrepreneurial competencies in Indonesia which showed that 89.86% of the students perceived medium, high and very high lecturers' entrepreneurial competencies. Only very few students perceived low and very low lecturers' entrepreneurial competencies. The disagreement between the results of this study and with of Indonesia (2013). The low extent of science education lecturers' entrepreneurial competencies is not a favourable indicator for the successful implementation of the objectives of integrating entrepreneurship education in science teacher education programmes. The findings disagree with Etokeren and Chinda (2022) entrepreneurship education assists science education undergraduates in possessing practical entrepreneurial skills with positive attitudes and business competencies, identifying noble business opportunities, being creative and innovative, managing small-scale industries and taking risks in business to ensure self-employment and self-reliance.

Further evidence showed that there is no significant difference between the extent of male and female science education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State (Table 4). The implication therefore is that male and female science education lecturers do not differ in their entrepreneurial competencies as such, there were no gender-related differences. The low extent of entrepreneurial competencies in science education programmes in Rivers State which both male and female science education lecturers possess. Results of test of hypothesis 2 in Table 4, show that there is no significant difference between the extent of university and college of education lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State. This implies that university and college of education lecturers do not differ in entrepreneurial competencies

Conclusion

The study concludes that when Science education lecturers possess a high level of entrepreneurial competencies, they will impact the same to their students thereby reducing unemployment. Entrepreneurial competencies help science education undergraduates: have practical entrepreneurial skills with affirmative attitude and business abilities, recognize decent business opportunities, be resourceful and inventive, succeed in small-scale industries and take risks

Cite this article as:
Worokwu, C., & Etokeren, I.S. (2023). Lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State tertiary institutions. *FNAS Journal of Mathematics and Science Education, 5*(1), 22-29.

in business to guarantee self-employment and self-reliance. This will provide a decline in over-dependence on white-collar and poverty levels and stimulate national development.

Recommendations

1. Lecturers should inspire and motivate students towards becoming entrepreneurs by instilling entrepreneurial skills in them
2. Institutions and government should organize in-service training on entrepreneurship education for science education lecturers to develop the lecturers' entrepreneurial competencies
3. There should be proper monitoring of the level of integration of entrepreneurship education into science teacher education prorammes to ensure its proper implementation.

References

Achor, E. E., & Wilfred-Bonse, K. (2013). The need to integrate entrepreneurship education into science education teachers' curriculum in Nigeria. *Journal of Science and Vocational Education (JSVE), 7*.

Deveci, 1., & Seikkula-Leino, (2018). A review of entrepreneurship education in teacher education. *Malaysian Journal of Learning and Instruction*, 15 (1), 105-148.

Deveci, I., & Cepni, S. (2017). The effect of entrepreneurship education modules integrated with science education on the entrepreneurial characteristics of pre-service science teachers. Socialinis Darbas, 15(2), 56-85

Dike, J.W., & Anwiri, E. (2020).Enhancing entrepreneurship opportunities through chemistry education: Implication for Nigerian youths empowerment. In The 21st Century. International Journal of Innovative Social and Science Education Research, 8(3), 101-107.

Etokeren, I. S., &, Chinda,W,. (2022). Uncovering Undergraduates' innovative talents towards employment generation for national growth and development: Implications of integrating entrepreneurship education into science teacher education programmes in Rivers State. *International Journal on Integrated Education*, *5*(5), 29-45

European Commission. (2011). *Entrepreneurship education: Enabling teachers as a critical success factor*. A report on teacher Education and training to prepare teachers for the challenge of entrepreneurship education. Final Report, Entrepreneurship Unit, Bruxelles.

Fang, C. & Chen, L. (2019). Exploring entrepreneurial intentions of science and engineering students in China: AQ methodology study. *Journals of Sustainability*, 11(10), 2751

Hardie, B., Highfield, C., & Lee, K. (2022): Attitudes and values of teachers and leaders towards entrepreneurship education. *Research Papers in Education*, 4, 1-25.

Indonesia, C. (2013). *Lecturers' entrepreneurial competencies: students' view*. A Paper presented at the International Conference of Organizational Innovations, Thailand July 2 – 4, 2013.

Konokman, G. Y., & Yelken, T. Y. (2014). Investigation of preschool teacher candidates' attitudes towards learning and their entrepreneurship levels. *International Online Journal of Educational Sciences*, 6 (3), 648-665.

Lackéus, M. (2015). Entrepreneurship in Education: What, Why, When, How. Retrieved January 10, 2023 from https://www. oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf.

Melnikova, J., Grünwald, N., Ahrens, A. & Zaščerinska, J. (2017). integration of entrepreneurship into higher education (educational sciences) in Lithuania and Latvia: Students and University Teachers' Opinion

Nab, J., & Lans, T. (2017). *Practice what you preach. A literature review on roles and competencies for entrepreneurship teacher*. Center for Teaching and Learning, Utrecht University, Thomas.

Saptono, A.,(2018) Entrepreneurship education and its influence on financial literacy and entrepreneurship skills in college. J. Entrep. Educ., 21, (4),. 1–11.

Wibowo, A., & Saptono, A. (2018). Does entrepreneurial leadership impact on creativity and innovation of elementary teachers?. *Journal of Entrepreneurship Education*, *21*(2), 1-9.

Xiang, Li. (2009). *Entrepreneurial competencies as an entrepreneurial distinctive: An examination of the competency approach in defining entrepreneurs*. University of Arizona, Dissertation and Theses Collection.

Zhou, X. & Zhu J. (2010). On the Cultivation of College Students' Innovative Ability.*Entrepreneur World (Theoretical Edition),* , (12),123-124.

Cite this article as:
Worokwu, C., & Etokeren, I.S. (2023). Lecturers' entrepreneurial competencies in science teacher education programmes in Rivers State tertiary institutions. *FNAS Journal of Mathematics and Science Education, 5*(1), 22-29.