Senior Schools Biology Teachers 'Views on Entrepreneurial Opportunities in Ilorin, Kwara State

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Abstract
The turnout rate of biology education graduates is alarming, leading to saturated labour market and widespread unemployment. This lack of alignment between capital and nature, result to poverty. Incorporating entrepreneurship opportunities in to biology could assist in ameliorating poverty. Hence, the need to understand teachers' viewpoints, as curriculum implementers, on bio entrepreneurial opportunities. This study explored multi-stage sampling, selecting 23 schools from Ilorin West Local Government area through random sampling. All biology teachers from these schools were purposively sampled having established their consent to be part of the project. A researcher developed questionnaire entitled Biology Teacher's View on Bio Entrepreneurship Opportunities was used for data collection; the reliability value of 0.85 was obtained using Cronbach alpha, and Chi-square statistic was used to test the hypotheses at a 0.05 level of significance. Outcomes showed that teachers held positive views towards bio entrepreneurship, though no significant difference between private and public-school teachers; and among teachers with varying qualification. The study concluded that furthering biology teachers' entrepreneurial skills could facilitate graduate employment and wealth creation. Government and school proprietors were recommended to establish periodic seminars to educate and equip teachers with bio entrepreneurial skills. Moreover, establishing bio entrepreneurship clubs in schools as extracurricular activities will offer practical training to students, prepare them for post-graduation employment and encourage economic self-sustainability. These initiatives will assist in alleviating unemployment and fostering a viable economy.

Keywords: View, Entrepreneurial, Opportunities, Unemployment, Poverty eradication

Introduction

There are myriads of problems confronting students while in schools, and after graduation. These ranges from written materials and biology curriculum related to equipment and facilities, administrative and organizational problems teachers' characteristics etc. The impact of these problems is felt at all level of education. Written and biology curriculum related problem; and teachers' characteristics collectively influence the organizational skills of curriculum contents (Alabi, 2017). Thes problems have tendencies of impeding the effective implementation of contents of curriculum. This call for mastery of contents of the curriculum and necessary skills of teaching profession for meaningful learning and easy transition from one educational level to another.

The skills of entrepreneurship strategies that could promote entrepreneurship is crucial for effective implementation of the curriculum, owing to the fact that one cannot give what we do not have. Educationist are required to possess these skills of problem solving to be able to cope with the challenges of the society. Unemployment is one of the challenges of labour market that education is expected to solve. One of the means by which the problem could be alleviated is through entrepreneurship within the context of education.

Entrepreneurship entails utilizing the imaginative and critical thinking ability to initiate new businesses or ideas for employment and wealth generation. Entrepreneurship require risk taking, crossing through unknown future with assurance. It is a known terminology across globed. Researchers across the globe had documented the potentials of entrepreneurship in creative thinking and problem solving. Nunez- Canal et al (2023) opined that entrepreneurial skills are capable of developing Spanish students' creativity, leadership style, problem solving abilities among others. In Finland Oksanen et al (2022) attributed to employment enhancement, social attachment, active engrossment and citizen's development.

As significant as these to socio-economy of the world, researchers have varying notion to why people embark on entrepreneurship. Some researchers ascribed it to genetics while some were of the views that entrepreneurial principle require skills that could enhance ones' passion for wanting to be an entrepreneur. Rietveld et al. (2021) were of the views that human inherit entrepreneurial trait and that venturing into entrepreneurial skill is a function of gene and that discussing it without taking cognizance of the prominent role of gene is incomplete; this implies that entrepreneurial failure could be attributed to genetics rather than ill planned program. The researchers were of the views that the willingness to be an entrepreneur cannot be separated from genetics and that the knowledge of genetic information may promote the field of entrepreneurship research.

Imbibing the skills of entrepreneurship in to student at the earlier stage of their education is one of the means of assisting students to grow professionally. Biology being the study of nature, more importantly the study of living things is characterized with several skills that could be embarked upon for professional growth, poverty eradication and employment generation. Entrepreneurship is a principle common to all fields. Its capability of employment generation in

biology education had been reported by (Bello et al,2020). The researchers observed the likelihood of biology education in developing and promoting bio-entrepreneurship opportunities among Nigerian youth for sustainable development. This potential is key to establishing a strong synergy between capital and nature.

In a like manner, Fassbender et al. (2022) was of the views that the inclusion of entrepreneurship into life science courses translate to economic competencies while Akinsowon and Salawu (2023) described bio entrepreneurship opportunity as a catalytic agent for employment generation, independency and national development. These assertions testify to the benefits of entrepreneurship across fields and educational levels. Federal Government through National Universities Commission, had mandated all universities to make entrepreneurial skill a core subject in 2010. Similarly, it was introduced to curriculum of secondary school in 2011 (Abimbola, 2017). This is to align with the global practices of other countries like Finland and Spain, that had earlier included entrepreneurship into their curricula. Inclusion of business skills into secondary and tertiary level curriculum is a way of ensuring the implementation of entrepreneurial skills at those tiers of education. It is often important to state that, the introduced skill of entrepreneurship is biology specific rather they are general.

Those entrepreneurial skills that are specific to biology are refers to a bio entrepreneurship. Bio entrepreneurship involves empowering biology education graduates with appropriate biology knowledge and skills for employment opportunities and income generation. Some of the bio entrepreneurial skills that could be embarked upon are beekeeping horticulture, fish farming, grass cutter farming, rabbitry, poultry farming etc. (Abimbola,2017). Similarly, Akinsowon and Salawu (2023) provided the list of entrepreneurial skills that could be ventured into in biology. These include science education book writing and editing, bioinformatics, SPSS, Python programing, biogas, bio-fermentation, solid waste recycling, re-utilisation and bio-remediation among others (Akinsowon &Salawu, 2023). Biology graduates could develop skills in these areas, utilise them as a mean of livelihood or additional income source, thereby improving the economic status of biology graduates while solving the societal problems within our immediate and extended environment. These revealed the potential tendencies of bio entrepreneurship in boosting the Nigeria economy. Hence, the need to be acquainted with status of entrepreneur in secondary school curriculum that serves as a foundation upon which biology education is built.

Senior school biology curriculum, though contains information on contents, fish, bee, bird, organic matters etc., but did not examine them from entrepreneurial perspective, indicating that entrepreneurial skills were not stressed at that level. However, the skills of demonstration, creativity, problem solving etc. could ginger students' interest towards business enterprises were embedded in senior school curriculum. Wokocha (2020) discovered that the only way by which entrepreneurial skills could be imbibed in secondary school is through the use of inquiry, demonstration, project and discovery methods since entrepreneurial expertise is lacking in their curriculum. In a like manner, Hassen et l (2021) affirmed the significance of course-based research, digital creations and community-based learning in promoting students experiential learning. Utilising these strategies for senior school students could assist in developing their inherent entrepreneurial skills.

Some of the reviewed literature focused on the problem confronting entrepreneurship. For instance, Ojone (2017) found lack of students' awareness of bio entrepreneurial areas as one of the causes of economic recession. Poor strategies and lack of awareness had been identified by Akinsowon and Salawu (2023) as challenges of implementing entrepreneurship education, this assertion buttressed the earlier statement by (Ojone,2017). Oyinlola et al (2024) study centered on challenges hindering the implementation of entrepreneurship in Nigeria Universities. Venturing into the way and manner of practicing entrepreneurship in public and private school will not be out of place, as such, there is the need to examined the disparity that may occur in the n entrepreneurship engagement of public and private schools. Amuda and Lawal (2023) reported a significant difference between public and private school achievement in physics while entrepreneurial knowledge of students from public school does not significantly differs from those of public schools (Nunez- Canal et al, 2023). This implies that public and private schools had similar knowledge of entrepreneurship.

Teachers' characteristic such as qualification, and experience influence curriculum implementation in varying degree. Some study established a significance difference study while other posited that there is no significant deference. Basil (2021) explored the influence of teachers' qualification and years of teaching experience on biology students' performance in Calabar Municipal. A significance difference existed between teachers' qualification; years of teaching experience and students' performance in biology. Oksanen (2022) study examined teachers, and

utilized questionnaire as done in the study, it however differs in that it focuses on entrepreneurial practices of teachers not on bio entrepreneurial opportunities. Nunez-Canal (2023) study also deviate from this study in that it focused on students' attitude, not on teachers' views. Oyinlola et al. (2024) utilized both qualitative and quantitative method to gathered preservice teachers' challenges on entrepreneurship implementation while the present study examined the teachers views not challenges, and only made use of quantitative data. Aside this, teachers' characteristics is another variable considered in this study. Ohakamike (2024) found no significant difference between qualified and unqualified teachers, although the study was conducted in upper basic English.

This study examined the teachers view on bio entrepreneurship opportunities in Ilorin West local government area, Kwara State. Specifically, the study found out:

1. Teachers' views on the subjects offered by the students in the field of entrepreneurship.
2. Biology teachers view on bio entrepreneurship opportunities
3. If school type influence teachers view on bio entrepreneurship opportunities
4. If biology teacher's qualification has influence on their view on bio entrepreneurship opportunities
5. If biology teacher's experience has influence on their view on bio entrepreneurship opportunities.

Research Questions

To achieve the objective of this study, the researcher attempted to answer these questions:

1. What are the teachers' views on entrepreneurship subjects offered by biology students?
2. What are the views of biology teachers on bio entrepreneurship opportunities?
3. Do the views of Biology teachers on bio entrepreneurship opportunities vary with their school type?
4. Do the views of Biology teachers on bio entrepreneurship opportunities vary with their qualification?
5. Do the views of Biology teachers on bio entrepreneurship opportunities vary with their teaching experience?

Research Hypotheses

The following hypotheses were tested in this study:

Ho_1: There is no significant difference in the views of private and public-school biology teachers on bio entrepreneurship opportunities

Ho_2: There is no significant difference in the views of qualified and non-qualified biology teachers on bio entrepreneurship opportunities

Ho_3: There is no significant difference in the views of experience and less experience biology teachers on bio entrepreneurship opportunities

Methodology

The study utilized multi stage sampling to involved 70 teachers that participated in the study. At the first stage, random sampling was used to select 23 public and private school that were involved in the study. Next was to purposively select the available biology teachers of the selected schools. A researcher developed, four Likert scale instrument entitled, Biology Teachers Views on Bio Entrepreneurship Opportunities was used to source for data. The face and content validity of the instrument was determined by three experts from the Department of Science Education. A reliability value of 0.85 was obtained using Cronbach alpha, and Chi-square statistic was used to test the hypotheses at a 0.05 level of significance.

Results

Table 1 presents the demographic information of the respondents; the table shows that 52.90% of the respondents are teachers in public schools while 47.1% of them teach in private school. Majority of the respondents (55.70%) are female while 44.30% of them are male. 21.40% of the respondents have years of experience between 0 and 5 years, 42.90% of them possess 6 to 10 years teaching experience while 35.70% of the respondents have 11 years and above level of experience. 10% of the respondents possess NCE qualification, 20% possess B.Ed. qualification, 30% possess B.Sc. only, 24.3% possess B.Sc. and PGDE while 15.70% have other educational qualification.

Table 1: Information about Respondents

Variable		Frequency	Percentage (%)
School type	Private	33	47.10

	Public	37	52.90
Sex	Female	39	55.70
	Male	31	44.30
Year of experience	0-5 years	15	21.40
	6-10 years	30	42.90
	11 years and above	25	35.70
Education qualification	NCE	7	10.00
	B.Ed.	14	20.00
	B.Sc. only	21	30.00
	B.Sc. + PGD	17	24.30
	Others	11	15.70

Source: Author's Computation (2018) using IBM SPSS 20 Statistical Software

Research Question 1: What are the teachers' views on entrepreneurship subjects offered by biology students?

Table 2: Fields of Entrepreneurship Offered by Biology Students

Field of Entrepreneurship Offered	Frequency	Percentage (%)
Horticulture	8	11.40
Snailery	0	0.00
Fish farming	9	12.90
Poultry	11	15.70
Apiculture (Beekeeping)	1	1.40
Animal husbandry	36	51.40
Others	5	7.10

Source: Author's Computation (2018) using IBM SPSS 20 Statistical Software

Table 2 presents the distribution of the entrepreneurship field in which biology students offer the subject. Information in the table shows that 11.40% of the respondents said their students offer subject relating to horticulture, 12.90% of them said their students offer fish farming, 15.70% said poultry, 1.40% said his/her student offer apiculture, 51.40% said their students offer animal husbandry while 7.10% of them said their students offer other fields not stated. According to the teachers, none of the students offer subject in snail farming.

Research Question 2: What are the views of Biology Teachers on bio entrepreneurship opportunities?

Table 3: Biology Teacher's View on Bio Entrepreneurship Opportunities

Statements	Strongly agree	Agree	Disagree	Strongly Disagree
Biology students offer entrepreneurship subjects in my school.	25 (35.70%)	30 (42.90%)	9 (12.90%)	6 (8.60%)
There is the need to incorporate into the objectives and contents of biology curriculum the likely skills that are related to biology	22 (31.40%)	44 (62.9%)	2 (2.90%)	2 (2.90%)
Bio entrepreneurship skills should be included in biology teacher education programme.	21 (30%)	41 (58.60%)	5 (7.1%)	2 (2.9%)
Bio entrepreneurship skills should be infused into the National Policy on Education.	16 (22.9%)	48 (68.6%)	5 (7.1%)	1 (1.4%)
Strategies for the actualization of bio entrepreneurship skills should be included into teacher education	21 (30%)	44 (62.9%)	3 (4.3%)	2 (2.9%)
Workshops or seminars should be organized for in-service teachers to update their knowledge on bio entrepreneurship.	42 (60%)	24 (34.3%)	3 (4.3%)	1 (1.4%)
Biology teachers with bio entrepreneurship skills are likely to have more means of livelihood than others without them.	29 (41.4%)	33 (47.1%)	7 (10%)	1 (1.4%)
Aside from teaching, there are series of bio entrepreneurship skills that biology teachers could embark on.	20 (28.6%)	44 (62.9%)	5 (7.1%)	1 (1.4%)
Entrepreneurship in biology education could be a means to reduce unemployment and thus enhance the nation's economy	30 (42.9%)	39 (55.7%)		1 (1.4%)
There is need for biology teachers to be paid extra fee for training students to become bioentrepreneurs.	28 (40%)	29 (41.4%)	10 (14.3%)	3 (4.3%)

Statements	Strongly agree	Agree	Disagree	Strongly Disagree
Phobia to take risk is an impediment for biology teachers to venture into bio entrepreneurship.	8 (11.4%)	44 (62.9%)	16 (22.9%)	2 (2.9%)
Government policies should provide secondary schools laboratories with equipment to carry out bio entrepreneurship practical.	44 (62.9%)	22 (31.4%)	3 (4.3%)	1 (1.4%)
Private sectors should provide secondary schools laboratories with equipment to carryout bio entrepreneurship practical.	33 (47.1%)	33 (47.1%)	4 (5.7%)	
Insufficient supply of potable water resources is a problem of bio entrepreneurship	18 (25.7%)	33 (47.1%)	19 (27.1%)	
Insufficient number and variety of species of plant and animal life within a region is a problem of bio entrepreneurship.	18 (25.7%)	38 (54.3%)	13 (18.6%)	1 (1.4%)
Biology teachers should not look only at the scientific side of bio entrepreneurship but also at the commercial exploitation of their results.	23 (32.9%)	44 (62.9%)	3 (4.3%)	
Discoveries from biology laboratories can be applied in the commercial market to create wealth.	31 (44.3%)	36 (51.4%)	3 (4.3%)	
Secondary school biology textbooks should include bio entrepreneurship topics.	31 (44.3%)	35 (50%)	3 (4.3%)	1 (1.4%)

Source: Author's Computation (2018) using IBM SPSS 20 Statistical Software

Information presented in Table 3 shows 31.40% of the respondents strongly agree to the view that there is need to incorporate into the objectives and contents of biology curriculum the likely skills that are related to biology, 62.90% of respondents agree to this while few of the respondents (2.90% and 2.90%) disagree and strongly disagree to this.

Out of the sampled respondents, 22.% of respondents strongly agree that bio entrepreneurship skills should be infused into the National Policy on Education, majority of respondents (68.60%) agree to this, few of respondents (7.10%) disagree to this while just 1.40% of them strongly

disagree. 60% of respondents strongly agree, 34.30% agree, 4.30% disagree while 1.40% of respondents strongly disagree that workshops or seminars should be organized for in-service teachers to update their knowledge on bio entrepreneurship.

Most of the respondents (62.90%) strongly agree that government should provide secondary schools laboratories with equipment to carry out bio entrepreneurship practical. 31.40% of respondents agree to this just 4.30% and 1.40% disagree and strongly disagree to the statement respectively. 32.90% strongly agree that biology teachers should not look only at the scientific side of bio entrepreneurship but also at the commercial exploitation of their results. 62.90% agree to this while just 4.30% disagree to this.

Hypothesis One: There is no significant difference in the views of private and public-school biology teachers on bio entrepreneurship opportunities

Table 4: Chi-square analysis on the Teachers view on Bio Entrepreneurship Opportunities based on School Type

School type	N	df	Chi-square	P-Value	Remarks
Private	33	8	6.97	0.54	Do not reject the
Public	37				null hypothesis

Source: Field Survey (2018)

Table 4 showed a df = 8, chi-squared = 6.97, p-value > 0.54. The p-value of the result is greater than 5% significance level; therefore, the null hypothesis that there is no significant difference in views of private and public-school biology teachers towards entrepreneurship opportunities is rejected.

Hypothesis Two: There is no significant difference in the views of qualified and non-qualified biology teachers on bio entrepreneurship opportunities

Table 5: Chi-square Analysis of Teachers Views on Bio Entrepreneurship Opportunities based on their Qualification

Qualifications	N	df	Chi-square	P-Value	Remarks

NCE	7	32	33.20	0.41	Do not reject the null hypothesis
B.Ed.	14				
B.Sc.	21				
B.Sc. and PGDE	17				
Others	11				

Source: Field Survey (2018)

Table 5 shows df = 32, chi-squared = 33.20 and probability value = 0.41. The probability value of the test is greater than 5% significance, this result in non-rejection of null hypothesis that there is no significant difference in the views of qualified and non-qualified biology teachers on entrepreneurship opportunities

Hypothesis Three: There is no significant difference in the views of experience and less experience biology on bio entrepreneurship opportunities

Table 6: Chi-square Analysis of Views of Biology Teachers on Bio Entrepreneurship Opportunities Based on their Experience

Years of experience	N	df	Chi-square	P-Value	Remarks
0 – 5 years	15	16	16.42	0.42	Do not reject the null hypothesis
6 – 10 years	30				
11 years and above	25				

Source: Field Survey (2018).

In the result presented in Table 6, df = 16, chi-squared = 16.42. The p-value of the test is greater than 5%; therefore, the null hypothesis is not rejected. It was concluded that there is no significant difference in the views of experience and less experienced biology teachers on entrepreneurship opportunities.

Discussion of Findings

Most of the respondents strongly agree that government should provide secondary schools laboratories with equipment to carry out bio entrepreneurship practical. This is a pointer to the significant roles of hands-on activities and demonstration to skills acquisition. This corroborate the finding of finding of Wokocha (2020) who opined that demonstration, project method, etc. are ways by which entrepreneurial skill could be imbibe into secondary school students.

Finding on the views of biology teachers on bio entrepreneurship opportunities of public and private schools established no significant difference in views of private and public-school biology teachers towards entrepreneurship opportunities is rejected. This implies the similarities in the views of public and private schools. This agrees with the finding of Nunez-Canal (2023) that school type does not influence students' knowledge of entrepreneurship.

On teachers' qualification, a significant difference does not exist between teachers' qualification and their views on bio entrepreneurship. This implies that their willingness to embark on entrepreneurship has nothing to do with their perceptions, it may be genetically related, or due to other factors not considered in this study. This contravenes the study by Basil (2021) that reported a significant difference between qualified and unqualified teachers.

Evidence from the study was a non-significance difference between the views of less experience and experience teachers. The observed result might be due to non-exposure to bio entrepreneurial activities, absence of inclusive policy and practical skills within and outside their schools of practice. This result differs from Basil (2021) who reported a significant difference.

Conclusion

The study concluded that despite the variation in the context of the examined teachers' characteristics, the teachers had similar bio entrepreneurship prospects.

Recommendations

The following recommendations were made based on the outcome of the study

1. Educational stakeholders, such as teachers' government, school owners and educators must work collaboratively to arrive at the envisaged views towards businesses for self-reliance, viable economy and for sustainable development.
2. Private and public schools' teachers could collaborate to enrich their comprehensive skills of bio entrepreneurship, through real live situations and scenarios that or employment and wealth creation.
3. Government and school proprietorship should provide professional development opportunities, mentorship programme, inclusive curriculum development and feedback to teachers to enhance already attained qualifications of teachers.

4. Experienced and less experience teachers should be exposed to workshops, seminars and conferences through which their creativity and professional proficiency are updated.

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