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Integrating Triple-Helix System in Agricultural Education Programme for Development of Employability Skills Among Students in Rivers State

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A B S T R A C T

The study examined how the integration of triple-helix system in agricultural education programme would develop students' employability skills in Rivers State. The study adopted a descriptive survey with three research questions. A random sampling technique was used to select 122 (106 students and 16 lecturers) respondents in agricultural education from the population of 350 in Rivers State University and Ignatius Ajuru University of Education. A self-structured questionnaire designed in 4-point rating scale of agreement was used for gathering data. Data was analyzed using mean and standard deviation with a benchmark mean of ≥ 2.50. Findings from the study revealed that the integration of triple-helix system in agricultural education programme would develop students' managerial skills such as enhancing their knowledge in planning, communication and risk management skill among others. Finally, it was also found that students would develop fresh ideas towards solving agricultural problems, imaginative thinking for production of agricultural value-addition, critical thinking skills for decision making, initiative skill for alternative method of food processing and skills for improved packaging of agricultural products when triple-helix system is incorporated into vocational agricultural education programme

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INTRODUCTION

Agricultural production is still considered as one of the major source of economic development of Nigeria and other nations of the world as it provides most of the essential necessities for satisfying human needs. It is undeniably the most important area of concentration for economic progress. Agriculture is no more a domain for the illiterates. Hence, the reason for various programmes that is geared towards inculcating individuals with the requisites skills for increased and quality food production. According to Oke and Fabamise (2018), agricultural education is a systematic programme of learning that is made available to develop learners' skills in agribusiness, vocation, science and technology of plant and animal production. It is designed to provide produce competence individuals for the world of work. Agricultural learners are those attending an educational institution and are ambitious and actively seeking for knowledge through research to solve problems relating to the field of agriculture. To solve these problems according to Amadi and Gibson (2020) learners must develop leadership, managerial, critical, creative thinking and innovative skill. These skills put graduates up for employment in private business enterprises and also to be managers of their own businesses. Though, these skills can only be effectively achieved through the collaboration of the school, industry and the government.

According to Amadi and Aleru (2016) agriculture education aims at ensuring that students are exposed to the important basic principles of agricultural production. This is however achieved through school-agro industry partnership with the government funding both learning ground and utilizing policies that would enhance its implementation. Agricultural education curricular emphasized the acquisition of productive work skills for employment and self- employment through prescribed activities and projects which are inherent aspects of agriculture. Agricultural education programme cannot depend completely on its own in achieving skills for generating new ideas or for innovation in this present knowledge-based society. Skill development revolves around relatively independent yet interacting institutional spheres. Thus, Triple-Helix system which is the integration of school-industry-government was found as a model for innovation, creativity and decision-making skill development among students. International Labour Organization (2011) explained skill development as a shared responsibility of government, industries and individuals, with social partners playing a critical role. This implies that creating policies that brings the government, the schools and the industries will play a major role in enhancing learners' skills for sustainability. School-industrial-government partnership is the alliance between formal education, agricultural industries and the government to create an enabling environment for developing the required skills needed for students to become skillful, innovative and self-reliant in the world of work.

Triple-Helix system in agricultural education is the collaboration or combination of three institutions to effectively develop or enhance students' skills in production agriculture for self-reliance; thus improving food security in the society. Etzkowitz and Ranga (2013) explained triple helix model as a set of

institutional components with interlinked relationships and predefined functions resulting to skill development. The triple helix model refers to a set of interactions between the university (academic), the industries (employers) and the government (policy maker) to foster economic and social development. Furthermore, the system adds dimension to drive skills development in agriculture through interaction between the three actors in skills development. Similarly, Rer (2017) posited that triple-helix approach stands for the evolution of multiple linkages between different actors at different stages of an innovation process. According to Etzkowitz et al (2013), the core function of triple helix system is generating, diffusing and utilizing knowledge and innovation. The Triple-Helix System addresses the concrete problem of "skill development" within school, industry and government by stimulating response to changing cognitive, technical, economic and international trends in a cyclic process. The focus is on relationships between the university, industry and government. To Amadi and Aleru (2016), this relationship enhances the process of acquisition of basic knowledge and practical skills that prepares students for occupation in agriculture.

Triple-helix system attracts government and industry representatives in planning with management of school on vocational skill development activities (Rer, 2017). Considering the objectives of vocational agricultural education, integrating triple-helix system model would enable the three actors understand the importance of SIWES and its opportunities to agricultural education students and grant industrial visit to various schools for relevant exposure of students to practical work.

Practical agriculture which is the fundamentals of the three tiers in agricultural education partnership gives students the opportunity to acquire skills, knowledge and competencies in the farm. Managerial skills are the right knowledge and competence of an individual in a position to fulfill some specific management activities. These skills include (but not limited to) planning, organizing, directing, coordinating and budgeting. Nwafor (2007) posited that incorporating agricultural industries and government agencies in schools is a certain way to develop students' knowledge in planning. Placing students on well-established agricultural industries would develop students' self-confidence and capacity to do things, thereby improving their managerial skills.

A resourceful manager is an asset to his/her employer. Thus utilizing agricultural industries in the delivery of agricultural education contents would enable students possess organizational skills. Students' development of risk management skill is based on the level of interaction between the school which opens up to students the risks involves in agribusinesses, the industry that gives them the hands-on experience on risk management skills and the government that provides the necessary funds for organizing on-the-job training. Engaging students in activities in agricultural demonstration farm/workshops develop students' technical know-how of the day-today running of farm enterprise and equipment maintenance work. Also, the utilization of agricultural entrepreneurs as students' instructors enhances students' risk management and thinking skills for employment (FAO, 2016). To instill students with planning and budgeting

ability requires government's provision of mechanized demonstration farm and the utilization of agricultural experts for the delivery of agricultural curriculum content. Similarly, Oke et al (2009) posited that tripartite model in education programme improves students' decision making abilities in agricultural enterprise, marketing of farm products and budgeting skills.

According to North Dakota State University (NDSU, 2020), corporation between the school, governmental bodies and private agricultural industries enhance students communication skill. NDSU (2020) further posited that it enables students develop skills on how to transfer idea to other management staff for farm profit. Dale (2019) in a study posited that practical experience is an avenue for students to develop skills for teamwork, effective communication, decision making strong organizational skill and problem-solving skills. Thus, constant partnership between the school, the industry and the government would enhance students' hands-on experience.

As farmers strive to feed the world with limited natural resources, advances in technology are the key to the future of agriculture. Thus, strong interactions between the university, industries and government allows hands-on learning among agricultural education students and gives an environment that encourages the development of sound innovative skills. Innovation is the creation of new content in a new business or for an existing one. Akpomi (2021) emphasized the integration of academics-students-entrepreneurs for development of valuable skills among students. The author further stated that the academics expose learners to the 'why' as they lay the theoretical foundations while the entrepreneurs expose learners to the 'how' through practical implementation. This however implies that students' interaction with theoretical contents enable them understand the practical implementation. The relationship between schools, agricultural industries and government go beyond mare teaching as it utilizes workshops to expose students to the step-by-step processes in utilization of agricultural inputs and production of agricultural products.

As things changes with time, agricultural production require fresh ideas to maintain food production. Thus, co-corporation between the schools, government and industries enhances students' skills in rebranding of agricultural products. Students who will venture into agribusinesses or be employed in agricultural sector must be creative and always ready to come up with fresh ideas and make good decisions about opportunities and potential projects. Triple-helix system which stipulates the interaction between school-industry-government is the key to improving innovativeness of learners. Salem (2017) in a study revealed that triple-helix approach has a positive influence on enhancing creativity skills and support in designing strategies to achieve innovativeness among students. Similarly, provision of well-equipped processing industries in schools by government would motivate students' initiative in processing, repackaging and marketing intelligence. Engaging students into practical work in agricultural education inculcate them with the ability to think and conceptualize abstract situations for creation of something news (Fayol, 2003).

Students' engagement in activities in agricultural research and development enhances their skills in critical thinking and initiative. Triple-helix model gives students the room to be innovative in the concept of marketing. According to Aleru and Lazarus (2021) constant involvement of students in agro industrial workshop motivates and enhances students' skills in designing improved indigenous technology, maintenance, purchase, sells and distribution of agricultural products for profit. Students' engagement in industrial work would enable them develop alternative method for the indigenous production of manure, fertilizer, herbicides and pesticides. Through the integration of personnel in agro-industries as resource persons, triple-helix system gives students the headway on establishing indoor vegetable farm which enhances limited land use and increases crop production. According to OECD (2020), when students are engaged in the doings of agriculture, they develop skills to do more with less and develop skills in the production of improved products.

Agriculture leadership skills are the prerequisite for students to succeed in agribusiness, participate in policy implementation, and improve farm industry best practices. Leadership skills involves both thought patterns and behaviours that link to the development of emotional intelligence. Students are not just trained to be producers and suppliers of farm produce, but to be entrepreneurial leaders (Amadi & Aleru, 2020). Hence, adequate leadership training skills is needed to enable them determine what to produce and direct their decisions after graduation. Manz and Neck (2013) see agricultural education as a programme through which students' leadership skills are developed. Students need leadership skills to achieve growth in the agricultural business sector, through innovation and production networking system (Stahl, Ulvenblad, Ulvenblad & Cederholm, 2016).

Association of Public and Land-grant Universities (APLU, 2019) listed team skills, communication skills, decision making skills, problem solving skills, self-management skills and professionalism skills as agricultural leadership skills students must master for gaining edge in the world of work APLU (2019) also stated that these skills are mainly developed when students are place on the environment replica to the world of work. They further explained that close partnership between schools and industries enables students develop organizational skill for effectiveness in any agricultural organization they render services. Similarly, a joint-participation of school, government and industries improves students' decision-making skills; thus providing an excellent vehicle for citizenship, and other values in the society.

LITERATURE REVIEW

Statement of Problem

With the high level of importation of agricultural products, it is evidently clear that Nigeria needs to raise more agricultural manpower that posses creative and problem solving-skills in agriculture. This manpower can be developed through efficient practical experience among learners in our educational institutions. This will enable Nigerian economy to benefit in areas such as increased productivity, resilient systems that leverage on finance opportunities, and in-depth economic inclusive growth which will result in economic growth. However, Ikuemonisan and Akinbola (2021) lamented that students' lack of skills in production agriculture and agribusiness pose serious threats to achieving increased employment opportunities and self-reliance.

Purpose of the Study

The main purpose of the study was to assess how integration of triple-helix system in agricultural education programme will develop employability skills among students in Rivers State. In specific terms, the study examined how:

1. Integration of triple-helix system in agricultural education programme will develop agricultural managerial skills among students in Rivers State.
2. Integration of triple-helix system in agricultural education programme will develop agricultural innovative skills among students in Rivers State.
3. Integration of triple-helix system in agricultural education programme will develop agricultural leadership skills among students in Rivers State.

Research Questions

The following research questions were formulated to guide the study

1. How will integration of triple-helix system in agricultural education programme develop agricultural managerial skills among students in Rivers State?
2. How will integration of triple-helix system in agricultural education programme develop agricultural innovative skills among students in Rivers State?
3. How will integration of triple-helix system in agricultural education programme develop agricultural leadership skills among students in Rivers State?

METHODOLOGY

The study was carried out in Rivers State. The state is dominated by Ikwerre, Etche, Ogoni, Ogba/Egbema/ Ndoni, Andoni, Opobo and Ekpeye with majority of the dwellers depending mainly on agricultural (crop, fish and livestock) production for sustainable livelihood. The descriptive survey research design was used to seek the opinion of the respondents on how the integration of triple-helix system in agricultural education programme will develop employability skills among students in Rivers State. The target population was 350 respondents which comprises of 334 agricultural education students at all levels and 16 agricultural education lecturers from state own (Rivers State University and Ignatius Ajuru University of Education) universities that offers agricultural education programme in Rivers State. A random sampling technique was used to select 106 agricultural education students, while all 16 agricultural

education lecturers were adopted for the study. The instrument for data collection was a structured questionnaire designed in a 4-point rating scale of agreement which was validated by two research experts. The reliability of the instrument was established using Cronbach alpha reliability coefficient method which yielded a reliability coefficient which yielded reliability of 0.75, 0.82 and 0.76 for research instrument 1, 2, and 3 respectively. Thus, the overall reliability index obtained was 0.77. Data were analyzed using mean and standard deviation with a criterion mean of 2.50 and above.

RESULTS

Research Question

1. **How will integration of triple-helix system in agricultural education programme develop agricultural managerial skills among students in Rivers State?**

Table 1. Mean Response on How Integration of Triple-Helix System in Agricultural Education Programme Will Develop Agricultural Managerial Skills

S/N	Statements	Lecturers (n=16)			Students (n=106)		
		$\overline{X_1}$	SD	Decision	$\overline{X_1}$	SD	Decision
1.	Incorporating industries to activities in agricultural education programme would instill students' with knowledge in planning	3.12	0.78	Agreed	3.34	0.78	Agreed
2.	Corporation between school, government agencies and agricultural industries would enable students develop communication skills	3.02	0.78	Agreed	3.14	0.73	Agreed
3.	Utilization of agricultural entrepreneurs as resource persons would enhance students' risk management skill	3.54	0.56	Agreed	2.88	0.45	Agreed
4.	Provision of mechanized demonstration farm and integration of industrialists would imbue students with skills in agribusiness budgeting	3.25	0.89	Agreed	3.56	0.63	Agreed
5.	Integrating work-base learning would enhance students' practical skills and teamwork	3.15	0.76	Agreed	3.38	0.76	Agreed
6.	Triple-helix system would encourage industrial workshop training thus enhancing students' skills in problem-solving	3.19	0.44	Agreed	3.45	0.67	Agreed
	Grand Mean	**3.21**	**0.70**	**Agreed**	**3.29**	**0.70**	**Agreed**

Source: Field work 2022

Data analyzed in Table 1 indicates that the integration of triple-helix system (item 1-6) in agricultural education programme will develop students' managerial skills for employment.

2. **How will integration of triple-helix system in agricultural education programme develop agricultural innovative skills among students in Rivers State?**

Table 2. Mean Response on How Triple-Helix System in Agricultural Education Programme Will Develop Agricultural Innovative Skills

S/N	Statements	Lecturers (n=16)			Students (n=106)		
		$\overline{X_1}$	SD	Decision	$\overline{X_1}$	SD	Decision
1.	Practical experience through school-government-industrial relation would inspire students' fresh ideas towards creating new method for solving agricultural problems	3.42	0.77	Agreed	3.14	0.64	Agreed
2.	Workshop activities organized through school-industrial-government collaboration would encourage students' imaginative thinking on production of agricultural value-addition	3.12	0.83	Agreed	2.98	0.78	Agreed
3.	Through hands-on experience from industries students would become critical in their thought for developing new agricultural market	3.14	0.72	Agreed	3.21	0.64	Agreed
4.	Workshop organized by school-agricultural industries would stimulate students' initiative in new agricultural products	3.51	0.63	Agreed	3.53	0.91	Agreed
5.	School-industrial collaboration relates teaching to real life situation thus improving students' critical thinking on alternative method for food processing	2.98	0.72	Agreed	3.14	0.62	Agreed
6.	Co-corporation between schools, government and industries enhances students' skills in improved packaging of agricultural products	3.33	0.61	Agreed	3.15	0.64	Agreed
7.	School-agro-government partnership in agricultural education enables students develop feasibility skill in agri-enterprise	3.17	0.52	Agreed	3.26	0.51	Agreed
	Grand Mean	**3.23**	**0.69**	**Agreed**	**3.20**	**0.68**	**Agreed**

Source: Field work 2022

Table 2 indicates that the integration of triple-helix system (item 1-7) in agricultural education programme will develop students' innovative skills for employment.

3. **How will integration of triple-helix system in agricultural education programme develop agricultural leadership skills among students in Rivers State?**

Table 3. Mean Response on How Triple-Helix System in Agricultural Education Programme Will Develop Agricultural Leadership Skills

S/N	Statements	Lecturers (n=16)			Students (n=106)		
		$\overline{X_1}$	SD	Decision	$\overline{X_1}$	SD	Decision
1.	Initiating triple-helix system encourage organization of seminar that unites school and industrialists thus developing self-decision making skill among students	3.09	0.66	Agreed	3.45	0.54	Agreed
2.	Triple-helix model enables effective implementation of siwes programme thus improving students' professionalism skill	3.18	0.85	Agreed	3.23	0.86	Agreed
3.	Constant meeting on technological innovation between actors enhances students' production skills	3.13	0.65	Agreed	3.76	0.71	Agreed
4.	Triple-helix model narrows the gap between theory and practice through field trips that imbue students with skills for good work ethics	3.00	0.82	Agreed	3.20	0.71	Agreed
5.	Triple-helix system attracts government and industry representatives in planning with school management on leadership skill development activities	2.76	0.94	Agreed	3.01	0.68	Agreed
6.	It grants agricultural education students training opportunity that enhances their organizing skills	3.41	0.74	Agreed	3.28	0.75	Agreed
7.	School-industrial-government integration in agricultural education gives students scholarship opportunity for advanced learning	3.22	0.58	Agreed	2.78	0.89	Agreed
	Grand Mean	**3.11**	**0.74**	**Agreed**	**3.24**	**0.73**	**Agreed**

Source: Field work 2022

Table 3 indicates that the integration of triple-helix system (item 1-7) in agricultural education programme will develop students' agricultural leadership skills for employment.

DISCUSSION

From research question 1, the study indicated that the integration of triple-helix system in agricultural education programme enhances students' development of agricultural managerial skills. This system enhances students' knowledge in planning, communication skills and risk management skill. It was also revealed that the provision of mechanized demonstration farm by government and the integration of industrialists imbues students with skills in agribusiness budgeting, enhances students' practical experience thus imbuing them with skills in teamwork and problem-solving. The findings are in corroboration with Nwafor (2007) who posited that incorporating agricultural industries and government agencies in schools is a certain way to develop students' knowledge in planning. The finding is also in consensus with Oke et al (2009) posited that tripartite model in education programme improves students' ability in decision making, marketing of farm products and farm budgeting.

Findings from research question 2 indicated that students develop innovative skills through the integration of triple-helix system in agricultural education programme. Students develop fresh ideas towards solving agricultural problems, imaginative thinking for production of agricultural value-addition, critical thought for decision making, initiative skill in production agriculture critical thinking on alternative method for food processing and skills for improved packaging of agricultural products. The finding is in corroboration with Salem (2017) who in a study found out that integration of triple-helix approach had a positive influence on enhancing students' creativity skills and support in designing strategies to achieve innovativeness. The finding is supported by the assertion of Akpomi (2021) who emphasized the integration of academics-students-entrepreneurs if valuable skills must be developed students' self-reliance.

Research question 3indicates that integration of triple-helix system in agricultural education programme enhance students' agricultural leadership skills. It was revealed that initiating triple-helix system encourage organization of seminars that unite school, ministry and industrialists thus developing students' self-decision making skill, professionalism skill in agriculture, production skills, good work ethics and enhances students' organizing skills. The findings of the study are in alignment with Association of Public and Land-grant Universities (APLU, 2019) who stated that close partnership between schools and industries enables students develop skills such as problem solving skill, self-management skills, professionalism skills and organizational skill for effectiveness in any agricultural organization they render services.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

As the whole world is focusing on providing innovative services that assures high quality standards to satisfy human needs, the integration of school-government-industries has an important role on skill development and innovation. Thus, triple-helix system is a valuable means through which students can easily develop employability skills in agricultural education programme for sustainability. This implementation would facilitate the achievement of agricultural education objectives.

Recommendations

Based on the findings and conclusions, the following recommendations were made:

1. Workshops/seminars should be constantly conducted as a means of motivating the actors involve in skills development to engage in joint programmes that would enhance students' managerial skills in agriculture.
2. Government should have a proper alignment with industries to increase constant visitation of students to agricultural industries so as to enhance their innovative skills through hands-on experience activities from the visits.
3. The School, government and the industries should structure agricultural education curriculum in such a way that it would focus more on supervised agricultural experience (SAE) where students would develop leadership skills within the short period of four years of the programme.

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