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LEARNING MODELS FOR THE 21ST CENTURY AGRICULTURAL EDUCATION GRADUATES FOR THE NEW GLOBAL ECONOMY AS PERCEIVED BY STAKEHOLDERS IN ENUGU STATE

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Abstract
Innovation and technology have technically shaped the ways of doing things. Agricultural education in the current technological advancement requires learning model that will match 21st century learning pace. This paper therefore examined learning model for the 21st century agricultural education graduates for the new global economy as perceived by stakeholders in Enugu State. The study adopted a descriptive survey research design and three research questions were formulated and answered based on the purpose of the study. Similarly, three hypotheses were tested at 0.05 level of significance. A sample size of 87 made up of 81 agricultural education lecturers and 56 instructors was selected using simple random sampling technique. A structured questionnaire titled "Learning model for the 21st century agricultural education graduates for the new global economy" (LMCAEGNGE) was developed as an instrument for data collection. Similarly, the questionnaire was validated by three experts, one from Faculty of Technology and Vocational Education, Nnamdi Azikiwe University, Awka and two from Enugu State University of Science and Technology (ESUT). 10 copies of the instrument were tested for reliability at a different location outside the study area and a reliability coefficient of 0.82 was obtained. Eighty-seven (87) copies of questionnaire were administered and retrieved by the researcher with the help of two research assistants giving a total return rate of 100 %. Mean and standard deviation were used in answering the research questions while t-test statistics was used to test the null hypothesis. The findings revealed 15 models needed for the 21st century agricultural education graduates to excel in the new global economy, the learning models are effective in increasing the employability of agricultural education graduates in the new global economy and the 21st century skills needed by agricultural education graduates to excel in the new global economy. It was therefore recommended among others that agricultural education graduates should embrace 21st century learning platform to upgrade their knowledge and skill in the area. This will enhance their adaptability to 21st century employment opportunities.

Keywords: Learning Model, 21st Century, Agricultural Education, Graduates, New Global Economy

Introduction
The concept of 21st century agricultural education graduates involve preparing individuals to excel in the dynamic and innovative field of agriculture, equipped with the knowledge, skills, and competencies necessary to tackle the challenges and opportunities presented by modern agriculture in a globalized economy. Given the rapid advancements in agricultural technology, graduates need to be well-versed in using 21st century skills like precision agriculture tools, data analytics, drones, sensors, and other digital innovations to optimize production, efficiency, and sustainability. In the view of Fraze, *et al.*

(2018) graduates in agricultural education should be able to use GPS technology to map out fields, analyze soil samples using automated systems, or utilize drones for crop monitoring. With the increasing focus on sustainability and climate change, graduates are trained to implement environmentally friendly practices that reduce the ecological footprint of agriculture. This according to Clark, *et al.* (2020) may include expertise in organic farming, integrated pest management, water conservation techniques, and renewable energy solutions. For example, a graduate might lead a project on implementing agro forestry systems to enhance soil fertility and biodiversity on a farm. Dossett, *et al.* (2019) pointed out that modern agricultural landscape requires graduates to have entrepreneurial acumen and business skills to thrive in a competitive market. Agricultural education in the 21st century emphasizes interdisciplinary collaboration, as complex agricultural challenges often require expertise from various fields such as biology, engineering, economics, and policy. Akins, *et al.* (2019) stated that graduates should be adept at working in multidisciplinary teams to address multifaceted issues, such as developing sustainable agriculture projects in a community involving stakeholders from different sectors. Akins, *et al.* further emphasized that by integrating these components into the education and training of agricultural graduates, institutions can produce professionals who are well-equipped to drive innovation, sustainability, and economic growth in the global agricultural sector, contributing to food security and environmental stewardship in the 21st century which invariably will contribute to the new global economy.

The concept of the new global economy refers to the evolving economic landscape shaped by globalization, technological advancements, digital connectivity, and shifting market dynamics. Abrami, *et al.* (2020) stated that new global economy is characterized by increased interconnectedness, rapid innovation, and a complex network of trade, finance, and information flows that transcend traditional boundaries and national borders. Several key elements define the new global economy: The new global economy is marked by the deepening interdependence of countries, businesses, and individuals across the world. Globalization has facilitated the free flow of goods, services, capital, and knowledge, leading to increased economic integration and interconnectedness on a global scale. Multinational corporations operate in multiple countries, supply chains span continents, and international trade agreements have opened up new markets and opportunities. The proliferation of digital technologies has revolutionized the way business is conducted in the new global economy. The digital transformation has enabled instant communication, e-commerce, remote work, data analytics, and automation, fundamentally reshaping industries and business models (Easterly, *et al.,* 2017). Companies harness big data, artificial intelligence, block chain, and other technologies to innovate, optimize operations, and reach global audiences in real-time. Similarly, Williams and Torgvati (2014) noted that the new global economy is increasingly driven by knowledge, innovation, and intellectual capital. Industries such as technology, healthcare, finance, and creative sectors place a premium on human capital, creativity, and specialized skills. These specialized skills are enhanced through the learning model adopted by the teacher or instructors. By familiarizing students with these technologies early in their education, they will be better equipped to meet the demands of a technology-driven agricultural sector. Additionally, learning model for 21st-century agricultural graduates should emphasize experiential learning and hands-on training. This can be achieved through internships, research projects, and practical fieldwork that allow students to apply theoretical knowledge in real-world agricultural settings. By engaging in experiential learning opportunities, students

can develop valuable skills, gain industry insights, and build professional networks that will help them succeed in the global economy (Smalley & Smith, 2017).

In Nigeria, over 70% of her population is directly or indirectly employed in agricultural sector. Apart from saving the country from hunger, it provides raw materials for industries and other salient role it plays in national development. In spite of this, the young people who are persuaded to study agricultural education or related course are ill-equipped with the needed skills to meet global job opportunity requirement in the area, hence finding job placement difficult after graduation. Suffice it to say that the technological improvement in the 21st century require certain learning models that will enable these graduates to meet the employment needs in the global world. It is based on this background that this study aims to find out different learning models that should be adopted in 21st century to boost Agricultural Education graduates job opportunities in the global economy.

Purpose of the Study

The main purpose of the study was to ascertain the learning models needed for the 21st century Agricultural Education graduates for the new global economy as perceived by stakeholders in Enugu State. Specifically, the study sought to:

i. identify different learning models needed for 21st century agricultural education graduates to excel in the new global economy;
ii. determine how effective the learning models are in increasing the employability of agricultural education graduates in the new global economy; and
iii. identify the 21st century skills needed by agricultural education graduates to excel in the new global economy.

Research Questions

The study answered the following questions

1. What are the different learning models needed for 21st century agricultural education graduates to excel in the new global economy?
2. How effective are the learning models in increasing the employability of agricultural education graduates in the new global economy?
3. What are the 21st century skills needed by agricultural education graduates to excel in the new global economy?

Hypotheses

The following null hypotheses were formulated to guide the study

1. There is no significant difference in the mean responses of agricultural education lecturers and instructors on the learning models needed for 21st century agricultural education graduates to excel in the new global economy
2. There is no significant difference in the mean responses of agricultural education lecturers and instructors on how effective the learning models are in increasing the employability of agricultural education graduates in the new global economy.
3. There is no significant difference in the mean responses of agricultural education lecturers and instructors on 21st century skills needed by agricultural education graduates to excel in the new global economy.

Methodology

The study adopted a descriptive survey research design. three research questions were formulated and answered based on the purpose of the study. Similarly, three hypotheses were also tested at 0.05 level of significance. Sample of the study comprised of 81 agricultural education lecturers and 56 agricultural education instructors giving a total sample of 87 selected using simple random sampling techniques. A structured questionnaire titled "Learning model for the 21st century agricultural education graduates for the new global economy" (LMCAEGNGE) was

developed as an instrument for data collection. Similarly, the questionnaire was validated by three experts, one from Faculty of Technology and Vocational Education, Nnamdi Azikiwe University Awka (NAU) and two from Enugu State University of Science and Technology (ESUT). To ensure reliability of the instrument, 10 copies of the instrument were administered at different location outside the study area and reliability coefficient of 0.82 was established. Eighty-seven (87) copies of the questionnaire were administered and retrieved by the researcher with the help of two research assistant giving a total return rate of 100%. Mean and standard deviation were used in answering the research questions while t-test statistics was used to test the null hypotheses at 0.05 level of significance. Any item with benchmark of 2.5 was considered to mean agreed while item below 2.5 was considered to mean disagreed. The decision rule was: any cluster of the related items with a value of 0.05 and above was regarded as significant while any cluster of related items that obtained a value below 0.05 was considered not significant.

Results

The results from the study were obtained from the research questions answered through data collection and analyzed as presented below.

Research Question 1

What are the different learning models needed for 21st century agricultural education graduates to excel in the new global economy?

Table 1

Mean Responses of Agricultural Education Lecturers and Instructors on Different Learning Models Needed for 21st Century Agricultural Education Graduates to Excel in the New Global Economy (n =87)

S/N	Item Statement	Mean	SD	Remark
1	Experimental learning	3.46	0.80	Agreed
2	Project –based learning	2.66	0.60	Agreed
3	Problem-based learning	2.80	0.75	Agreed
4	Inquiry –based learning	2.70	0.71	Agreed
5	Technology based learning	2.55	0.66	Agreed
6	Collaborative based learning	2.72	0.54	Agreed
7	Competency-based learning	2.91	0.70	Agreed
8	Global learning	2.61	0.90	Agreed
9	Design Thinking	2.67	0.70	Agreed
10	Action Learning	2.70	0.80	Agreed
11	Blended Learning	2.80	0.60	Agreed
12	Simulation and Virtual Reality	2.85	0.65	Agreed
13	Game-Based Learning	2.85	0.70	Agreed
14	Cross-Institutional Collaboration	2.65	0.89	Agreed
15	Continuous Professional Development	2.68	0.80	Agreed

Result in Table 1 shows that all the 15 items had their mean range from 2.55 to 2.91; hence they were all above the bench mark of 2.5. This shows that the respondents agreed that all the 15 items were learning models needed for 21st century agricultural education graduates to excel in the new global economy. Similarly, the standard deviations of all the 15 items ranged from .60 to .89 which indicates that all the respondents were not too far from the mean and were close to one another in their opinion.

Research Question 2

How effective are the learning models in increasing the employability of agricultural education graduates in the new global economy?

Table 2
Mean Responses of Agricultural Education Lecturers and Instructors on How Effective are the Learning Models in Increasing the Employability of Agricultural Education Graduates in the New Global Economy (n= 87)

S/N	Item Statement	Mean	SD	Remark
1	The learning model ought to be relevant to industry	2.61	.60	Agreed
2	They have to possess interdisciplinary skills	2.65	.72	Agreed
3	Critical thinking and innovation are required	2.90	.77	Agreed
4	Communication and collaboration are needed	2.59	.60	Agreed
5	The model should be adaptable and flexible	2.67	.55	Agreed
6	Global perspective will enhance it	2.62	.90	Agreed
7	They should provide certain problem-solving ability	2.60	.85	Agreed
8	Leadership and initiatives are of great value	2.55	.60	Agreed
9	Practical thinking is necessary	2.80	.66	Agreed

Result in Table 2 shows that all the 9 items had their mean range from 2.55 to 2.90 hence they were all above the bench mark of 2.5. This shows that the respondents agreed that all the 9 items were the ways by which these learning models will increase the employability of agricultural education graduates in the new global economy. Similarly, the standard deviations of all the 15 items ranged from .55 to .90 which indicates that the respondents were not too far from the mean and were close to one another in their opinion.

Research Question 3: What are the 21st century skills needed by agricultural education graduates to excel in the new global economy?

Table 3
Mean Responses of Agricultural Education Lecturers and Instructors on the 21st Century Skills Needed by Agricultural Education Graduates to Excel in the New Global Economy (n = 87)

S/N	Item Statement	Mean	SD	Remark
1	Critical thinking entrepreneurial mindset	2.55	0.50	Agreed
2	Global awareness	2.50	0.65	Agreed
3	Sustainability mindset	2.60	0.58	Agreed
4	Problem solving skills	2.75	0.92	Agreed
5	Adaptability skills	2.66	0.50	Agreed
6	Communication skills	2.73	0.59	Agreed
7	Digital literacy skills	2.66	0.55	Agreed
8	Inter-disciplinary knowledge	2.60	0.83	Agreed
9	Entrepreneurship mindset	2.62	0.77	Agreed
10	Technical Skills	2.50	0.70	Agreed
11	Crop and Soil Management	2.55	0.55	Agreed
12	Agribusiness Management	2.58	0.52	Agreed
13	Risk Management	2.89	0.58	Agreed

Result in Table 3 shows that all the 13 items had their mean range from 2.55 to 2.89 hence they were all above the bench mark of 2.5. This shows that the respondents agreed that all the 13 items are the 21st century skills needed by agricultural education graduates to excel in the new global economy. Similarly, the standard deviations of all the 13 items ranged from .50 to .92 which indicates that all the respondents were not far from the mean and were close to one another in their opinion.

Hypothesis 1

There is no significant difference in the mean responses of lecturers and instructors on the learning model needed for 21st century agricultural education graduates to excel in the new global economy

Table 4

t-Test Result of Agricultural Education Lecturers and Instructors on Learning Model Needed for 21st Century Agricultural Education Graduates to Excel in the New Global Economy.

Variables	n	Mean	Std.Dev.	Df	t-test	t-tab	Remark
Lecturers	51	2.51	0.68				
				120	-5.55	1.98	NS
Instructors	36	2.65	0.52				
Total	87						

In the test hypothesis 1, it revealed that the t-calculation was -5.55 which was less than t-tabulated of 1.98 at 0.05 level of significance with 120 degrees of freedom. This result is not significant. Therefore, the null hypothesis which states that there is no significant difference in the mean responses of agricultural education lecturers and instructors on the learning model needed for 21st century agricultural education graduates to excel in the new global economy is accepted. This implies that the two groups of respondents did not significantly differ in their responses on the learning models needed for 21st century agricultural education graduates to excel in the new global economy.

Hypothesis 2

There is no significant difference in the mean responses of lecturers and instructors on how effective the learning models are in increasing the employability of agricultural education graduates in the new global economy.

Table 5

t-Test Result of Agricultural Education Lecturers and Instructors on How Effective the Learning Models are in Increasing the Employability of Agricultural Education Graduates in the New Global Economy

Variables	n	Mean	Std.Dev.	Df	t-test	t-tab	Remark
Lecturers	51	2.67	0.68				
				120	-5.55	1.81	NS
Instructors	36	2.62	0.42				
Total	87						

Test of Hypothesis 2 revealed that the t-calculation was -5.55 which was less than t-tabulated of 1.81 at 0.05 level of significance with 120 degrees of freedom. This result is not significant. Therefore, the null hypothesis which states that there is no significant difference in the mean response of agricultural education lecturers and instructors on the effectiveness of these learning models in increasing the employability of agricultural education graduates in the new global economy is accepted. This implies that the two groups of respondents did not significantly differ in their responses on the effectiveness of these learning models in increasing the employability of agricultural education graduates in new global economy.

Hypothesis 3

There is no significant difference in the mean responses of lecturers and instructors on the skills needed by agricultural education graduates to excel in the new global economy.

Table 6
T-Test Result of Agricultural Education Lecturers and Instructors on the 21st Century Skills Needed by Agricultural Education Graduate to Excel in the New Global Economy

Variables	n	Mean	Std.Dev.	Df	t-test	t-tab	Remark
Lecturers	51	2.77	0.72				
				120	-5.65	1.98	NS
Instructors	36	2.82	0.58				
Total	87						

Test of Hypothesis 3 revealed that the t-calculation was -5.65 which was less than t-tabulated of 1.98 at 0.05 level of significance with 120 degrees of freedom. This result is not significant. Therefore, the null hypothesis which states that there is no significant difference in the mean response of agricultural education lecturers and instructors on the on the skills needed by agricultural education graduates to excel in new global economy is accepted. This implies that the two groups of respondents did not significantly differ in their responses on the skills needed by agricultural education graduates to excel in the new global economy.

Discussion of Findings

The study found 15 learning models needed for 21st century agricultural education graduates to excel in the new global economy. The study found no significant difference in the mean responses of lecturers and instructors on the concept under discussion. The findings affirm the study conducted by Abrami *et al.* (2020) on the learning models needed for 21st century agricultural education graduates to excel in the new global economy. Abrami *et al.* noted that certain learning models are needed to boost graduates' employability and create good working environment. This finding is also in accordance with Bancino and Zeyalkink (2017) who observed that project based learning and experiential learning is some of the learning model that will quickly expose learning into new learning era.

Also, the study revealed how effective the learning models are in increasing the employability of agricultural education graduates in the new global economy. The study found no significant difference in the mean responses of lecturers and instructors on the concept under discussion. The finding is in line with Mayer (2019) who noted that the effectiveness of the learning model depends on the relevance to industry. Mayer, noted among others the need to possess interdisciplinary skills, critical thinking and innovation, communication and collaboration adaptable and flexible among others. The finding also revealed 21st century skills needed by agricultural education graduates to excel in the new global economy. The study found no significant difference in the mean responses of lecturers and instructors on the concept under discussion The findings are in line with Williams and Torquati (2014) who observed that skills are paramount for upmost success in the 21stcentury. Williams and Torquati noted that due to the moving trend of technology, there is need for every graduate to embrace new technology that will enhance his or her employability status. The finding is also in agreement with Stone (2014) who also observed that skills like digital literacy, agribusiness management, technical skills, and problem-solving skills among others are very paramount for any graduate to excel in the global economy.

Conclusion

This study identified learning models needed for 21st century agricultural education graduates for the new global economy. The study also revealed how effective the learning models are in increasing the employability of agricultural education graduates in the new global economy and 21st century skills needed by

agricultural education graduates to excel in the new global economy. New global economy requires graduates acquiring relevant skills to effectively contribute to growth and development of the society. Graduates of agricultural education should imbibe these 21st century skills through the use of learning models in training and workshop equipping them to meet the demand of the new global economy.

Recommendations

Based on the findings of the study, the following recommendations are made

1. Curriculum planners should adopt learning models needed for 21st century in developing curriculum for agricultural education program to enable graduates have a good platform to acquire worthwhile knowledge and skills required to thrive in the new global economy.
2. Curriculum planners and policy makers should endeavor to establish a relationship between learning models for agricultural education graduates and its relevance to industry or workplace.
3. Agricultural education graduates should embrace 21st century skills and learning platform to upgrade their knowledge and skill in agriculture.

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