

**TEACHING AGRICULTURAL SCIENCE IN SECONDARY
SCHOOLS IN AKWA IBOM STATE: IMPLICATIONS FOR THE
ACHIEVEMENT OF FOOD SECURITY IN THE 21ST CENTURY
COVID-19 ERA**

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Abstract

Nigeria as a nation is endowed with enormous human and natural resources that can sufficiently cater for the people. But overview of the current situations points to the fact that Nigeria is among the poorest nations with high hunger and food insecurity rate, especially in this COVID-19 era. This paper highlighted related factors for the teaching of agricultural science in secondary schools: Implications for the achievement of food security in the 21st century COVID-19 Era. Analytical review of literature was adopted. It was discovered that agricultural science teaching at the present time at the senior secondary school level is predominantly theoretical. To achieve the formidable goals of agriculture in post COVID-19 era, one knows that if the students must learn and have interest in making Agriculture their life entrepreneur in the 21st century post COVID-19 era the subject must be properly blended with both theory and practice for sustainable skill development. The standard of teaching and learning agricultural science in secondary schools has to be innovative and scientific; strategic and tactical in development of required practical based competence in teachers and students that arose interest of students; improve acquisition of competence; enhance active involvement of students in agriculture and promote students productivity. Against this backdrop, the researchers recommended that State Government and corporate individuals should emphasis on training and retraining of agricultural science teaching professionals on improvisation skills and effective teaching methods. School administrators in addition to sharing farms to teachers, should provide senior students with farm spaces to practice their desired agricultural skills acquired in schools. Also, Simulation packages instructional strategies should be adopted in teaching agricultural science instead of lecture method to adequately instill the first hand real life experience that can enhance curiosity, interest and practical innovation; and

School managers should create measures that reward and recognize students with best productive ventures in practical Agriculture in schools.

Keywords: *Teaching, Teachers, Recognition of Students' Competence, Teaching Strategy.*

Introduction

Nigeria as a nation is endowed with enormous human and natural resources that can sufficiently cater for the people. In terms of natural resources, Nigeria has vast span of arable land that support diverse classes of crops; better climatic resources that support animal husbandry; and any other agro-allied production. These are coupled with enormous mineral resources such as crude, sulphate, silicon, among many others. During the pre-independence and early independence era, Nigeria was reported to have been among the nations that contributed remarkably to the export market through her exportation of cocoa, maize, corn and many other agricultural produce (Oji-Okoro, 2011).

Sadly, after the advent of the first democratically elected government administration, the agricultural sector in Nigeria started to dwindle and many attributed to lack of government interest in agriculture, poor policy intervention, reliance on obsolete crop varieties, lack of modern implementation that would maximize productivity and worst still, poor attitude to Agriculture (Nwozor, Olanrenwaju & Ake, 2019; Popoola, 2018). This has incorporated the nation into the list of nations with highest unemployment as well as food insecurity. Nevertheless, between the 2009 and 2019, the two administrations of Nigeria have created diverse agricultural programmes such as Agricultural Transformation Agenda, Anchor Borrower Programme, Presidential Fertilizer Initiative, Youth Farmers Lab., and Presidential Economic Diversification Initiative, among others (Odukoya, 2020). These programmes were geared to rejuvenate the agricultural sector, provide required input facilities as well as process facilities to ensure enhanced interest in the sector and improve productivity. Although these efforts seem to be marred by corruption, nepotism, and irregularities, many are of opinion that at least the tempo increased the agricultural productivity to a single digit in GDP (Osabohien, Akinpelumi, Matthew, Okafor, Iku, Olawande & Okorie, 2019). This increment in the production and productivity of agriculture unfortunately seemed to have been impeded by the advent of Corona virus pandemic which have resulted in the escalation of higher percentage of unemployed people; heighten poverty rate; and people living in hunger (World Health Organisation, 2021).

Hunger rate in Nigeria has gone above the manageable extent and Nigeria tends to be among the first three nations that lead. This unfortunate status could be attributed not only to COVID-19 pandemic but the emphasis given to Agriculture in the 21st century by Nigerians as demonstrated by the level of students' apathy to the subject in secondary schools.

Basically, Agricultural Science curriculum was designed to effectively tackle the case of students' apathy in agriculture, encourage practical involvement of students in agricultural sector, empower them with agricultural competence and enhance their productivity for self-reliance. The Federal Republic of Nigeria, through the National Policy on Education (2014, 28) streamlined the objectives of Agricultural Science to include:

1. encouragement of students in the use of their hands;
2. the appreciation for the dignity of labour;
3. familiarity with biological processes thereby instilling rationality in the students;
4. increasing self-sufficiency and self-reliance in food production, as well as enhancing students' interest in producing part of their food needs and improve their diet and thus minimize the cost of feeding in their secondary schools.

The design of the curriculum in Agricultural Science was to be learning by doing since Agriculture is a practical based subject that should emphasis student-centred activities rather than lecture method engagement. However, in spite of the strategic model of agricultural science curriculum, the implementation can only be imagined to be achieved. This could be attributed to many factors but primary consideration is given to the issue of teaching.

Teaching of Agricultural Science in Senior Secondary Schools in Akwa Ibom State

Teaching method in Agricultural Science is the ultimate factor that determines employability of students in secondary schools. It is the bridge required for the optimization of skills acquisition because it regulates the extent of instructional transfer from the teacher to the students. Ukeje cited in Obunadike and Omeye (2014) explained teaching as an action of a person (teacher) imparting skills, knowledge or giving instruction, or the job of a person who teaches. In other words it is the process of guiding or active participation of learners by the teaching profession for appropriate acquisition of competence on the subject. The effectiveness of teaching method employed

is measured by the retentive and cognitive ability of the learners to acquire requisite competence in the subject taught.

In reality, teaching method utilized in public secondary schools in Akwa Ibom State is basically the lecture teaching method also known as expository teaching method. This method involves the utilization of less on note in dictating the principles and concepts embedded in Agricultural Science curriculum to students without emphasis on actual practical involvement of students in the field. The method manipulates students to be active listeners that depend strictly on the passive experience of the teacher rather than collaboratively learning the Agricultural concepts by acquisition and experience. Although many scholars outlined the advantages of lecture teaching method to include easy control of students, easy transfer of curriculum instructions within record time, and assisting students to develop understanding of subject matter (Hegarty,2000; Kirk,2000; and Obanya, 2009), it is a teacher-centred (lecture) teaching method that has the potency to:

- i. Limiting the students to the level of all experience possessed by the teacher.
- ii. Encouraging the students' dependency instead of becoming self-reliant.
- iii. Hindering the students' sense of curiosity and inquisition.
- iv. Stressing the students' retentive and cognitive ability.
- v. Severe the collaboration essential for interactive innovation sharing among the teaching professionals and learners.
- vi. Contribute to the high rate of educational wastage as most of the students tend to lose concentration, interest and focus in the course of instructional transfer.

It is based on the enormous implications of lecture teaching methods currently utilized in public secondary schools in Akwa Ibom State that have caused students' lack of interest in Agricultural Science and low employability of students in Agricultural Science. The State should deem it imperative to incorporate more innovate teaching methods in the delivery of instructions in Agricultural Science.

Teaching is a systematic process of transmitting knowledge, attitudes and skills in accordance with professional principles (Ayeni, 2011; Isa, Mamman, Badar & Bala, 2020). This especially has been argued to contribute to a large extent the effectiveness of quality education service delivery (Isa, et al 2020). Many authors attributed teaching strategy to high interest of students to studies, improve concentration and retention (Brindley, 2015) and quality

academic outcome (Hesson & Shad, 2007). In an empirical study conducted by Isa et. al. (2020) on the relationship between teaching methods and academic performance of secondary school students in Nigeria, it was found that most of the teachers' methods of teaching have a great effect on students' academic performance; based on these findings, student-centered methods and teacher-student interactive methods were recommended in order to improve students' academic performance.

In another development, Asoodeh, Asoodeh and Zarepour (2012) examined the effects of student-centered learning on academic achievement and social skills in 2nd elementary. Using a simple random sampling method, one class was chosen in Shahid Atashdast Shousf School in 2010 and pupils were trained for a month based on Gagne's educational event and David Johnson and Roger Johnson's organized stages of cooperative approach. Prior to doing pattern, teaching of pupils were evaluated by researchers' designed educational questionnaire and researchers' designed observational checklist and group working. After three months, procedures were evaluated and follow-up was performed. The results showed that the approach was successful and effectual as a technique toward teaching pupils in 2nd elementary. According to what have been done, cooperative learning through performance of pupils, provide the opportunity for social acceptance and self-confidence and also improve mental ability.

Also, Gelisli (2009) determined the effect of student-centered training approaches on students' success. Experimental design with pretest and posttest group were used in the study. The working group of the study consisted of experiment and test groups with 60 people chosen out of third grade students of Gazi University, Faculty of Technical Education, the Program of Furniture Decoration Teaching and Machining Teaching. It was found at the end of the study that the success was significantly higher in the group where student-centered methods were applied compared to the teacher centered group. The implication is that teaching strategies have remarkable impact on educational achievement of students. In most of the schools in Akwa Ibom State, almost all the schools are utilizing expository method of teaching which place students at the receiving end rather than being participating members. This method tends not to align effectively in the twenty first century society that required practical approach to issues. Thus, the paper set out to outline approaches required to improve the teaching and learning of Agriculture in the post COVID-19 era to achieve food security and employability skills in the 21st century.

Theoretical Perspective of the Twenty First Century Agricultural Science in the Post COVID-19 Era

The implementation of Agricultural Science curriculum which was majorly designed to enhance the skills of students in doing the practice of agriculture is supported by the view of Piaget's constructivist theory of learning propounded by Piaget (1952). Constructivist theory states that human beings generate knowledge and meaning from an interaction between their experience and ideas. In the view of Piaget as backed by other constructivists, learners lack cognitive maturity to acquire concepts presented abstractly. The theory regards students as active learners in the process of acquiring agricultural skills as such, emphasizes on the need to interact with their agricultural environment through practical activities. Such interactions with the agricultural environment allow students to create their own understanding and meaning about the concepts embedded in agriculture. Otherwise, teachers cannot transfer intact agricultural knowledge from their heads to the learners but rather students' knowledge construct through practical activities. In other words, the utilization of students-centered methods in the transfer of agricultural science instruction could improve learning process as learners could create their own knowledge as a result of this interaction with the agricultural environment.

However, the concepts embedded in agricultural sciences cannot simply be presented to students for easy comprehensibility rather these learners must be actively involved and be able to extend meaning out of the concepts through practical experience with agricultural environment (farm). Therefore, when learning the concepts embedded in agricultural science, students need to have concrete references and real examples on which to hinge and relate their learning experiences thereby solve problems. This can be achieved through the students-centred strategies such as activity based on the farm practice.

However, this agricultural practical instructional strategy should scaffold students cognitively until they are capable of thinking at the abstract level and are able to generalize concept to other concepts. It is important to note therefore that Piaget's constructivist theory emphasized on active learning or learning by doing which implies that learners have meanings of what is taught in the classrooms when they are given the opportunity to participate actively in the learning process.

Also, the acquisition of agricultural skills required in the post COVID-19 era can equally be anchored on the theory of discovery learning as propounded by

Bruner (1966). The theory stipulates that learning is a highly complex activity which involves three major processes, namely, acquisition of information, manipulation or transformation of this information into a form suitable for dealing with the task at hand and testing and checking the adequacy of this information. This implies that students learn after adequate manipulation of learning resources which they can effectively transform to usable applications. In essence, the theory streamlines that students should be given opportunity to discover and invent the meaning of the concepts embedded in Agricultural science using practical approaches. The approach would allow teachers to extend their lesson to a wider range of students and increase participation through individualized process. Through this method, students are bound to make personal connections to their own interests and would be encouraged to express their own opinions.

The implication of this theory to the paper emanates from the fact that inclusion and the utilization of students-centred practical-based teaching of the concepts of Agricultural Science would not only give them opportunity to acquire new information but can create a manipulative environment for students, and in turn, improve their employability and zealousness in practicing agriculture as employable business.

Functional Approach to the Inculcation of Valuable Agricultural Competence in Post COVID-19 Era

Building a formidable Agricultural Science business starts from secondary schools which remains an intermediate level that propels the advancement of learners in the subject. The requirements for ensuring efficiency in the development of students' passion in practicing Agriculture begins with effective teacher, instructional strategies, improvisation of packages, creating students' farms and recognition of students' Agricultural productivity.

Effective Teachers: Teachers are the bridge builders that facilitate the passion, interest and efficiently manage the desires of students towards a course. The place of teachers in educational development is undoubtedly the most vital fulcrum on which the significant load of education revolves. It is no gain saying the fact that teachers are the pivot or pillar on which the load that maintains the equilibrium of education in any developing nation hinges. They serve as transformers, moulders and designers of learners' skills and attitudes. According to Afe (2001), teachers hold the key to their own teaching by playing crucial roles in educational attainment. The teacher is ultimately responsible for translating policy into action and principles based on practice

during interaction with the students. They help the students to decide on what to learn, and how to learn. Teachers develop appropriate learning units, establish functional classroom cultures, effectively organize and manage classroom planning. They deliver focused, structural and engaging lessons as well as communicate clearly, the curriculum instructions to their students. These broaden the potentials of teachers as the machinery on which everything in school system is based. Therefore, Agricultural Science Teachers must be professionals that are passionate, effective, efficient and innovative in discharging their responsibilities.

Utilisation of Practical-Based Instructional Strategy: Since Agriculture is a subject that inculcates the blueprint of learning by doing, prominent involvement of students in the practical teaching and learning facilitates students' learning effectiveness; enhances students' competence; and promote students' value orientation and employability in the area of agriculture. Practical-based strategy is a constructivist's approach whereby knowledge is constructed by students through an active involvement in activities, and mental process of development. The strategy assists students in building and creating meaningful knowledge. Ojo and Owolabi (2020) inferred that practical-based learning strategy create learning opportunities that not only expose students to new information or experiences but also enable them: to examine their own ideas, to determine the extent to which the new experiences make sense in light of these ideas, to consider a number of possible alternative explanations for what they have experienced, and to evaluate the usefulness of a number of different perspectives.

Utilisation of Improvised Teaching Packages to Project Real Life Experience: Agricultural concepts can equally be explained to the students using simulation strategy rather than expository approach. According to Goldsim (2011), simulation method of teaching and learning is a technique that replaces and amplifies real experiences with guided ones often "immersive" in nature that evoke or replicate substantial aspects of the real world in a fully interactive fashion. In other words, simulation method can introduce an aspect of realism into students' learning experience. This method according to Watson cited in Goldsim (2006) suggestion may help improve classroom dialogue, active participation and activities that may not be possible ordinarily in a classroom setting; enhance teachers' efficiency as measured in students' academic performance, students' attitude and their learning achievement levels. Therefore, utilization of simulation of simulated packages in explaining practical patterns of agricultural implementation can improve

students' curiosity, spark their interest to actively be involved in the acquisition of competence in the subject as well as encourage students' economic considerations in the area of Agriculture.

Creating Agricultural Farms for Students: The school's environment should provide portions of farms for students to grow crops, rear animals and practice desired area of their interest. It is through this self-reliant practice that active interest and value-based development are assured. Thus, rather than apportioning farmland to teachers, it could be more productive to give them to students for practice.

Rewards and Recognition of Students Agricultural Productivity in School: Asoodeh, Asoodeh and Zarepour (2012) asserted that direct translation of this could be that the better the rewards and recognition, the higher the levels of motivation and satisfaction, and possibly therefore, the greater the levels of performance and productivity. Rewarding students' active involvement in schools practical based agricultural activities as well as recognition of students' comparative productivity improve the desire to learn; enhance the spark to scientifically improve their innovations; sustain concentration and interest in Agriculture; and as well, create effectiveness in targeted production. Basing this position on theory of planned behaviour propounded by Fishbein and Ajzen (1967), which observes that behaviour of an individual is influenced by the intention to perform that behaviour. The theory explains the relationship between attitudes and behaviours within human action. The ideas found within the theory of reasoned action have to do with an individual's basic motivation to perform an action. The central construct of Theory of Planned Behaviour is the individual's intention to perform a given behaviour. Accordingly, intention is best predicted by attitude towards the behaviour, subjective norms and perceived behavioural control. Therefore, exogenous factors (such as traits, active engagement of students, and skills acquired) indirectly influence intention and behaviour.

According to theory of planned behaviour, there are three conditions that can affect the relationship between behavioural intention and behaviour. The first condition is that the measure of intention must correspond with respect to their levels of specificity and sacrifice given to the action/intention. That is, to predict a specific behaviour, the behavioural intention must be equally specific. Behavioural intention in this case is a function of both attitudes and subjective norms toward that behaviour. Basically, an attitude is a person's opinion about whether behaviour is positive or negative, while a subjective

norm represents social pressure arising from one's perception. The second condition that affects the relationship between behavioural intention and behaviour is that there must be stability of intentions between time of measurement and performance of behaviour. The intention must remain the same between the time that it is given and the time that the behaviour is performed. The third condition is the degree to which carrying out the intention is under the volitional control of the individual.

In the case of acquisition of competencies in Agriculture Science, the involvement of students in practical based learning of Agriculture is believed to enhance the tendency of curriculum attainment of expectation and can equally activate the passion and effectiveness of students which aligned with the concept of self-efficacy. This implies that the degree to which an individual believes they can successfully execute Agricultural production for recognition is a very vital step to achieving the desired competence. It is differentiated from outcome expectations, the individual's belief that performance of a behaviour will produce a specific outcome, which is also a critical component of social cognitive theory (Bandura, 1977). The long run behavioural effects of this reward and recognition strategy is the sustenance of interest in developing students value-based orientation of self-reliance for enhanced productivity and enhancement of students' employability in Agriculture.

Conclusion

The emphasis on the potentials of Agriculture in the post COVID-19 society can actively neutralize the economic implications of the pandemic by actively engaging the populace especially in productive agricultural related practices. Since one of the prominent consequences of the pandemic is to heighten hunger rate; poverty rate mostly resulting from halted economy and unemployment, active involvement in agriculture can create more value chain that can at least create employment and enhance food security. To achieve this formidable agriculture in post COVID-19 era, the standard of teaching and learning agricultural science in secondary schools has to be innovative and scientific; strategic and tactical in development of required practical based competence in teachers and students that enhances interest of students; improve acquisition of competence; improve active involvement of students in agriculture and promote students' productivity. It is against this backdrop that the researchers recommend: the following:

Recommendations

1. State Government and corporate individuals should emphasize on training and retraining of agricultural science teaching professionals on improvisation skills and effective teaching methods. The teachers' improvisation skills will aid them fabricate simulation packages that can enhance students' retention, attitude, interest and improve academic performance in Agricultural Science.
2. School administrators instead of sharing farms to teachers should provide senior students with farms spaces to practice their desired agricultural skills acquired in schools. This will develop students' inventive ability and establish research chain for productivity.
3. Simulation packages and guided instructional strategies should be adopted in teaching agricultural science, instead of lecture-method to adequately instill the first-hand real-life experience that can enhance curiosity, interest and practical innovation.
4. School managers should create measures that reward and recognize students with best productive ventures in practical Agriculture in schools. The blueprint for recognition should be on quality of innovative skills; viability of students' agriculture project embarked on in terms of ingenuity and originality; and economic/productive value-added benefits of the produce. This will spur students' active involvement in the business of agricultural investments.
5. Animal husbandry, fisheries and crop production should be emphasized where possible.
6. Farms should be set up for students
7. Excursions should be organized from time to time to well established farms in towns for practical experience.

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