



# **Roles of Technologists in the Teaching and Learning of Agricultural Science in Secondary Schools in Nigeria: Implication for Effective Curriculum Implementation**

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## **ABSTRACT**

The paper is on roles of technologist in the teaching and learning of Agricultural Science in Secondary schools in Nigeria: Implication for Effective Curriculum implementation. The study reviewed the agricultural science curriculum and the objectives for studying the subject, the need for the establishment of the national board for technical education and the concept of teaching and learning. Furthermore, it discussed technical education and the use of practical training in agriculture, the philosophy of Agriculture, the place of the Agricultural technologist in effective curriculum implementation in Nigeria. Also highlighted are some of the constraints to the use of the Agricultural technologist in the teaching of Agricultural Science in secondary schools in Nigeria and the probable solutions that could solve the problems. It was concluded that the Agricultural technologist be given a chance to be part of teaching Agricultural Science in secondary schools in Nigeria. The recommendations are that teaching should not be restricted to professional teachers only but others too, curriculum planners should create space for the Agricultural technologist in the next curriculum review, and education stakeholders should start engaging their services.

**Keywords:** Agricultural technologist, teaching and learning, agricultural science, curriculum

## **INTRODUCTION**

Rural science used to be one of the school subjects in the past, agriculture was known more with elementary schools and higher institutions only (Umoh & Etuk, 2003). Not minding that, when the Advanced Teacher Colleges (ATCs) came, the educational policy makers realized that Agriculture could be very vital in the secondary school curriculum, so for its implementation, well trained agriculture teachers were required which the ATCs were now allowed to take responsibility of. Later, Agriculture became a core subject in the secondary school curriculum when 6-3-3-4 system of education was introduced. The underlying objectives as stated by (Okorie, 2001), are as follows: To stimulate and sustain students' interest in agriculture, to enable students acquire basic knowledge and practical skills in agriculture, to enable students integrate knowledge with skills in agriculture, to prepare students for further studies in agriculture and to prepare and expose students to occupations and opportunities in the field of agriculture.

In the implementation of the curriculum, 'learning by doing' is the basis, for students to be able to produce food and other agricultural products for themselves and the society at large. The emphasis above confirms the social learning theory that says that "learning occurs in a social milieu" where the learner observes others, identifies with them, imitates their actions or behaviours and eventually reproduce what he has seen others do" (Ngwoke, 2010). This by implication means that there will not be learning if an effective teaching was not done. For proper implementation, the teaching must be done to make them have improved skills in the psychomotor domain essentially. According to (Esu, 2009), 'The Nigerian society needed a more pragmatic, dynamic and job oriented curriculum which should be seen as the "master key" to individual and group capacity building' hence the above. The intended occupations that

represent this could be found in the industries, business, agriculture, research and other areas. The workers in these occupations who possess the needed skills in line with the above kind of teaching effect are called technicians but in agriculture they are called agricultural technologist who are fully trained in different skills for vocational agriculture. If they were given vocational training it meant they could guide others through teaching them what they have been taught. The major challenge is the fact that the prerequisite skills needed to ensure for effectiveness and productivity, a good number of the graduate teachers do not seem to possess and this may be as a result of most of them never being to a school farm from where they would have learnt the actual act, though a lot of the time it is not their fault since most of the school from where they graduated may never have taken them to the school farm for even sight-seeing not to talk of teaching them on the field there . This then means they would be in need of help and the closest help they can possibly get to cover the lapses is the Agricultural technologist. The choice of the Agricultural technologist is hinged on the practical sense, seeing that their training curriculum constitute about 60-70% practical training and 30-40% theory learning.

Some of the agricultural science teachers already engaged by the schools possess little or no technical abilities. The most unfortunate aspect of this is seeing fresh agricultural education graduates come out of school without the initiative for agricultural science practical. Hence, the worries of the researcher to probe into the problems and encourage that the agricultural technologist be brought in to bridge the knowledge and skill gap created by helping to enhance the practical skills of the agricultural science students and cover up for the agricultural science teacher(s) deficiencies in technical know-how.

### **The Establishment of the National Board for Technical Education to Boost Technical Skills Development**

The Federal Government had established the National Board for Technical Education (NBTE) by Act 9 of January 1977; in response to the acute shortage of technical/technological manpower which was a major constraint towards the actualization of the Third National Development Plan on Education between 1975-1980. The NBTE was given a mandate with overseeing the training of, and accreditation of academic programmes in all Technical and Vocational Education (TVE) institutions. These institutions were to train middle-level technical/technological manpower, and providing practical training (NBTE, 2012). Right now, there are more than 110, technical institutions in Nigeria, among which are the Colleges of Agriculture. From the information available, almost all of these schools graduate, not less than 70-250 students from the various branches of agriculture annually, which gives an indication that the availability of the agricultural technologist graduate is guaranteed and instead of allowing them to roam the streets for lack of job or inability to start their own businesses for want of finance to obtain loans from the banks who usually demand humongous collaterals for the meager loans to be obtained could be incorporated into the teaching system especially because of the above mentioned challenges and capacities so stated with which they possess to help in reducing the woes of unemployment level currently standing at 54.2%, (TVC, 2018).

### **The Concept of Teaching and Learning**

According to Maduewesi (2006), he described teaching as a human undertaking with the purpose to help people to learn. It is an interaction between the teacher and the learner under the teacher's responsibility in order to bring about the expected change in the learner's behaviour. Ezeani (2006) sees the art of teaching as an activity that anybody, professional or non-professional, who aims at influencing another individual to change his behaviour engages in. This indicates the fact that once someone can spend his time with another person and is able to help the individual develop new positive attributes that result in a change of behaviour from the former then teaching has been done not minding the facilitators' educational qualification. Learning on the other hand as described by Ngwoke (2010), is a process that includes purposing, planning, executing, judging, eliciting the trial response, correcting the trial response, and eliciting the test response. He added that learning indicates progress and betterment in human conduct e.t.c. Learning means to prompt changes in the behaviour of an individual, accounting for difference in behaviour which are not due to such factors as maturation, and other phenomenon that can make for

changes in the activities of a person. From the perspective of the above statement, it means that learning cannot take place unless guidance is given to the learner, and because there is no specificity as to who should guide the learner, it then again, means that any available person who has knowledge of the issue at hand to be learnt can do this job.

Moreover, having agreed that learning is the acquisition of habits, skills, knowledge, and the sole aim of teaching is to ensure that these changes come about for learning to be absolute, then it is relevant to say that what matters in teaching is to ensure that worthwhile changes are effected in the behaviour of the learner which can be done as theory or practical requiring technical skills.

### **Technical Education for Practical Training and use in Nigeria**

Technical education is that type of education which deals with practical skills acquisition and application of basic scientific knowledge (Nwokolo, 2012). Okorie (2001) advanced further that technical education is designed to prepare, upgrade persons for occupations for which graduation from a university degree programme is not required. Some of the objectives of technical education in the National Policy on Education (FRN, 2004) include to: Provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical levels, vocational or training in technical skills, knowledge, ability and competencies required for use in an occupation. However, technical education has not been well developed and there has been lack of men with technical 'know-how' needed to implement economic programmes for advancement including agricultural science.

If the concern of technical education is the acquisition of skills and competencies, it means that its recipients surely are equipped to perform effectively in whatever skill, goal and competencies acquired. Furthermore, in the case of the agricultural technologist because they have been fully prepared for business and vocation then they must be the first to be recommended when it comes to technical know-how in the field of Agriculture. Thus, the question of the educational level of the recipients of technical education becomes of little value, rather, the ability to perform well should be what should attract more attention. It is also imperative for us not to undermined Agriculture, a compound and complex field that is riding on its philosophy.

From these and many more, it is clear why the agricultural technologist can play a good and great role in teaching in any level of education practice. For this reason, in implementing the curriculum learning by doing is greatly emphasized so that the students would be able to produce food and other agricultural products for their up keep and that of the community they live in. Lots of the activities given in the curriculum are meant to ensure that the building of psychomotor skills in agricultural practices in the students is guaranteed. So it is expected that each student be given his/her own equipment, farm space, farm structures and regular supply of fertilizers and animal feed for cultivation of crops and rearing of farm animals.

According to Okorie (2001), it was to ensure that the itemized philosophy of agriculture is carried to the later that has made government to from time to time roll out programmes that would emphasize and consolidate on the that fact that effectiveness and efficiency must be ensured in agriculture, therefore the said programmes listed below were put out time and again though not in any chronological order here mentioned: Young farmers club, operation feed the nation, green revolution, national accelerated food production programme, agricultural insurance schemes, river basin and rural development authorities, the national agricultural land development authority e.t.c. Although most of the programmes here are known to us as what is meant to empower the Nigerian masses but the actual purpose was for them to be used as instrument to pursue the mandate of educating the populace especially the younger people on how to be beneficial to themselves their various communities and the nation at large through agricultural engagements (Ubakamma, Eruchalu, Ezeani & Okafor, 2000)

### **The Place of the Agricultural Technologist in the Teaching Profession for Effective Curriculum Implementation in Nigeria**

Agriculture is the growing of crops, rearing of animals and processing them for man's use. (Ifeanyieze and Olaitan, 2009). Agriculture is one of the subjects taught in both primary and secondary schools but the emphasis will be laid on secondary school agriculture which is one of the pre-vocational and vocational subject for the junior and the senior secondary schools in Nigerian respectively (FRN, 2004). The Agricultural Science teacher is an individual who has acquired the art of imparting knowledge, skills and attitudes in any given area of agriculture such as animal science, crop science, agricultural engineering, economics, extension, finance and marketing to pupils and students in schools, this means that the job of curriculum implementation and even at that effectiveness and efficiency is compulsory for full productivity. Also considering the above mentioned contents of an agricultural science curriculum, it becomes necessary to highlight the opinion of Nwafor (2007) that any professional teacher would agree to the fact that there are areas or topics in one's teaching subject that one finds difficult or uninteresting. Now, asking the teacher to teach every aspect of the subject would amount to him or her transferring observed weaknesses indirectly to his students. What he does is dependent on the amount of competence he has acquired, and consequently making his teaching ineffective and even the learning that follows, thereby resulting in a waste of time, energy and other valuable resources. In order to disallow such wastages, (Offorma2006; Deizigha, Ukoha, Akor, Ogan & Ige (2013)), therefore, outlined certain principles that can guide a teaching process to include: Active participation of learners, relating classroom experiences to real life experiences of the students, frequent repetition in the teaching process, reinforcement of the students, wide range of experiences by the teacher for generalization and discrimination, multiple learning, teaching for transfer, taking cognizance of individual differences, team teaching and co-operative planning. These principles are the same for teaching all subjects whether considered highly theoretical or highly practical oriented except that the practical subjects must be allotted more time and when it comes to agricultural science all seriousness is required which is what the agricultural technologist can do best and possibly cover the weaknesses of the agricultural science teacher who is poor in teaching practical areas of the subject.

An agricultural technologist is a person who works at a job which requires applied technical knowledge and applied skills in agriculture. His work can be likened to that of an engineer, agronomist, soil scientist, agricultural economists but narrower in scope, (Okorie, 2001). An Agricultural technologist according to (ANZSCO, 2009), performs tests, and experiments, and provide technical support to assist the agricultural scientist in areas such as research, production, service and marketing. This may be the reason the University of Port Harcourt in February, 2013, published an advertisement for the post of an agricultural superintendent (Uniport, 2013), a confirmation of the functions needed of an agricultural technologist. The University of Nigeria Nsukka also have farm managers and agricultural superintendents that take students for field practical after the lecturers are done with the students on the theoretical aspect of the courses that are offered in the classroom. This makes it easier for the lecturer to be able to have time to do other things like research, attend to student matters, attends meetings that may benefit the department and faculty or even the institution in general. Hence, it would not be out of place to involve the agricultural technologist in teaching in secondary schools in Nigeria.

From experience in the College of Agriculture, the services and guidance of a farm manager (agricultural technologist) helps the students to be at home in terms of the practical aspect of the course more in line with the theories to which they have been exposed in the lecture room. Other functions performed by an agricultural technologist include: to test effects of various treatment on growth and yield, record and interpret experimental data in field experiments (Myfuture, 2002). Identifying pathogenic micro-organisms and insects, parasites, fungi and weeds harmful to crops and livestock, and assisting in devising methods of control, analyzing products to set and maintain standard of quality, planning slaughtering, harvesting and other aspects of production processes, may advise producers on farming techniques and management e.t.c (ANZSCO, 2009). The agricultural technologist's jobs involves working with people to help, inform and teach, a confirmation of the assertion of Dike (2018). So having accepted that teaching and learning results in change in behaviour and that both a professional or non-professional

could be involved in it, and it is now clearly confirmed that the faculties of agriculture in the Universities and Colleges of Agriculture employ the services of these technological staff to reduce the workload on the lecturers, and that these technologist support the scientist, then it is also imperative that the introduction of the agricultural technologist in secondary school to enhance agricultural science teaching will by every means increase the productivity of the agricultural science teacher (Ngwoke, 2010; Nwafor, 2007 & ANZSCO,2009).

Firming-up the above statement, Azikiwe (2006) says that instructional materials could be classified into human and material resources and this human resources are made up of the teacher, the learner, and the resource persons and the tutorial and non-tutorial staff. So the above is a confirmation of the fact that anyone can assume the position of a teacher or a resource person without him/her necessarily undergoing the training of a professional teacher so long what is to be taught will be relevant to the learner and the society at large in the context of use, thus, this opening again allows an opportunity for the agricultural technologist to contribute his own quota in teaching. In further lending support, Nwafor (2007) has said that when learners embark on a field trip that the services of an agricultural technologist becomes handy especially when the teacher is indisposed and/or not familiar with the equipment that the students will be shown and some schools even use them as vocational counselors. These individuals provide counselling services on various occupations to the students by analyzing the different jobs to find their requirement, remunerations and opportunities for advancement in the students' chosen careers. Other facts that may validate the impact of the agricultural technologist to support the agricultural science teacher in recent times include that teachers: Trained in the absence of the right facilities, considering the dearth of good teaching and learning facilities in most of the tertiary institutions in the nation and labour unions are engaged in a battle of the fist just to get them to provide a few needed facilities, so these graduates are usually lost when it comes to performing practical, so the presence of an agricultural technologist will bridge the gap that may have been created, the introduction of an agricultural technologist is necessary to stem the tide of conservatism of only training people for office work instead of developing students into skilled men that can help advance entrepreneurship, tackle the problem of inadequate technical 'know-how' and lack of interest and motivation in agriculture and also to build them to be people who have interest as well in farming and food processing activities thereby encouraging national food security and to reduce poverty to a minimum level in Nigeria. The challenges of the perceived inadequacy in agricultural education teacher education programme could also be made mild through this means as most of the agricultural science teacher trainee who may have come to such secondary schools for teaching practice would have been grounded in both theory and practical before pursuing their return for more studies, (Okorie, 2001). The presence of the agricultural technologist in the secondary school system will encourage proper transfer of learning and the building of individuals that are holistically rounded in education and ready to participate in societal problem solving in not just the agricultural sector but also in the social and economic life of Nigeria.

### **Some Constraint to the use of the Agricultural Technologist in Teaching in Secondary Schools in Nigeria**

Some of the problems facing the use of the agricultural technologist include:

1. The challenge of acceptance of these individuals as competent enough to teach secondary school students.
2. The general believe that the agricultural technologist is academically not good enough to teach others.
3. The challenge of the dichotomy in the certification system in Nigerian.
4. The challenge of poor innovation and innovation implementations skills by Nigerians.
5. The challenge of inferiority complex on the part of the agricultural technologist themselves because of what the society thinks of them.
6. The challenge of lack of continuity in government policies and programmes.

### **Some Solutions to the Constraints on the use of the Agricultural Technologist in Secondary Schools in Nigeria**

1. The Nigerian people and society should learn to accept the agricultural technologist in the teaching of Agricultural science in secondary schools because the education system and the study of agricultural science is at a cross road.
2. The masses should also come to agree that education is not in paper qualification but in the amount of knowledge, skills, attitudes and values that someone may have acquired to support himself/herself and the extent of contribution that could be made to societal growth.
3. The Nigerian government should come out in full through proper legislation to disabuse the mind of the populace over the dichotomy on university degree and diploma certifications from the tertiary institutions in the country.
4. All over the world innovation is a constant as it happens all the time and it is the same reason the developed countries of the world are ahead of us in terms of development because they innovate, strategize, disseminate the innovation and once the results are positive it is imbibed but the reverse is the case in Nigeria. So let Nigerian learn to appreciate innovations especially in the area of using the Agricultural technologist in teaching in secondary schools in Nigeria.
5. The graduate of technical education in Nigeria should value the education they have received and then hold their heads high by proving themselves once the need arises.
6. Successive Nigerian government should learn to sustain any programme introduced by their predecessors. So that if the programme that what this research is advocating gets the nod of a sitting government that the successive ones does not terminate it because it holds a lot of benefits.

### **CONCLUSION**

From the reasons advanced in this research work, it is evident that the use of the Agricultural technologist in the teaching and learning of Agricultural Science in secondary schools in Nigeria would produce maximum results in the students in secondary schools in Nigeria to the admiration of all especially in the development of their practical skill, building of confidence and formation of self-esteem characteristics that may have been lacking since they are aware they do not have the requisite knowledge and skills they may need to compete in the wider society and in the world of work. By their employment from the streets a lot of insecurity problems also would have been curb e.tc.

### **RECOMMENDATIONS**

The following are the suggestions supporting this research study:

1. Teaching in practical subjects like Agricultural Science in Nigeria should not be restricted to professional teachers only but also allow other resource persons like the Agricultural technologist in order to give the best of teaching to the learners.
2. Since Agricultural Science is a practical oriented subject, curriculum planners should in their next review of the secondary school curriculum create allowance in their recommendation for the use of the Agricultural technologist in teaching the practical aspects of the subject.
3. Education stakeholders should encourage the use of Agricultural technologist in the teaching and learning of Agricultural even before a policy on it from the government is released especially because it holds beneficial values.
4. Any Agricultural technologist engaged and perceived to be weak theoretically could be given further training to enhance his capacity in the teaching of students.
5. The teaching profession should not be over regulated to the point where it would jettison an innovation as that of the use of the agricultural technologist in teaching agricultural science.
6. Government should issue a strong legislation conclusion on certificate dichotomy in Nigeria so that the perception of the technical certificate holder being inferior to degree holders will stop.

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