MANIPULATIVE SKILLS AND COMPETENCIES REQUIRED FOR EFFECTIVE IMPLEMENTATION OF VOCATIONAL AGRICULTURAL CURRICULUM IN NIGERIAN SECONDARY SCHOOLS

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Abstract
Agricultural education is a course for which the manipulative skills and competences required in its teaching are approaches that have concepts in curriculum development. These approaches identified knowledge, skills, attitudes and judgments as generally required for successful performance of tasks involved in implementing and demonstrating the skills of learning and teaching agriculture. Skills occur in consonance with cognition. There are cognitive skills and manipulative skills. While the cognitive skills demands that one needs to study and observe a process, master the purpose of using a skill and how the skill will benefit the teacher of agriculture, the cognitive skill will help isolate the various elements of the skills, their sequencing and the nature of final performance. The manipulative skills enable a person who has technical knowledge, intellectual skills to physically practise those skills and transform them into saleable skills. The skills, tasks and competencies a teacher of agricultural education possesses and uses in teaching reflect in observable and non observable behaviours of the learners in agricultural practicals. Therefore it is important that instructional methods should vary with different topics. It is recommended that in the use of manipulative skills for teaching, consideration should be given to some factors, such as the nature of the topic to be taught, the nature of the class receiving the instruction and the teacher him/herself. Again the teacher may need to combine several methods having in mind that vocational agriculture curriculum is a practical oriented subject that requires skill.

Introduction

Vocational agriculture is a course taught at various levels of Nigeria's educational systems, by this it is taught at primary schools, post-primary schools, schools of agriculture, polytechnics, colleges of education and at university levels. The schools vocational agriculture curriculum prior to its introduction of 9-3-4 school system is assumed to have taken into consideration the antecedents, that is, the quality, qualifications and predispositions of the human resources of the nation, the intellectual ability, socio-economic background and cognitive styles of the prospective learners. On these premise, the successful implementation of the agriculture curriculum demands: (i) the use of effective and relevant instructional materials including textural materials. (ii) the planning for/and effective adoption of relevant supportive strategies like seminars, conferences, symposia, workshops and other interactive fora between policy makers, resource persons and teachers.

(iii) development and use of effective instructional techniques in the realm of teacher- child material interaction.

The manipulative skills and competencies required in the effective teaching of vocational agricultural curriculum will impact on the cognitive, psychomotor and effective outcomes of the learners, teachers and parents in agriculture curriculum. Vocational agricultural curriculum is wide in scope and include the following areas: 1. Farm mechanization 2. Agricultural engineering 3. Veterinary medicine 4. Crop protection 5. Soil and water conservation 6. Forestry 7. Fishing 8. Livestock 9. Crop science 10. Agronomy 11. Food science and technology 12. Agriculture geography 13. Soil survey 14. Agricultural education 15. Horticulture 16. Agricultural economics and extension 17. Soil science 18. Agricultural Biology 19. Farm Management 20 Agricultural chemistry 21. Silviculture 22. Combination of two or more fields etc. From the foregoing vocational agricultural curriculum refers to a course of study in agricultural programme, a plan which shows the scope and teaching sequence of all the learning activities provided for the particular group of students in agriculture.

Concepts in Competencies

The federal government of Nigeria recognizes the need for agricultural science in the Nigerian educational system by including the course among the core subjects and electives in the 3-3 secondary education system. The system needs professionally and technically competent agriculture teachers to implement the curriculum in a way as to generate interest in the youths who elect to take up agriculture as a vocation.

Competency approach is a fairly new concept in curriculum development and it identifies knowledge, skills, attitudes and judgements as generally required for successful performance of a task. They are those things the students and teachers are expected to do in course of the learning-teaching process to accomplish what is expected. Tasks and manipulative skills go hand in hand as they are generally expressed in observable behaviour. Tasks and manipulative skills include demonstration of physical abilities or competencies to show that essential skills required by the courses are acquired and developed.

Skills or manipulative skills could be defined variously as dexterity or coordination, especially in execution of learned physical tasks (Webster-Merriam, 2000). It is a learned power of doing something competently: a developed aptitude or ability. Hull (2001) defined skill as manual dexterity through the repetitive performance of an operation. To possess a skill is to demonstrate the habit of acting, thinking or behaving in a specific activity which has become so natural to the individual through repetition or practice that it has become automatic.

Skill being purely physical is somewhat unrealistic, for seldom do skills occur in the absence of all cognition. Therefore there are cognitive skills and manipulative skills. The manipulative skills enables a person who has technical knowledge, intellectual skills to physically practise those skills and transform them into saleable skills in agriculture.

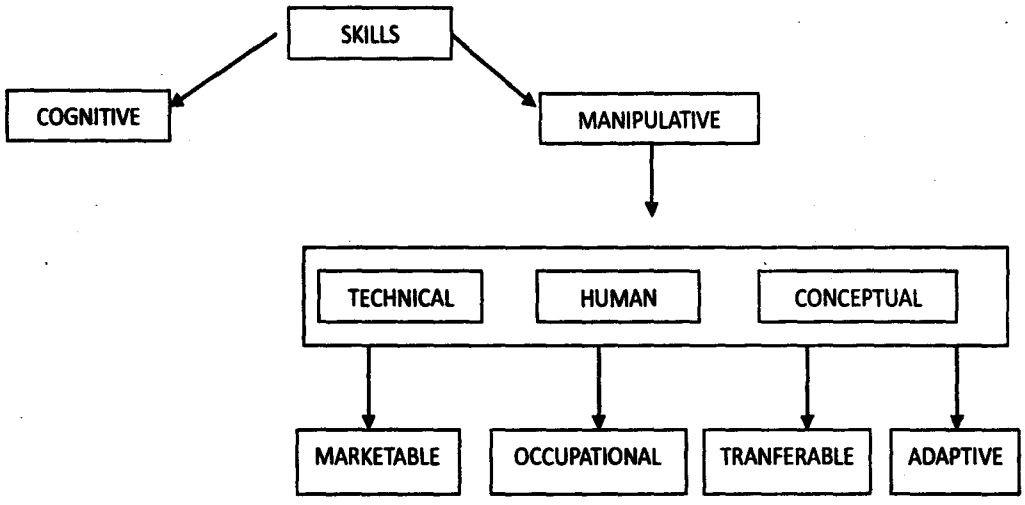

Figure 1 Categories of skills and uses

Ezeji and Okorie (2004) categorized skills into three: technical, human and conceptual. Agriculture needs the three because the technical skills call for understanding and proficiency in grafting, budding, and breeding activities in farm animals; they are particularly involving in methods, processes, procedures or techniques for improvement of plants and animals. The human skill which is the leaders ability to work effectively in a group situation is another factor, because he is to foster co-operation effort within the group of which he or she is the team leader.Conceptual skill in agriculture refers to the capacity of the management personnel to perceive the organization as an integral units. The above three categories could still be grouped as 1. marketable or saleable skills 2. occupational skills 3. transferable skills, and 4. adaptive skills.

The goal of agriculture is to help the individual to acquire skills to make a living and advance professionally in farming. Therefore there are two types of resources needed viz human resources and material resources as presented in figure 2

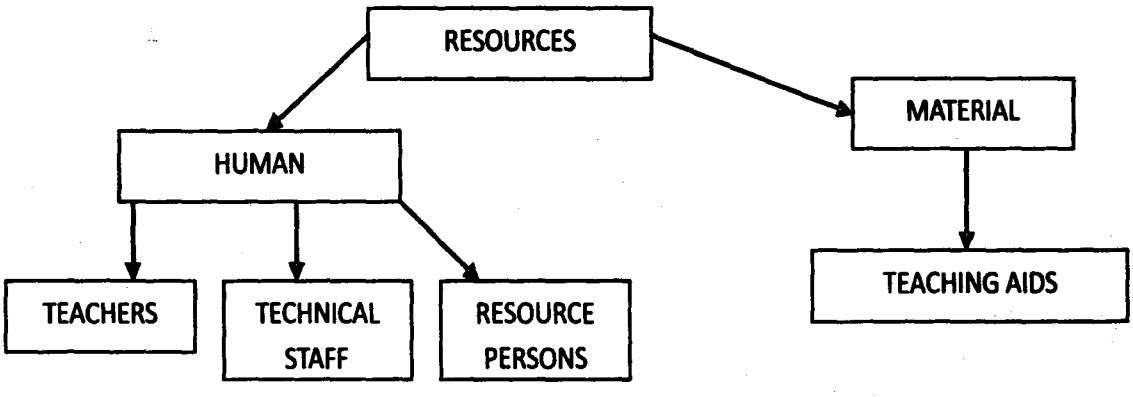

Figure 2. Resource Classification

The human resources constitute of three categories: the teachers, the technical staff and the resource persons. The material resources are the teaching aids while the agricultural teacher can use the resource person in teaching tasks and manipulative skills in vocational agriculture curriculum since he cannot specialize in all areas of agriculture. The teachers skill has to do the following (a) obtaining relevant information concerning a project or skill he intends to teach (b) providing equipment and relevant resources (c) locating other resource people (d) teaching practical aspect of the course (e) counseling and guiding the students for proper understanding.

The resource people could be experts from agricultural companies, commercial farms, private farms, co-operative societies, youth clubs, banks, ministries of agriculture, (extension agents), veterinarians or excursion .The areas of need vary and could be projects, like livestock rearing, castration of animals, grafting and budding in crop production, manufacturing process like getting oil from palm fruits, palm kernel, groundnut, beniseed and the likes.

Materials resources are teaching aids which include (1) locally available materials which the teacher can use to aid his instructions like objects, pictures, diagrams, charts and cartoons. (2) imported/commercial materials e.g. film strip, video- television, over head projectors and motion pictures (3) textbooks and monographs which are used for improving instructions, like pocket cards with notes and summaries (4) task instruction sheet (TIS)- these are series of curriculum materials carefully organized as instructive laboratory arrangement towards individualized, competency based instruction. Task instruction sheet includes: instructions, assignments, task objectives, equipment needed and instruction/task evaluation.

Competencies for effective teaching of agriculture.

Competency based curriculum is an important tool for educating teachers and prospective farmers in vocational agriculture curriculum, like different methods of producing and processing of agricultural products. In order to teach effectively, agriculture teachers must be familiar with the most effective methods of teaching vocational agriculture curriculum. Ogbazi (2008) identified thirty six professional competencies needed by vocational agricultural teachers. He grouped these competencies under the following: (i) methods skill and techniques (ii) teachers' attitudes and social relations (iii) teachers' use of equipment and facilities. In the first group there are twenty five competencies, in the second group, six competencies were found.

Competent teachers of agriculture required in our school system should be effective in utilization of agricultural equipment and facilities available in the school. Their competency should stretch to manipulative skills/tasks and the advantages include (1) the enablement of the teacher to evaluate students acquisition of skills through performance tests (2) helping in development of the teachers competence (3) giving the teacher the knowledge of where improvement is necessary in a skill development (4) helping the teacher to evaluate his own teaching skills.

Device for Improving Competencies

Important devices or facilities for teachers use in improving their competencies for effective teaching of agricultural curriculum include: concept map and telling questions.

Concept Map- This is the plan or map course of study related to the other. A concept map may be divided into (i) primary concepts (ii) secondary concepts (iii) tertiary concepts.

Using a concept map to teach small stock production

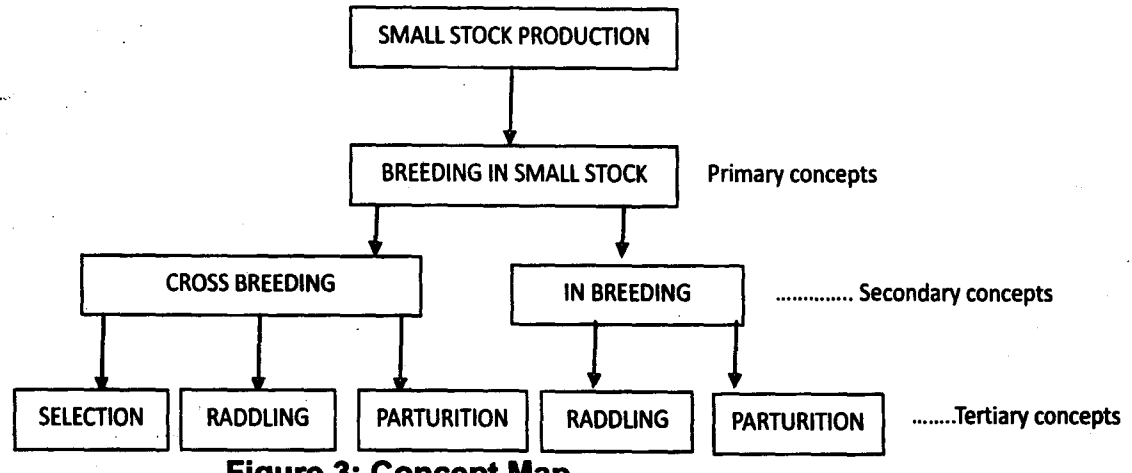

Figure 3: Concept Map

The teacher can even use the concept map as a guide to select unit objectives. As illustrated, the concept map on small stock production can give the teacher his/her unit objectives from breeding, for example at the end of the course, the student should be able to state that small stock production could be in- bred or cross bred.

Primary concepts: These are the largest key concepts or words in a concept map. It should be split into secondary concepts.

Secondary concepts: these are larger key concepts or words which are smaller than the primary concepts. The secondary concepts can also be divided into tertiary concepts.

Tertiary concepts: these are the minute key concepts or words in a concept map. As sketched in the concept map. As sketched in the concept map, in a course on small stock production, breeding is a primary concept; the secondary concepts are cross breeding and in- breeding while fertilization and parturition may form the tertiary concept.

Telling questions are skills of using fundamental questions with which a course deals and which identifies the focus of a course of study. Each telling question requires understanding, abilities and attitudes which students should possess in order to provide adequate answers.

Telling questions help serve as a guide to the teachers on what to teach and the extent to which it should be taught. For example a course in plant budding and grafting way have the following telling questions.

1. What are the essential tools needed in budding and grafting?
2. What are the uses of budding knife, tape and paint in budding and grafting?
3. What are the safety measures to be observed to prevent cambium for being damaged?

4. What is the importance of taking in?
5. What are the different types of plants that can be budded and grafted?
6. What is budding and grafting?
7. What are the importance of T-cut, scion and topping?
8. What are the steps to be taken to prevent failure?

Manipulative Skill Acquisition

In manipulative skills, there are classification of the levels

1. Reflex movement
2 Basic fundamental movement
3. Perceptual abilities
4. Physical abilities
5. Skilled movements
6. Nondiscursive communication.

These levels vary in their acquisition some are natural while some are learnt and with individual differences, some learn faster than others, nevertheless there are stages in skills acquisition as presented by Perrot (1999):

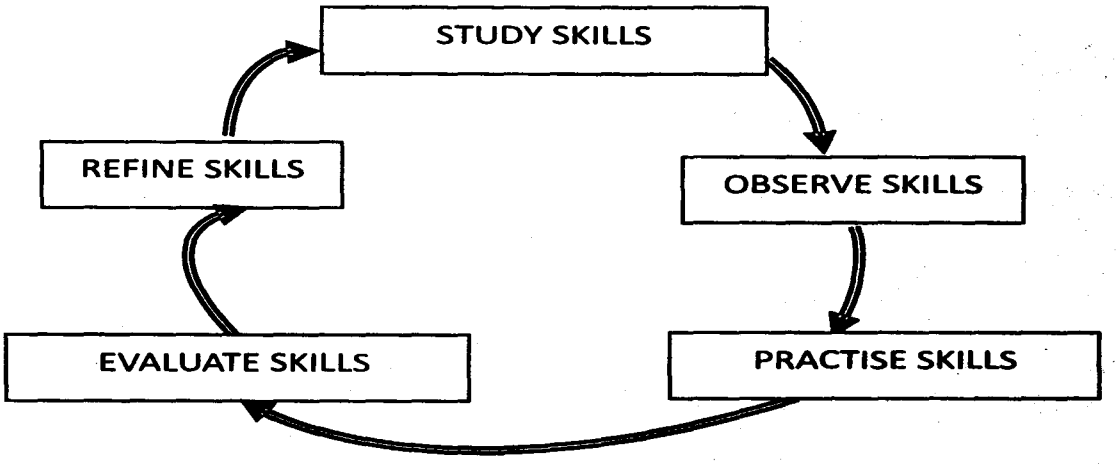

Figure 4: Stages in Skill Acquisition

Whatever skills that are required for the effective teaching of vocational agriculture curriculum, the acquisition is a three stage fold, namely:

1. Cognitive – one needs to study and observe the skill; know the purpose of using it and how it will benefit the teacher. Cognitive skill will help isolate the various elements of the skills, theirs sequencing and the nature of final performance.
2. Practice – complex skills cannot be learned without a great deal of practice.
3. Obtaining knowledge of results or feedback which is evaluation. Perfecting in a skill is a repetitive exercise, it is a continuous practice with trying the skill and ending with evaluating it, before starting again until perfection is reached.

Conclusion

There are expectations from students for their participation in a course of study and the expectations may either be expressed in student observable or non observable behaviours. The skills, tasks and competencies the teacher

possessed and used in teaching, reflect in the observable and non observable behaviour of the learners in agricultural practicals. Therefore it is important that the instructional methods should very with different topics. In a professional and competent agricultural teaching, there is no one method that can be considered the best for teaching vocational agriculture curriculum. However, in choosing a method, consideration has to be given to some factors, such as the nature of the topic to be taught, the nature of the class receiving the instruction and the teacher him or herself. He/she may combine several methods but he/she should not forget that vocational agriculture curriculum is a practical subject which requires skills and that learning by doing and demonstration act very important teaching methods in agriculture.

Recommendations

1. Agricultural curriculum should be taught with dexterity having in mind that it is a science which requires demonstration while teaching.
2. Students should be encouraged to repeat project until they realized the objectives.
3. Teachers should vary instructional methods/combined several methods since agricultural curriculum is taught using theory and practicals.

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