A Descriptive Study of High School Agriculture Teachers Competencies in Swaziland

Sandile B. Ndwandwe[1]
Manzini

Barnabas M. Dlamini[2]
University of Swaziland
Luyengo, Swaziland

Abstract

A descriptive study was utilized to determine competence level of high school agriculture teachers regarding curriculum reforms in Swaziland. The objectives of the study were to describe current competencies possessed by selected high school agriculture teachers and to identify knowledge gaps of high school agriculture teachers on the new topic contents included in the Swaziland General Certificate of Secondary Education (SGCSE) agriculture syllabi and to assess the availability of teaching facilities. To collect data for this study, observational data collection procedures were employed. A total of eight agriculture teachers from the four regions of the country were observed to assess their competencies on organizing and planning for lessons, command of the subject matter, classroom management, innovative teaching, method of instruction and assessment of the SGCSE agriculture curriculum. A content analysis procedure was also employed to assess objectives, content topics contained in the syllabi, learning approaches used, available teaching facilities and assessment used. Findings from observations showed that agriculture teachers had high competence levels in planning and organizing for lessons, command of subject matter and classroom management. Teachers also demonstrated lack of expertise in innovative teaching, incorporating educational technology in method of instruction and assessing practical skills and ability. Based on the findings of the study, a conclusion drawn was that while high school agriculture teachers had high competence levels in the key aspects of teaching and learning process, they had low competencies in teaching the new content topics included in the SGCSE agriculture syllabus and needed in-service training on the new topics. A study involving survey on high school agriculture teachers is recommended to determine their perceived competencies in addressing the new objectives incorporated in the SGCSE agriculture syllabus, as well as teaching the new content topics incorporated in the SGCSE agriculture syllabus.

Key words: Competence, content analysis, curriculum, IGCSE, high school agriculture teachers, SGCSE, agriculture.

Introduction

Education is viewed as a primary means of solving social problems (Worthen and Sanders, 1987; Freire, 1973). Burrow and Farmer (1988) further stated that education is one of the primary resources for social and economic changes and improvement. The Swaziland National Development Plan (1973 – 1977) recognized the efficiency in the school system was limited by its inherent academic orientation. This underscores the need for reorienting the curricula at primary and senior secondary schools, to counteract prevailing non technological bias and enable students who graduated to move more naturally into available employment opportunities.

The introduction of agriculture in schools was one attempt to address the inadequacies of the school system in relation to the future prospects of students who graduated. Agriculture is the most important economic sector followed by manufacturing in Swaziland (Dlamini, 1986). Introducing agricultural curriculum into African schools was generally hailed as a panacea for agricultural development. The introduction of the Schools Agriculture Program is regarded as the most educational innovation in Swaziland (Gooday, 1974). The Schools Agriculture Program was launched in 1973, as an initiative to introduce practical subjects in the school system. It represents one strategy for implementing the objectives of the Second National Development Plan, to reorient the senior secondary school curriculum away from its non-technological bias (Sullivan, 1981). Rivera and

[1]P.O. Box 533; E-mail: sandilebirthwelln@gmail.com
[2]Department of Agricultural Education and Extension, Faculty of Agriculture, Private Bag Luyengo; Email: dean@uniswa.sz

Zijip (2002) presented evidence that radically different institutional arrangement in agricultural education and extension is in an increasingly large number of countries.

The Government of Swaziland underscores the fact that the country is currently faced with socio-economic challenges such as: poverty, high unemployment rate, HIV/AIDS, increased competition in Direct Foreign Investments and global competition in products and market conditions. In response, educational reforms were made through the inception and subsequent implementation of the Swaziland General Certificate of Secondary Education (SGCSE) agriculture syllabus, replacing the International General Certificate of Secondary Education (IGCSE) agriculture syllabus in 2010 (Ministry of Education, 2009).

Curriculum changes are basically responsive to political and socio-economic challenges. There was a significant challenge in place with the agriculture curriculum relevant to keep paces with changes new curriculum content. Such curriculum modification in the modern era of technology more often than not, demands changes in pedagogy, hence teacher competence is consistently challenged (Wallance, 1996; Ottevager, 2001; and Taylor, 2000). However, due to demographic changes in the society and fast-changing fields of agriculture and rural development, there is a significant challenge in keeping the agriculture curriculum relevant, more often than not to keep pace with the technological advancements and the ever-changing yet very volatile socio-economic challenges.

Since the inception and subsequent implementation of the SGCSE agriculture syllabus, teacher professional competencies has neither been developed nor assessed. There were new additional objectives and new topic contents incorporated and the question was, how are high school agriculture teachers coping with the implementation of the syllabus? What knowledge gaps, if any, existed in as far as the teaching and learning of agriculture was concerned. There was a need to investigate teacher competence levels in teaching the SGCSE agriculture syllabus. Currently, there is no systematic documentation in Swaziland on professional competencies of the SGCSE agriculture teachers. Hence, a gap in the literature existed and this investigation was conducted to begin a process of assessing the competence of high school agriculture teachers in Swaziland.

Theoretical Framework

Findlay and Drake (1989) suggested that competence in one's professional role is important in the overall learning process, while Ready (1967) described competence as a motivational factor that is responsible for individual achievement. Sarbin (1954) emphasized that a person that cannot enact a role for which one lacks the necessary role expectation. Hertling (1974) assumed that required competencies can be identified and an educational program can be conceived which will enable the participants to develop those competencies.

Schamhart and van den Bor (1994) stated that training needs analysis may be carried out when intending to implement curriculum reforms. Taylor (1997) strongly advocated for involvement of teachers and other stakeholders in curriculum development. Newcomb (1974) noted that there are numerous lists of competencies in agricultural education, but little is known regarding which competencies are related to success. Cook (1963); and Stewart et al., (1983) focused on compilation of competencies needed by agricultural education teachers to be successful and major determinants were found to be knowledge of subject matter and ability to execute the necessary agricultural practical skills.

Attitude, demographic characteristics, work experiences and perceived levels of competence are indicators of the teacher's ability to perform effectively professional roles complex interplay (Findlay, 1989). Fishbein and Ajzen (1975) indicated that attitudes are necessary precursors to changing behaviors. Theories on attitudes suggest that cluster feelings, beliefs or behaviors are relatively lasting and that there is a relationship between attitude and competence level (Swanson, 1972; Findlay, 1972; and Wiley et al., 1997). These studies also found that individuals with positive attitudes toward a discipline tend choose or perform highly in that discipline and this positive attitudes is maintained permanently.

According to Kiernan (2004), one of the most under used data collection method is observation. Observation can be used to qualitatively assess and evaluate many physical aspects of an environment such as a school by using a combination of observation and an interview. Kiernan (2004) further stated that observations are useful when the subjects cannot provide information or can only provide inaccurate information.

Taylor-Powel and Steele (1996) stated that observation is a way of gathering data by watching behavior, events and noting physical characteristics in their natural setting. There are many types of observation, direct or indirect, participant or non-participant, obtrusive or non-obtrusive, structured or non-structured. Direct observation is when you watch interactions, processes, or behaviors as they occur; for example observing a teacher teaching a lesson from a written curriculum to determine whether they are delivering it with fidelity. Taylor-Powel (1996) further stated that observation is ideal when collecting data from individual is not a realistic option, if respondents are unwilling or unable to provide data through questionnaires or interviews and it allows the researchers to directly see what people do rather than relying on what people say they did.

The advantages of observation as a method of data collection is that data can be collected where and when an event or activity is occurring, it does not rely on people's willingness or ability to provide information and it allows the observer to directly see what people do rather

than relying on what people say they did. However, the disadvantages of observation are that its susceptibility to observer bias, susceptibility to the "Hawthorne effect," that is, people usually perform better when they know they are being observed, although indirect observation may decrease this problem, it can be expensive and time-consuming compared to other data collection methods and it does not increase the observers understanding of why people behave as they do.

Purpose and Objectives

The purpose of the study was to observe and record competence attributes of high school agriculture teachers regarding curriculum reforms in the Swaziland high school agriculture curriculum. The objectives of the study were to:

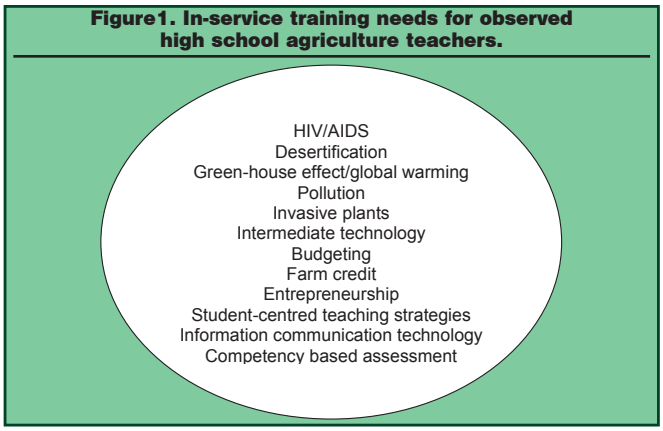
1. Describe current competencies possessed by selected high school agriculture teachers.
2. Identify knowledge gaps of high school agriculture teachers on the new topic contents included in the SGCSE agriculture syllabus.

Methodology

The study was designed to be descriptive in nature, employing qualitative data collection procedures. The target population of the study included all high school agriculture teachers employed by the Government of Swaziland (N= 134). In order to control for frame error, an up-to-date list of high school agriculture teachers was obtained from the Schools Agriculture senior inspector in the Ministry of Education. The participants in the study included a sample of eight teachers (n= 8) drawn from the target population for observation. The sample was further stratified according to the four regions of the country, two teachers per region and one being from a mission school and the other, came from a public school. The criteria used by the researchers to only observe eight schools, was based on the fact that the researchers wanted to obtain relevant data with depth.

In this study, observation was used to determine agriculture teacher's competence in teaching the SGCSE agriculture curriculum. According to the consultative document, for effective implementation of the SGCSE syllabus, teachers needed to show competence in planning and organizing materials in form of audio visual aids, teaching equipment, planning activities, using recommended teaching methods and crafting innovative teaching strategies (Ministry of Education and Training, 2010). However, obtaining such information from respondents was not realistic and respondents were less likely to provide accurate information about their competence thus observation was the only suitable data collection technique.

Figure1. In-service training needs for observed high school agriculture teachers.



Observation instruments were also developed as tools for actual teaching, lesson plans, checklist for teaching facilities and field notes after extensive review of literature. A panel of experts reviewed the instruments and attested to their content validity. In this study high school agriculture teachers were observed for a term (12 weeks), to determine teacher competencies in teaching the SGCSE agriculture syllabus. To obtain in depth information and explanations, observations were conducted together with interviews. A scheme book, lesson plan and a daily preparation book were reviewed and questions were sought for clarity. Observations were also recorded in the field book in a form of field notes to be used later for data analysis and interpretation.

Data collected from observations were analyzed using content analysis procedures and summarized in descriptive form in relation to knowledge and skills observed in the teaching and learning processes. The observed data were inductively developed into a list and then presented using tables. Trends and patterns on observed and unobserved skills were used to identify in-service training needs for high school agriculture teachers in Swaziland.

Findings

Objective 1 of the study was to describe current competencies possessed by selected high school agriculture teachers in Swaziland. Agriculture teachers were observed to assess their competencies on: organizing and planning for lessons, command of the subject matter, classroom management, innovative teaching, method of instruction and assessment of the SGCSE agriculture curriculum (Table 1).

Teacher's Competencies on Organizing and Planning for Lessons

Young (1990) identified the ability to plan and execute lessons as one of the basic skills in teaching agriculture, since agriculture is skill based. The findings of the study indicated that agriculture teachers have high competence levels in organizing and planning for lessons. The observed agriculture teachers demonstrated high competence levels in organizing and preparing audio-visual aids, scheming of work, providing students with a syllabus, recording work done, developing lesson plans, stating lesson objectives, good time management skills, coordinating agricultural activities and locating and selecting student references and materials for further reading.

Table 1. The list of teacher activities observed that relate to teacher competencies

Teacher competence	Teacher activity
1. Organizing and planning for lessons	Agriculture teachers organized and prepared teaching materials, scheme of work, provided students with syllabi, developed lesson plans, stated lesson objectives, and demonstrated good time management as agriculture teachers arrived in time in class and also left just immediately the bell has rung. Teachers coordinated agricultural activities with the colleagues and the administration. Teachers helped student to select and locate reference material for further reading.
2. Command of subject matter	To demonstrate command of the subject matter, agriculture teachers; gave a variety of relevant examples, posed questions to students in class, answered students in class and handled questions very well, organized lessons such that they reflected lifelike situations, and related current lesson to past lessons. Teachers were very creative in preparing teaching aids and they were correctly used, captured teachable moments with ease, and allowed creativity on the part of students. Teachers utilized appropriate and adequate teaching facilities as they used real objects or models, they demonstrated masterly of principles of learning as they passed comments on student performance as reinforcement.
3. Classroom management	Agriculture teachers were competent in classroom management in that, in that they demonstrated good human relations as it was evident that teachers had good relationship with colleagues and students. Teachers guided and supervised students practical's with ease, were able to create a conducive learning environment, allowed few distractions and interruptions, carefully moved around the classroom, and gave clear directions. It transpired that most agriculture teachers had established a set of rules to manage student behaviour. Teacher was time conscious, and had long range plans to improve student performance. Teachers demonstrated good chalkboard use and management. Most teachers confronted students for noise, late coming and not doing assigned tasks, and they constructively criticized students for educational improvement. Almost all teachers demonstrated a friendly and respectful relationship with students, and they recognized and appreciated student effort.

Teacher's Competence Levels on Command of the Subject Matter

The findings of the study revealed that agriculture teachers observed a high command of the subject matter. Observed teachers organized their lessons and reflected "lifelike" situations, to trigger students thinking on how learned information can be used in real life situations. Teachers ensured their lessons were student-centered and problem based, in ways that encouraged students to brain storm possible solutions that could address current problems recurring in every-day life in most communities. Teachers demonstrated an ability to give various relevant examples and handled students' questions very well.

Teacher Competence Levels on Classroom Management

Larsen (1992) and Miller et al. (1989) identified classroom management and organization as influencing the effectiveness of agriculture teachers. The findings of this study indicated that agriculture teachers had high competence levels in classroom organization and management. Teachers were able to guide and supervise students and created conducive learning environment. They indicated that they were effective teachers since they minimized wasting of time, allowed few distractions and interruptions; carefully moved around the classroom; and gave clear instructions. From the observations, the conclusion was that, almost all the observed teachers had established a set of rules and procedures to manage student behavior, absenteeism and noise making.

Teachers' Competence Levels on Innovative Teaching

Observations of teachers suggested that agriculture teachers lacked competence in innovative teaching. Observed teachers lacked the skill of developing an understanding with students such that, the students are actively engaged in the teaching and learning process. Teachers lacked creativity and thus failed to provide the stimulus upon which students can reflect on, share different experiences, interpret phenomena and become aware of their prior knowledge, connect it to what they already know and construct their own "new" information, upon which they can apply to solve different problem situations. Agriculture teachers were unable to develop and secure a desirable learning approach, which stimulates interest, develops thinking ability and helps students to evaluate, draw inferences from and make decisions essential to the solution of a problem, which is invaluable in agricultural education.

Teachers' Competence Levels on Method of Instruction

Mbingo (2002), suggested that teaching agriculture should be practical oriented; competence based; employ discovery learning, investigatory approach, research based and problem based learning - that seek to probe students on current problem and brainstorm on possible solutions to existing problems. The findings of the study revealed that the teaching of agriculture was still dominated by the old and trusted traditional methods of instruction, the lecture, demonstration and classroom discussion methods and the approach was still teacher centered. Teachers demonstrated average competence on oral presentations, debates, case studies and research. Observed teachers demonstrated low competence levels on using field trips, resource persons, role playing, problem solving, modular teaching, cooperative learning, inquiry learning, experiential learning and value clarification (Table 2).

Teaching Resources Available to Teach Agriculture in High Schools

Shelhamer (1993) stated that facilities and materials are crucial in agricultural education since they provide students with opportunities for experiential learning and diverse learning styles, which is more ideal in agricultural education instructional systems. The results of the study indicated that most of the schools provided teaching materials ideal for the old and tested teaching methods such as the lecture, classroom discussion and demonstration (Table 3). Almost all the observed schools had an adequate supply of facilities that aid

Table 2. Teacher competence and methods of instruction

Method of instruction	Comments on teachers competence in planning, use and actual implementation
Mostly used methods of instruction Lecture Classroom discussion Demonstration	Agriculture teachers demonstrated high competence levels in planning for lecture, classroom discussions and demonstrations. Teachers seem comfortable and familiar in using these methods of instruction
Averagely used methods of instruction Oral presentations Debates Case studies Research	Agriculture teachers showed average competence in using these methods of instructions. These methods of instruction were rarely used and when used they were not used correctly. Teachers' seemed to be nervous and they were not sure with what they were doing. Only two teachers of the observed teachers proved to be competent in oral presentations.
Methods of instruction never used Field trips Resource persons Role playing Problem solving Modular teaching Cooperative learning Inquiry learning Experiential learning Seminars Value clarification	The results of the study revealed that agriculture teachers never used these methods of instruction. Lack of teacher competence on using these methods contributed to these methods of instruction not being used. In some rare cases where agriculture teachers declared their competence in using these methods of instruction, it transpired that lack of resources and facilities in the school limited the teacher on using some methods of instruction.

theory, basic knowledge and understanding such as text books, posters, charts, maps, chalk, chalkboard, classrooms and classroom furniture. However, tools that aid practical skills and abilities such as garden tools, pH test kits, soil auger, small livestock and fruit trees were in limited supply. The findings of the study further revealed that schools struggled to provide adequate technology related equipment such as videos, computers and accessibility to internet, audio cassettes, television, digital cameras, USB flash drives and CD ROMS. The results of the study further revealed that only prevocational schools on the observed schools were able to provide skill aiding equipment. Observations suggested that all the prevocational schools had adequate teaching facilities in computers, green houses, refrigerators, laboratories, access to internet, video cassettes, seed trays, gas cylinders, electric heaters, brooders, printers, clocks, bee hive boxes and sprinklers and various first class animal houses in their agriculture department.

Teacher Competencies on Assessment of SGCSE Agriculture Syllabus

The findings of the study indicated that a majority of teachers tend to use assessment only to collect scores for learners and not to improve teaching and learning. The type of test teachers gave students were merely examining students on knowledge and understanding and less on handling information and problem solving. Agriculture teachers did not formulate their own questions but used past exam papers to drill students. Agriculture teachers did not analyze the tests according to their level of difficulty to identify weaknesses of the learners or work on concepts they find to be most challenging to the students. The findings of the study further indicated that agriculture teachers lacked competence in assessing practical skills and ability. Teachers struggled to construct and formulate six good practical exercises assessing students on responsibility, initiative, technique, perseverance and quality. Teachers failed to account for marks awarded to students and failed to provide supporting evidence that practical's were carried out. However, teachers demonstrated high competence levels on assessing investigatory projects.

Identified Knowledge Gaps in Teaching the New Topic Contents Included in the SGCSE Agriculture Syllabus

Objective 2 of the study was to identify knowledge gaps of high school agriculture teachers on the new topic contents included in the SGCSE agriculture syllabus. Barrick et al. (1983) stated that the identification of relevant topics can be crucial in providing agriculture teachers with quality in-service training. The findings of the study revealed that curriculum reforms incorporated new topic contents addressing current socio-economic challenges, hence observed agriculture teachers alluded to the need of in-service training on the following topics: HIV/AIDS, Desertification, Green-house effect/ global warming, Pollution, Invasive plants, Intermediate technology, Budgeting, Farm credit and Entrepreneurship. Through scheduled interviews during observations, agriculture teachers highlighted to indicate a need for in-service training on the new topic contents, student-based method of instruction and use of information communication technology and multi-media in teaching and learning process.

Table 3. Teaching facilities available in the agriculture department in most high schools in Swaziland

Teaching facilities	Comments on availability
Teaching facilities available in most schools Chalk and chalkboard, text books, pH test kit, nutrients test kit, classrooms, classroom furniture, garden tools, continuous assessment record books, maps, posters, small livestock, and fruit trees.	Most schools provided these teaching facilities in adequate supply.
Teaching facilities available in some schools Videos, computers, access to internet, television, digital cameras, USB flash drives, audio cassettes, soli auger	Some schools struggled to provide these facilities, however they were in limited supply. In some cases, these facilities were not only for agriculture department but rather for the school and all departments were entitled to use them.
Teaching facilities not available in most schools Department computers, printers, refrigerator, soil auger, soil dispenser, laboratories, cattle, goats, green houses, sprinklers, brooders, bee hive boxes, electric heaters, clocks, seed trays, television set, DVD players, digital cameras, 48 kg gas cylinders, and various first class animal houses.	These teaching facilities were not available in most of the observed schools. It is however, worth to note that the three prevocational schools observed, Lavundlamanti, St Philips and Salem high schools provided these equipment at departmental level and in adequate supply.

Conclusions

This observational study of a sample of teachers suggest that high school agriculture teachers are competent in key aspects of teaching and learning process, since they were highly competent in organizing and planning for lessons, command of subject matter and classroom management. This implies that high school agriculture teachers possess the qualities of effective teachers and can successfully implement the SGCSE agriculture syllabus if given the necessary support in provision of good infrastructure and in-service training on identified in-service training needs.

The study was limited to a small number of observations. Meaning there is a need to conduct a more comprehensive quantitative study to determine high school agriculture teacher's perceived competencies on addressing the new objectives incorporated in the SGCSE agriculture syllabus and as well as teaching the new content topics incorporated in the SGCSE agriculture syllabus.

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