

Factors that Impact on the Teaching and Learning of Agriculture Science in FET Schools in Mpumalanga, South Africa: A Case of Mandlethu FET School

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ABSTRACT A survey was conducted at Mandlethu FET School in Mpumalanga Province of South Africa to determine factors that affect teaching and learning of Agriculture Science at the school. The study also sought to identify possible support from the learners' view point that are needed to improve on the teaching and learning of Agriculture Science at the same school. Face-to-face interviews with the learners and one educator using questionnaires, was used to collect data for this study. The present study identified several factors that hinder effective delivery of tuition, and these include: educator's poor attendance of classes; lack of parental support; inadequate government support for learners and educator, poor social skills on the part of the learners and lack of resources like study materials. According to the learners, measures that are needed at the school so as to improve on their teaching and learning experience include: learners being given extra assignments and questions to do after school, the school offering extra classes to reinforce what has been taught during school hours, timely delivery of resources like text books by the Department of Education and provision of a library. In conclusion, closer collaboration between the school, government and families is needed to solve the problems both learners and the educator face so as to create an environment that is conducive for effective teaching and learning to take place. Such an approach recognizes the "significance of families" and the "contributions of schools and government" as a "necessary framework" for working together in "complementary efforts toward common goals" to maximize success for learners.

INTRODUCTION

The number of learners pursuing Agriculture Science as a subject at Further Education and Training (FET) Schools and other Agricultural Colleges throughout South Africa has been on the decrease post-apartheid. According to Paterson and Arends (2004), only one in five learners write Agriculture Science in the South African Senior Certificate Grade 12 School leaving examination. The reasons for this decline is multifaceted and includes factors related to poor motivation which leads to lack of interest in the subject; learners electing to take Agriculture Science when they lack the necessary background, learners being forced to take the subject because it belongs to a group of subjects that they are interested in, or students being advised by their teachers to take Agriculture Science even if they do not have interest in the field. It is obvious that if learners are made to

choose a subject without considering whether they are interested in the field or not, it could result in learners developing a negative attitude towards the subject.

In South Africa, the basic structure of the National Qualification Framework (NQF) consists of the General Education and Training (GET), Further Education and Training (FET) and Higher Education and Training (HET) bands. While GET offers the first possible exit point from the formal education system, the FET is designed to provide for intermediate to higher level skills and competencies to promote the integration of education and training, and to enhance learner mobility and progression at the critical point between GET, HET and the work place (Department of Education 2001a). Therefore, teaching and learning of Agriculture Science at FET level is highly critical given its role as the interface between general or compulsory education on one side and the work place and

higher education on the other side (Paterson and Arends 2008).

FET schools offering Agriculture Science as a subjects are predominantly 'black' schools, located in rural areas characterized by small-scale livestock and crop production. This situation hinders parents from getting involved in their children's school activities due to their work schedules, lack of resources, lack of transport and stress because of living in poor neighbourhoods as observed by Hill and Taylor (2004). One other problem associated with this low socio-economic status and low parental participation in children's education is that learners spend time helping with household activities after school hours instead of concentrating on their studies (Singh et al. 2004). This practice disadvantages the learners in their pursuit for basic education and has potential to negatively impact on South Africa's quest to attain the United Nation's Millennium Development Goals (MDG) on improving science education.

Given that South Africa is faced with the challenge to guarantee adequate food production to sustain the increasing population, FET Colleges and Schools offering Agriculture Science as a stand-alone subject are likely to play a significant role in providing learners with the opportunity to study Agriculture Science (Paterson and Arends 2008).

In light of this, the authors assessed the factors that impact on the teaching and learning of Agriculture Science at FET Schools using Mandlethu as a cases study, and also assess the learners' view of what is needed to boost teaching and learning at their school. This will help to foster training of learners who understand and are capable of passing Agriculture Science at Grade 12 Senior Certificate level. The decision to undertake this research was informed by the fact that teaching and learning are dynamic processes that need to be regularly adjusted to meet the changing needs and opportunities in the area (Kidane & Worth, 2012). It is envisaged that this research will be used as a tool to help the educators reach the common goal of assisting learners to do their best in Agriculture Science at Mandlethu FET School and elsewhere in South Africa.

Objectives

The research had two objectives namely:

- ♦ To determine factors that hinder effective delivery of teaching and learning of the Ag-

riculture Science at Mandlethu FET School; and

- ♦ Identify possible support strategies from the student perspective that are needed to improve the teaching and learning of Agriculture Science at Mandlethu FET School.

MATERIAL AND METHODS

Study Area

This study was conducted at Mandlethu FET School located in Vlaglaagte 1 in former KwaNdebele homeland, Mpumalanga Province of South Africa. The area is rural and characterized by small-scale livestock and crop production. The people live mostly in organized settlements.

Study Population

The school had 13 class rooms, 13 educators and 396 learners in Grade 10 to 12 in the year 2012. Out of these 161 learners comprising of 80 grade 10 learners, 56 grade 11 learners and 25 grade 12 learners were enrolled for Agriculture Science. Overall, there is only one educator for Agriculture Science in the school.

Sampling and Data Collection

The participants were chosen using purposive sampling, and the criteria for inclusion was that the participant had to be a learner who is taking Agriculture Science or had to be an educator who is involved in the teaching of Agriculture Science. Therefore the only Agriculture Science educator (n=1) and all learners (n=161) who are pursuing Agriculture Science formed the study group (n=162). One school was chosen for this study in order to control some of the variance across Agriculture Science programs and the method of instruction. A pilot study was conducted to test the relevancy of the data collection tool (questionnaire) on 20 grade 10 Agriculture Science learners from the school. The results from the pilot study were used to amend the questionnaire. Changes in layout and in particular the wording of questions were made for easier interpretation.

The survey was conducted using structured interviews. Each interview lasted between 30 to 60 minutes. The information obtained from learn-

ers (n=161) focused on reason for choosing to study Agriculture Science, challenges faced by learners pursuing Agriculture Science at Mandlethu FET School and possible support strategies they thought if implemented would improve on the teaching and learning of the subject in question at their school. Meanwhile primary data obtained from the educator (n=1) included the following: number of years of teaching Agriculture Science at Mandlethu FET School; number of learners taking Agriculture Science in all grades (grade 10 to 12) that were part of the study group at Mandlethu FET School and challenges encountered during the teaching of Agriculture Science at Mandlethu FET School faces.

Data Analysis

Completed questionnaires were retrieved and analyzed qualitatively using codes, matrix of themes, and indicators, to describe the factors that impact on the teaching and learning of Agriculture Science at Mandlethu FET School.

RESULTS AND DISCUSSION

Assessment of the Factors that Influence the Attitude of the Educator

From the results of the present study, factors that influence the educator's attitude towards the teaching of Agriculture Science at Mandlethu FET School can be categorised into the following themes: lack of study material; in-

roduction of new syllabus; lack of resources to conduct practical sessions and lack of parental support (Table 1).

Lack of Study Material

The educator identified lack of study material (Table 1) as one of the challenges she faces in teaching Agriculture Science at Mandlethu FET. However this finding is hardly astonishing, because lack of resources for teaching and learning of science subjects has been highlighted by Makgato (2007) as being an endemic problem in most South African public schools. The present study shows that 19 years after the dawn of the democratic dispensation in South Africa, problems like lack of access to material and/or equipment for teaching and learning science subjects and lack of infrastructure such as a library have not been adequately addressed by the Department of Education. It is the responsibility of the School Governing Board (SGB) to ensure that the Department of Education provides the school with all the resources required for teaching and learning (Bush and Heystek 2003). According to the RSA (1996) and the Education Law and Policy Handbook (RSA 1999), the Mpumalanga Provincial Department of Education is mandated to provide schools with adequate resources to teach science subjects. However, based on the findings of this study, both the SGB and the Provincial Department of Education are failing to execute their mandate to deliver services to the children at the Mandlethu FET School. The authors are of the view that this

Table 1: Analysis of factors influencing the educator attitude towards the teaching of Agricultural science at Mandlethu FET School

<i>Code</i>	<i>Theme</i>	<i>Indicators</i>
Challenges of teaching Agricultural science there are no study materials for all of them.	Lack of study materials	1 Textbooks are not enough for grade 10 2 The number of learners is increasing and 3 Child headed families cannot buy textbooks and stationary
	New syllabus	1 Lack of new textbooks to teach new syllabus (CAPS) introduced in 2013 2 The teacher has to compile class notes for the learners
	Lack of practical teaching materials	1 Shortage of practical teaching resources such thermometers, pH scale and demonstration farms
	Lack of parental support	1 Parents do not help learners with school work at home 2 Parents letting children help with household work

could be as a result of lack of liaison between the School Management (SM), the SGB and the Local Circuit and Curriculum Manager (LCCM). Alternatively, the prevailing situation could also be attributed to lack of adequate mechanisms by which the LCCM can pick up problems timely and provide solutions. Furthermore, the prevailing situation could also be blamed on the failure on the part of the SM to plan, budget and articulate school needs at SGB meetings. Further research is therefore needed to look into the exact cause of the problem so that solutions can be suggested.

Since Mandlethu FET School is a public school that depends on government resources, failure on the part of the Mpumalanga Provincial Department of Education to provide the school with all required resources means that the school cannot effectively perform its role of educating the learners. This could explain why Mandlethu FET School tends to perform very poorly every year especially in science subjects.

The school has a shortage of educators especially for Agriculture Science, with only one educator assigned to teach the subject to learners in grades 10, 11 and 12. Based on this finding, the authors believe that this situation leads to students at Mandlethu FET School not being given the necessary attention required to influence a positive attitude towards the subject.

When the educator is de-motivated there is a strong tendency to negatively influence the learners' attitude towards the subject. Available evidence suggests that the attitude of students can be influenced by the attitude of the teacher and his or her method of teaching because teaching cannot be separated from learning. For instance, studies carried out have shown that the teachers' method of teaching mathematics (Kumpulainen et al. 2011) and his or her personality greatly accounted for the students' positive attitude towards mathematics (Yara 2009). According to Griessel et al. (1989), it is the duty of the school to lead the child as a complete human being to self-realization. However, this task seems unachievable in situations of lack as presently observed at Mandlethu FET School.

New Syllabus

In 2013, the government of South Africa introduced a new curriculum for Agriculture Science. According to the educator, this has se-

verely hampered her ability to deliver quality tuition to the learners. According to the educator, she was not at the time provided with relevant text books needed to teach the new syllabus (Table 1). This could explain why the educator feels that the introduction of the new syllabus has hampered her ability to deliver quality tuition. Besides that, results of another part of this study (results not shown) found that the Agriculture Science educator is not adequately equipped to handle Science subjects. This compounds the problem and could be attributed to the fact that the educator obtained her qualification under the old curriculum which might not have adequately prepared her to handle the new curriculum. Worse still, the same study (results not shown) showed that the educator was not trained to specifically teach Agriculture Science. This has been reported to be an endemic problem in most South African schools, where majority of educators though qualified as professional educators, their training in mathematics and Science subjects is inadequate (Mangena 2001). A recent study by Kumpulainen et al. (2011) showed that lack of understanding of teaching methodologies among educators and researchers was a setback to social interaction in learning and instruction.

Lack of Parental Support

Failure of parents to support their children with their studies was also identified by the educator as a hindrance to quality teaching and learning from taking place at Mandlethu FET School (Table 1). This was expected given that Mandlethu FET School is located in rural South Africa. This situation acts as a barrier to involvement by the parents in their children's school activities. This is due to factors related to their low social status as observed by Hill and Taylor (2004). These findings are consistent with those of Mmotlane et al. (2009), who found that there was low parental participation in school activities in South African black schools. Similarly, Martin (2003) reported that some parents do not participate in their children's school activities because they feel that it is not their job or that they have no interest because of attitudes or beliefs. Desforges and Abouchaar (2003) also indicated that poor parents with low socio-economic status find it difficult to support their children's educational development. Parental socio-

economic status has more influence on their participation in the education of the children more than other variables such as gender, age and marital status (Astone and Mclanahan 1991; Grolnick et al. 1997). Further to this, it is possible that due to prevailing predominantly low socio-economic status of parents in the study area, in trying to empower the family, children spend time helping with household activities after school hours as indicated by a many of the learners interviewed. Singh et al. (2004) reported that involving children in such activities after school hours may be tiring and leaves children thinking of going to sleep afterwards instead of studying. The authors are of the view that this practice disadvantages the students in their pursuit of Agriculture Science education at Mandlethu FET School and as such can be blamed for poor performance at school.

Assessment of Factors that Influence the Learners Attitude Towards Teaching and Learning of Agriculture Science

Factors influencing the learners' attitude towards the learning of Agriculture Science at Mandlethu FET School were summarized and are presented in Table 2. According to the learners interviewed, factors that are influencing their altitude towards learning Agriculture Science could be placed in three themes. The first theme included factors that speak to their social life.

This includes social media, sports activities and influence of friends (peer pressure). The second theme consisted of factors related to actual teaching and learning, which include lack of education resources, poor time management, language barrier and poor attendance of classes by the educator. The last theme consisted of factors related to conditions at home, specifically having to do house hold chores when they get home after school.

Factors Related to Actual Teaching and Learning

Learners, who were interviewed, indicated that factors that inhibit the efficient learning of Agriculture Science at Mandlethu FET are multifaceted. This is best captured by the following quote by some of the learners who were interviewed:

"Nothing, only poor teaching until Unisa intervened, Television, Playing soccer, lack of textbooks, lack of studying resources, study guides, library, diagrams, textbooks"

The learners identified inconsistency on the part of the educator when it comes to attending classes as one of factors that is a hindrance to effective teaching and learning at the school. The learners describe the educator's attendance of classes as being poor. When asked to describe the educators attitude towards her teaching engagements, the learners had this to say:

Table 2: Analysis of factors influencing the learners' attitude towards the learning of Agriculture Science at Mandlethu FET School

<i>Code</i>	<i>Theme</i>	<i>Indicators</i>
Factors influencing learning of	Aspects related to social life Agricultural science at MandlethuFET School	<ol style="list-style-type: none"> 1. Spending time with friends disturbs learners from learning 2. Friend are very discouraging 3. Watching TV makes it difficult to study after hours 4. Playing soccer after school instead of studying 5. Don't have time to study due to family responsibilities
	Factors related to actual teaching and learning	<ol style="list-style-type: none"> 1. The teaching of Agriculture Science was poor until UNISA intervened. 2. Poor attendance by the teacher 3. lack of textbooks and other study materials 4. No library at the school 5. Learners not being fluent in English
	Conditions at home	<ol style="list-style-type: none"> 2. Doing household chores at home after school leaves one tiered to study

“...poor attendance by the teacher...”

This is likely to be true and was expected given the heavy work load assigned to the teacher who is the only educator tasked with the teaching of Agriculture in the three classes

Like the educator, learners also identified lack of educational resources (text books and other study materials) as being hindrances to effective teaching and learning at Mandlethu FET School. This is very important especially if the educator is not able to effectively deliver lessons during class time as has been indicated by the learners. Therefore the situation is made worse by lack of study guides, library, teaching diagrams and textbooks as indicated by the learners (Table 2). This means that learners do not have opportunity improve on their understanding beyond what was taught in class. This is critical considering the fact that Agriculture Science sometimes requires books that learners can use as reference to help them to complete certain tasks that might be part of homework or assignments.

In a recent survey with 62 science students at Mandlethu FET by Mbajjorgu et al. (2012) on what they do after school hours, 45.2 % of the students indicated that they read at home after school hours against 38.7% who during that time help with household chores. This gives a difference of 6.5% in favour of the number of students studying at home after school and numerically translates into 4 students out of a total of 62 students who participated in the study. This implies that less than half of Agriculture Science students at Mandlethu FET School have the opportunity of studying at home after school. It would therefore make sense to provide learners with other learning materials such as “*study guides, teaching aids and textbooks*” together with a library to accord the learners the opportunity to explore knowledge through other materials especially after school hours.

The desire of the learners to have these facilities is an indication that they are not comfortable with the present situation and thus needed a change. With availability of the library, it would be possible for learners to read together and learn from each other. This is supported by the fact that most learners expressed their willingness to learn from others if put into groups to work on subject related problems.

Considering that science subjects especially Agriculture Science is practical orientated,

learners need to be given to do practical sessions and experiments. However, because the school lacks resources to conduct experiments as required by the curricula, the learning of Agriculture Science is effective. This is affirmed by science learners in Soshanguve secondary schools who in one study indicated that the teaching of Agriculture Science could be improved by showing learners what is taught practically (Makgato 2007). It is therefore important that resources to conduct all the practical classes as required by the curricula for science subjects be availed to enhance the understanding and application of scientific knowledge (Department of Education 2001a).

Language barrier was also cited as a problem for the learners and thus a deterrent to effective learning of Agricultural Science. This is because English is a second or even a third language for most learners. Asked about the preferred language of instruction, some of the learners indicated that they preferred to be taught Agriculture science in their home or mother tongue languages. The home language spoken by many students was IsiNdebele. It is thus logical that and a number of students wanted their home language to be adopted as the medium of instruction. The statements below highlight this fact:

“.....I might not know the answer in English but I know it in IsiNdebele’.

“.....I want home language...”

“...I want some questions to be explained in my home language”

During the course of the interviews, the authors encountered learners who could not express themselves in English necessitating the services of a translator to conduct the interviews. The present findings are consistent with a number of studies which have indicated the difficulties that learners face in learning (Latu 2005; Ndamba 2008). Such learners need more help from the educator; they need the educator to listen to them, be patient with them so that they are able to understand what is taught in the subject.

Aspects Related to Social Life

When the learners were asked to shed light on how they manage their study time and also about their study skills at home, one of the response that sums up the general feeling of the

learners read thus: *"I am a teenage mother with two children, so after school I have to fend for my children instead of reading and therefore I don't have a personal home study time table or roster to study"*. The same learners also mentioned like watching television, relationships with certain friends and involvement in extramural activities after school like playing soccer as some of the hindrances to their ability to study. From this, it is clear that learners at Mandlethu FET School are confronted with critical social and emotional problems with potential to negatively impact on their education. In view of this, as suggested by Drake (2000) more collaboration between the school and families need to be encouraged to solve such problems. Such an approach recognizes the *"significance of families"* and the *"contributions of schools"* as a *"necessary framework"* for working together in *"complementary efforts toward common goals"* to maximize success for students as learners (Christenson and Sheridan 2001).

Home Related Activities

According to the learners interviewed, it was observed that learners have to attend to household chores in the afternoons when they get home (Table 2). This leaves the learners with little or no time to study. This was however anticipated given that the study area is rural and as has been noted in the section on factors that influence educator's attitude, children from rural areas tend to do lots of chores after school, which unfortunately leaves them tired and unable to study at home.

Why Learners Choose to Study Agriculture Science

In light of all the hardships that are associated with teaching and learning of Agriculture Science at the school under study, the authors decided to investigate factors that motivate the learners to pursue Agriculture Science as a subject. When asked why they choose to study Agriculture Science, some of the interviewees indicated that they chose the subject because of the similarities between Agriculture Science and Life Science. Other learners were of the view that by studying Agriculture Science it would open doors for them to pursue further studies in fields like botany, chemistry and biochemistry.

Therefore despite the potential for both learners and educators getting demotivated, the learners showed a strong motivation to study the subject as indicated in their quotes below:

"Love of farming and is a science subject".

"I want to be an animal health technician".

"I like animals and so I want to learn about them".

"Agriculture has many career opportunities".

Possible Supportive Measures which According to the Learners are Necessary to Improve Teaching and Learning of Agricultural Science at Mandlethu

On the question of how learning could be improved on at the school, some of the learners were of the view that more engagement with the course through being given extra assignments, being offered extra classes and more exercises would help improve on their performance (Table 2). This is captured in their own words below:

'..... We need more questions from the teacher.....'; '.....we need extra classes.....; '.....we need extra assignments.....;the teacher should give more exercises to practice on.....'

Furthermore, the learners suggested the following remedies for the problems they encounter with their studies: parents or guardians need to get more interested in their studies and offered assistance; the Department of Education and the SM need to provide them with adequate study materials such as stationeries, textbooks, study guides, study diagrams, study DVD'S, school garden for practical classes and a library. This view was supported by the educator, who indicated as discussed above.

CONCLUSION

In conclusion, the factors that impact on the teaching and learning of Agriculture Science at Mandlethu FET School are multifaceted. There are those that are educator centred, and include the educator not being able to offer the new syllabus, and not being consistent with class attendance. The other factors are related to lack of resources for effective teaching and learning to be realised. Besides that, there are factors that are associated with failure on the part of the government to provide needed resources timely to meaningfully impact on teaching and learn-

ing. Poor social skills on the part of the learners is factor which leads to poor time management, failure to handle negative peer pressure and ensuring that extra-curricular activities and entertainment such as watching television do not impact negatively on their studies. The parents centred factors include lack of support and failure to provide an environment conducive for studying. Despite the hardships the hurdles learners are faced with, the desire to study and do well is evident and with the right support Mandlethu FET School has potential to improve on its current performance.

RECOMMENDATIONS

In light of the findings of this study, parents need to get on board and offer an environment that conducive for meaningful teaching and learning. It is also recommended that the teaching of Agriculture Science should be reinforced either by re-skilling the current educator or acquiring services of one or more educators to lessen the teaching load for the educator. Students need to be equipped with social skills to be able to prioritize their studies. In light of the shortage of resources that students could use to do self-studies, the recommendations by learners of what needs to be done to improve on their learning experience should be given priority. Furthermore, there is a need for research to find ways of improving access to books and stationeries to meet the learner's needs.

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