

Agriculture Teacher Education in Zimbabwe: A Teacher-Mentors' View of Trainee Teachers Holding National Certificate in Agriculture

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Abstract

The purpose of the study was to determine the suitability of National Certificate in Agriculture holders for a one year Post Agriculture Diploma in Education teacher training. Views of teacher-mentors on trainee teachers' knowledge of subject content in their area of training were solicited for. The teacher-mentors, to whom the trainee teachers were attached during teaching practice, were asked to rate their mentees' subject content efficacy and practical ingenuity. Twelve teacher-mentors were randomly selected to participate in the study. Data were collected using questionnaire and analysed using SPSS 17.0. The major findings were that trainee teachers lacked in subject content and laboratory related practical skills. The study recommended that the training duration of the PADE programme be extended by at least a year to facilitate subject content enrichment. This study benefits planners of agriculture teacher education programmes in other countries since it looks at various models of teacher education in Agriculture.

Keywords: agriculture teacher training, national certificate in agriculture, F1 school, F2 school, mentee, teacher-mentor.

INTRODUCTION

Agriculture teacher training, for secondary school teaching, in Zimbabwe is in the form of Post Agriculture Diploma in Education (PADE). The students who enrol for teacher training have a qualification in Agriculture, ordinarily a Diploma in Agriculture (DA). The Agriculture training is offered by the Ministry of Agriculture (MoA) through its Agriculture colleges. Teacher training is offered by the Ministry of Higher and Tertiary Education with Department of Teacher Education (DTE) University of Zimbabwe as the certifying institution. The PADE programme is premised on the assumption that students enrolled for teacher training already have sufficient subject content and requisite skills in Agriculture. The teachers' college focuses on pedagogical skills training only, DTE certifying the teaching (pedagogical) qualification. DTE does not assess the subject content as it is presumed the trainee teacher is already equipped enough with content and practical skills in Agriculture. Trainee teachers undergo a 20 months training, split into five terms on college campus and one term on teaching practice.

College enrolment statistics show that of late, DA holders, are not enrolling in the PADE programme. The programme is, instead dominated by a new calibre of students who have a National Certificate in Agriculture (NCA) as an entry qualification (Belvedere Technical Teachers' College Enrolment Files, 2006-2012). This has possibly been

necessitated by the drift of DA holders to university education as their diploma qualification is considered a university entry qualification.

NCA is a fast track method of training agriculture extension workers that was adopted by the Ministry of Agriculture (MoA) in 2004, on realisation of the need for more extension staff due to the land reform programme. All the five conventional agricultural colleges had to offer NCA in addition to the diploma they were offering. The NCA programme also saw training of extension workers decentralising to other non-agricultural training centres called vocational training centres (Muchara, 2010; Moyo 2004). The end result was that the MoA produced more manpower than what was required, as a result NCA holders have turned to Agriculture teaching in secondary school.

Trainees, in NCA programme, need to have attained at least any 5 'O'-Levels, irrespective of their school 'O'-Level Agriculture, Mathematics and Science background. On the contrary, the DA programme requires an applicant to have passed at least 5 'O'-Levels including English, Mathematics and Science. NCA students undergo a 1-2-1 programme i.e. one term at institution followed by two terms out on attachment and then one term back at institution. This implies that students have a contact time of two terms (approximately 8 months) with their lecturers/tutors. On the contrary, diploma holders

undergo a 3-3-3 programme i.e. three terms at college followed by three terms on attachment and then three terms at college. This translates to six terms (two years) of student-lecturer contact and one year on attachment. The eight-month versus two-year contact time contrast between NCA and diploma holders, respectively, has brought a lot of debate on whether NCA holders have been adequately trained in the subject area, Agriculture. This pushed the researchers to get the views of teacher-mentors on how students attached to them fared during teaching practice. Teacher-mentors deal directly with trainee teachers when the trainees are on teaching practicum. A trainee is attached to a mentor who monitors and further guides the trainee on best practices in teaching. As alluded to earlier on, trainee Agriculture teachers, in Zimbabwe, are not taught subject content at the teachers' college as that component is presumed adequately covered at agriculture training.

History of Agriculture Teacher Education in Zimbabwe

Colonial/Pre-independence

The training of Agriculture teachers for secondary schools started in 1967 (Gadzirayi, 2000). The model that was followed during the colonial period involved both Ministries of Education and Agriculture. In this model, aspiring Agriculture teachers had to undergo a two years skills training at a rural technical institute (Mlezu). The institute was located in a farm. This entails that trainees had a hands-on approach to Agriculture training. The two year stint at the rural technical institute was followed by a final year at a teacher's college. One thing to note here is that there was formal coordination and monitoring by both ministries (Gadzirayi). The model produced a category of teachers who were referred to as T2B. These teachers were trained to teach in selected African secondary schools that were meant for 'the less academically gifted African children' (Mungazi, 1991). These secondary schools were referred to as F2. The reality, however, is that these schools were meant to generate cheap labour for the colonial master. The F2 education system was also meant to prepare Africans as semi-skilled workers compared to the F1 system designed to ensure colonial supremacy (Nherera, 1995; Mungazi, 1991 ; Zvobgo, 1994). Teaching of Agriculture and other technical vocational subjects was, therefore rudimentary. The aim was to produce a school graduate who could till the garden for the colonial master and follow orders appropriately. On the other hand whites and a handful of blacks in F1 schools had a curriculum that prepared them for leadership at work. The secondary school children in F1 schools were taught scientific principles and concepts, making them more adaptable than their counterparts in F2 taught rudimentary work.

In 1980, Zimbabwe got independent and the first thing the new African government did was to phase out F2 education system. A new 'O'-Level Agriculture Syllabus 5034 (OLAS) was introduced and this called for some appreciation of science. The new syllabus emphasized on principles and practises of Agriculture. This means that the syllabus called for 'O'-Level students to have some scientific appreciation (principles) in order to understand certain practices necessary in Agriculture. According to the National Agriculture Education Panel (NAEP) (1984), the T2B teachers were generally found incapable of teaching the scientific sections of the new syllabus. It should be noted, as highlighted already, that T2B teachers were trained to teach in F2 schools and at most Form 2 in F1 schools (Mungazi, 1990; Zvobgo, 1999). Preparing these teachers to teach scientific concepts would have been a negation of the advancement of white supremacy over the blacks. Worse still, most of these teachers had themselves not had a strong scientific background. This could explain the reason why these teachers struggled with scientific sections of the new syllabus of the independent Zimbabwe.

Post-colonial

At independence, the joint training of teachers at the rural technical institute was terminated following the scrapping of F2 school system. The Ministry of Agriculture, however, continued training focusing now on Agriculture specialists who were awarded a Certificate in Agriculture. In September 1981, a new model (Gweru Teachers' College- GTC model) was introduced . The model targeted agricultural experts with diplomas from agriculture colleges i.e. Chibero and Gwebi Agricultural Colleges. These colleges were involved mainly in the training of whites and a handful of blacks as agriculture research specialists and to manage farms and agro-industries. The curriculum at these colleges had a strong scientific approach to agriculture (Gadzirayi, 2000). This easily meant that a solution to the scientific section of the OLAS had been found. The experts were enrolled to train as teachers for one year at GTC.

In the following year (1982), another model was muted, to run concurrently with the one at GTC. A teacher's college in the city of Harare (Belvedere Teachers' College- BTC) started recruiting post 'O'-Level candidates to train as Agriculture teachers in a four year period (Gadzirayi, 2000). The trainee teachers had to study Agriculture and an academic subject i.e. specialized in two subjects. The trainee teachers were on college compass in their first and third years. They went for teaching practice (TP) in their second and fourth years of training. The first intake went on its first TP in 1983. According to NAEP (1984), trainee teachers in the new model identified a number weaknesses of the model when they went out for their first TP. Among the

grievances copied to the NAEP by trainee teachers were:

- the theoretical nature of their Agriculture course at college.
- the limited range of practical activities on offer at the college.
- students did not feel competent to deal with the practical aspects of the junior and senior Agriculture syllabi.
- students coming out of one term's TP had found that they had major problems coping with the Agriculture syllabi (both junior and senior). (NAEP, 1984)

The students actually requested that they be moved from the teacher's college to an agricultural college where they could get adequate practical exposure. Complaints by students could be justified in that:

- Time at college was shared between Agriculture and an academic subject since students had to train in two subject areas. However, Agriculture taught in Zimbabwe is broad, embracing five disciplines. It is most probable that students did not have adequate time to cover all disciplines because of inadequate time devoted to the training by virtue of pursuing two subjects.
- The teachers' college did not have adequate practising areas and facilities for students to be engaged in practical agricultural activities.
- Despite the fact that Agriculture is constituted of a variety of subject disciplines (5), there was only one lecturer running the whole programme (NAEP, 1984). According to NAEP (1984:5), by 1984, this lecturer had "... 133 first year, 78 second year and 27 third year students to man". One major question would be; was the lecturer that versatile to be able to tackle all the five disciplines that constitute Agriculture as well as single-handedly man such a big number?

A closer look at the BTC model reveals that it lacked practical exposure for trainee teachers while the scientific aspects were not an issue. This was in direct contrast with the colonial model which was strong in practical but lacking the scientific backing. The GTC model in which Agriculture experts were enrolled seemed the only one which produced the right calibre of the Agriculture teacher that was required. Following the issues raised by students after TP, the NAEP recommended that the BTC model be phased out and the college adopts the GTC model.

In 1992, BTC implemented the NAEP (1984) recommendations by enrolling students following the GTC model while GTC was given a state university status, now Midlands State University (Gadzirayi,

2000). The programme was named 'Post Agriculture Diploma in Education' (PADE). Training at the teacher's college focused on pedagogics/methodologies only, with the Department of Teacher Education (DTE) UZ certifying the teaching qualification component only. This is the model the college is still following, however, a new problem has surfaced. The coming up of many universities, in Zimbabwe, has created avenues for agricultural college graduates to enrol in universities, with diploma in Agriculture as an entry point. To-date six universities accept diploma in Agriculture as a qualification for one to enrol in a Bachelor of Science Agriculture programme. This saw most Agriculture diploma holders shunning the PADE programme at BTC (Mawodza, BTC, lecturer; personal communication, May 18, 2011) and extension services in the Ministry of Agriculture.

CONCEPTUAL FRAMEWORK

The success of any teacher to deliver to his/her students greatly depends on the teacher's self-efficacy. Johnson and Wardlow (2004) define self-efficacy as an individual's belief in his/her ability to undertake and accomplish a particular task. This self-belief is an aggregate of personal teaching efficacy, general teaching and content efficacy (Gibson and Dembo, 1984). Content efficacy is the level of confidence a teacher possesses in his/her subject area (Burris et al., 2010). In this text, it refers to an Agriculture teacher's confidence level in content related to the subject. Focus was given to content efficacy because the researchers felt the other components of self-efficacy are catered for at the teacher's college in collaboration with DTE (UZ).

Knowledge in subject matter has been found to be an important characteristic of effective teachers (Roberts & Dyer, 2004). The subject matter knowledge within agricultural education is complicated in that Agriculture, as a subject in Zimbabwe, encompasses a variety of disciplines. The disciplines include plant and animal sciences, agronomy, ecology, genetics, agricultural economics and agricultural engineering. In Zimbabwe, an Agricultural teacher is expected to teach all the areas competently in order to fully prepare students for 'O'-Level ZIMSEC Agriculture examinations and life after school. Furthermore the teacher is expected to guide pupils in conducting field experiments (projects) in their areas of interest, hence the need for knowledge on field experimental designs (Zimbabwe 'O'-Level Agriculture Syllabus 5034).

STATEMENT OF THE PROBLEM

An analysis of the PADE programme shows that the student pool has shifted from DA to NCA holders. This is despite the fact that the PADE programme was introduced based on the understanding that DA holders had adequate subject content. The coming in of NCA holders whose agricultural training duration

was significantly shorter than that of DA holders created a necessity to establish whether the mode of operation of the PADE programme should be maintained. This study sought to find out the subject content level of NCA holders, based on their teacher-mentors' perceptions, with respect to content and skills in specific areas related to the Zimbabwe 'O'-Level Agriculture Syllabus 5034.

PURPOSE OF THE STUDY

The purpose of the study was to describe the views of teacher-mentors on the performance of NCA-holding trainee Agriculture teachers while on practicum. It was envisaged that in the process the researchers would identify pre-service preparation needs, if any, of these trainee teachers.

IMPORTANCE OF THE STUDY

This study generates debate in terms of how best agriculture teacher education can be improved. It also triggers scholars to think of models that produce wholesome agriculture teachers who can effectively deliver in all sections of the otherwise diverse subject. The study also provides a frame work for other scholars and readers to adopt and improve on, when crafting new teacher education programmes for agriculture teachers. The major limitation of the study is that it is based on one teachers' college. This is because there is only one college (BTTC) that trains agriculture teachers for secondary schools in Zimbabwe.

RESEARCH QUESTIONS

The study sought to answer the question: How suitable are the NCA holders for the Post Agriculture Diploma in Education? To answer this major question, this study was guided by the following sub-questions:

1. How do teacher-mentors rate trainee Agriculture teachers' knowledge base of key areas of the Zimbabwe 'O'-Level Agriculture Syllabus 5034?
2. How do teacher-mentors rate trainee Agriculture teachers' ability to conduct practicals as required in the Zimbabwe 'O'-Level Agriculture Syllabus 5034?

MATERIALS AND METHODOLOGY

This descriptive survey was conducted in schools in Harare and its peri-urban. This geographical delimitation was opted for since BTTC trainee agriculture teachers are deployed in the area for a one term teaching practicum. Twelve teacher-mentors whose experience with trainee Agriculture teachers with NCA exceeded three years were randomly selected to participate in the study. It was strongly felt such teacher-mentors would provide relevant information based on their exposure to different trainee teachers. Each teacher-mentor was asked how she/he perceived her/his mentee's subject knowledge

in given subject areas based on lessons observed. Each teacher-mentor was also asked how she /he perceived her/his mentee's competence in conducting practicals in given subject areas and guiding students in project work. Data were collected using a piloted and validated questionnaire. The questionnaire was trial ran at two schools which were later excluded from the sampling frame. The questionnaire was split into two major sections namely theory-related and practical-related sections. Each section of the questionnaire had a close-ended section and an open-ended section. In the close-ended section, the teacher-mentors were asked to rate the strength of their mentees, in subject content and practical ingenuity. They had to respond to the close-ended sections of the questionnaire on a 5-point Likert-scale ranging from very weak (1) to very strong (5). The questions were premised on content areas of the Zimbabwe 'O' Level Agriculture Syllabus 5034 (ZOLAS). The open-ended sections, requested teacher-mentors to highlight their general observations during the trainee teachers' practicum and suggest areas, if any, that required enrichment at the teacher's college. The data analysed using SPSS Statistics 17.0.

RESULTS AND DISCUSSION

The teaching experience of participant teacher-mentors ranged from 5-13years with a mean of 8.25 years of teaching. Their mentoring experience ranged from 3-8 years with a mean of 5.67 years of mentoring. The demographics clearly show that, on average, the participant teacher-mentors were experienced teachers

Teacher-Mentors' Rating of Trainee Agriculture Teachers' Knowledge Base

Teacher-mentors were asked to rate the strength of their mentees' subject knowledge, in specific content areas of the ZOLAS. The rating was over a range of 5 weightings, very weak (1)-very strong (5). The responses of the teacher-mentor respondents were as portrayed in Table 1.

Table1: Students' knowledge in specific subject areas as perceived by teacher-mentors (n=12)

	N	Minimum	Maximum	Mean (X)	Remark
Agriculture economics	12	1	3	2.00	Weak
Agriculture engineering	12	1	4	2.80	Average
Animal science	12	1	4	1.75	Weak
Animal production	12	3	5	4.33	Strong
Crop science	12	1	3	1.42	Weak
Crop production	12	2	5	4.00	Strong
Ecological issues	12	1	3	1.50	Weak
Horticulture	12	1	4	2.56	Average
Soil science	12	1	3	1.83	Weak
Valid N (listwise)	12				

Source: Field Data (May, 2012)

Key: $X < 2.50$ Weak; $2.50 \leq X < 3.50$ Average; $X \geq 3.50$

For most content areas, the responses ranged from very weak to average. The teacher-mentors rated their mentees as having been weak in agriculture economics, animal science, crop science, ecological issues and soil science. The students were rated average in agriculture engineering and horticulture. They, however, were rated strong in animal production and crop production.

Observations Related to Theory

The teacher-mentors highlighted the following observations:

- Students could not explain basic concepts.
- Some students had difficulties relating their lessons to everyday life.
- In cases where pupils were doing hard sciences (Chemistry and Biology), most trainee teachers had difficulties answering questions from such pupils.

Teacher-Mentors' Rating of Trainee Agriculture Teachers' Practical Ingenuity

Analysis of practical ability and ingenuity were conducted as for knowledge base. The trainees were rated as having strong command in production related practicals (mean range 4.30-4.50). Trainee teachers were, however, rated weak in laboratory practicals and field experimental designs (mean range 1.30-1.60).

DISCUSSION

With regards to subject content efficacy, the general picture reflected that the trainee teachers were weak in a majority of key sections of the syllabus. The observations by the teacher-mentors that most trainee teachers struggled teaching Agriculture to classes that were doing pure sciences were actually a repeat of the challenges that were encountered during the colonial Agriculture teacher education. As explained earlier on, products of the colonial Agriculture teacher education had serious problems with scientific concepts. This problem seemed re-emerging with Agriculture teachers whose entry qualification to teacher training was NCA. The findings are also in agreement with those by SCRADA (2012). SCRADA conducted a tracer study on the effectiveness of agricultural training programmes in three countries in Southern Africa and established that respondents lacked the theoretical basis of key concepts. Teachers need a high sense of content-efficacy if they are to successfully prepare pupils for national or international examinations (Zarafshani et al., 2008). The Zimbabwe 'O'-Level Agriculture Syllabus 5034 requires an Agriculture teacher to adequately prepare pupils in all disciplines of the syllabus, in order to pass 'O'-Level. Although some authorities (Roberts, Harlin and Ricketts, 2006; Knobloch, 2001; Woolfolk and Hoy, 1990) suggest that content efficacy accrues with experience, no parent would like own child lose out during the time the teacher will be gaining the

efficacy. The need for the teacher to be adequately prepared at training level is, therefore, very crucial. Agriculture as a technical subject, in Zimbabwe, requires that the teacher be able to impart practical skills among learners at school. The ability to conduct practicals is important as it has a bearing on pupils' experiential-learning and problem-solving abilities (Roberts, 2006).

Teacher-mentors indicated the trainee teachers were competent in conducting practical tasks associated with production but had difficulties with laboratory work and field experimental layouts. The strong flare of students in practical tasks could probably be attributed to the nature of their training in Agriculture colleges. It has to be noted that the NCA programme was initially designed to generate extension services personnel not secondary school teachers. The thrust of extension services, in Zimbabwe, is on increasing production by teaching farmers how to grow crops and rear animals.

CONCLUSIONS AND RECOMMENDATIONS

The study started with a question, 'How suitable are the NCA holders for the Post Agriculture Diploma in Education?' Basing on mentees rating by the teacher-mentors, NCA holders are not adequately prepared to pursue a one year programme that was designed for the DA holders. The Agriculture trainee teachers with NCA qualification appear to be a duplicate of the teacher calibre who had difficulties tackling scientific sections of the 'O'-Level Agriculture Syllabus in Zimbabwe. The researchers would like to recommend the following:

- No NCA holders should follow a one-year PADE programme; the training duration be extended to allow for content enrichment.
- There is need to design a content enrichment programme that is to be certified by DTE.
- All sections of the Agriculture department at BTTC may need to be revamped so as acquaint trainee Agriculture teachers with appropriate practical skills to teach in schools

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