

Full Length Research Paper

# Enhancing students' engagement in vocational agri-science and after-school careers in agricultural business: A case study of Uganda

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There is urgent need to stem the many failed attempts to improve agricultural education delivery in Africa in a context of growing youth unemployment and food insecurity. Studies show that teachers are ill prepared to engage learners practically, and motivate them towards agricultural careers. Constructively, aligned teaching that matches learning outcomes, teaching methods and assessments has gained currency in pedagogical change. This study examines the pedagogical methods used for secondary school agriculture in Uganda. Data were collected in a cross-sectional survey from 80 agriculture teachers and 57 administrators from 60 secondary schools, randomly drawn from 25 districts in Uganda, and analyzed with descriptive statistics. Results show that the teaching and learning approaches are teacher-centered and examination oriented. The current focus on national examinations is unable to engage learners in a meaningful way. We recommend system-wide improvements in the teaching based on clear statements of intended learning outcomes which also should extend beyond the confines of the school to the villages where children live and work.

**Key words:** Agriculture teachers, secondary schools, teaching methods, Uganda.

## INTRODUCTION

Agriculture is a priority sector for addressing poverty and unemployment in most of sub-Saharan Africa, and will continue to do so for some time to come (Vandenbosch et al., 2002). Vocational Agricultural Education has preoccupied educators in Africa for more than a century with no end solution in sight (Bergmann, 2003). While it is argued that agricultural education is the right thing to do in a situation where a majority of the population derives livelihoods from land, others feel vocational education compromises academic achievement of learners in core subjects like mathematics, English and science

(Riedmiller, 2002; World Bank, 2007). Yet the increasing public outcry about the failure of schools to equip learners with employability skills is a pointer that vocational, technical and entrepreneurial education must be an essential component of schooling in Africa (BTVET, 2010; Kwame and Kissi, 2013).

The youthful population structure across most of sub-Saharan Africa poses an ever growing need for food security, and a more sustainable future amidst dwindling employment opportunities in the urban industrial sector. While school enrolments across the continent are on the

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rise (UNESCO, 2015), there is also growing concern for the increasing number of school graduates who are unable to find jobs. This is not only costly to families and national economies in general but poses a potential security threat where there is likelihood of increased crime from desperate youths (ILO, 2012).

Some critical observers have pointed to the failure of school systems to equip youth with requisite skills they need to survive after school. It has been cited that secondary school curricula is outdated, and unsuited for the kind of education required to prepare graduates for the 21st century jobs. The teaching approaches are also teacher-centered, and do not engage students enough into active learning which they need to become productive members of their societies (Bentley, 1998).

Student engagement, which refers to how students feel about belonging at school and participation in its learning activities, has been cited as important in helping the youth to enter a knowledge society and apply their skills in real life situations (OECD, 2003). The sense of belonging at school, whether they feel accepted, lonely or rejected by the teachers and their peers or by school attendance is the proximate measure of learning participation. The OECD (2003) survey of 42 countries indicated that 25% of students reported to be disaffected from school, indicating that schools needed to do more to ensure all learners are engaged in the teaching learning activities.

In Uganda, Agriculture employs 66% of the population, and accounts for about 23% of total Gross Domestic Product (GDP), and for 46% of total exports (UBOS, 2014). The sector is also the basis for much of the industrial activity in the country and remains the stimulus for growth in other sectors such as trade and the services (GoU, 2000). Whereas, population growth in itself can spur economic growth through provision of labour and domestic market demand for industrial products, the high unemployment and lack of employability skills among Uganda's youth is a growing national concern (OPM, 2014). Such a public outcry brings to question whether the schools are doing an effective job in engaging learners in educationally purposeful activities which prepare them for after-school life.

Uganda's population is growing at an unprecedented rate of 3.4% per annum compared to 2.6% growth in agriculture (UNBS, 2011). This means the country may not be able to feed its people in the near future if youths are not mobilized into gainful employment on-farm and off-farm. Youth unemployment is also a key development concern in Uganda's National Development Plan (GOU, 2010).

The 2004 draft National Agricultural Education Policy (NAEP), which was overtaken by the BTVET policy, noted that agricultural education in Uganda was hampered by the broad and theoretical curriculum that has minimal linkage to entrepreneurship and business. BTVET (2008) blames the lack of practical skills among

school graduates on the poor teaching methods. It argues that agriculture, which is a practical subject, is taught using the traditional talk-and-chalk method and that those who take up agricultural careers fail to succeed in agribusiness because of the lack of practical skills.

While agriculture remains the major source of employment, it is still frowned upon as a second rate education that is only suitable for those who cannot excel academically (Ssekamwa, 1997). The challenge rests with the capacity of agriculture teachers to provide learners with requisite skills for self-employment and job entry into the world of work.

Teacher education is therefore critical in developing the pedagogical skills teachers need to meet public expectations. At tertiary levels of education agriculture is taught by subject matter specialists who lack a pedagogical background. As such they lack the necessary skills needed to facilitate teaching and learning processes for enhanced retention and transfer of learning (Kasozi, 2003), and this has a backwash effect on lower levels of education such as secondary schools.

### Research problem

Over 500,000 youth in Uganda graduate each year to scramble for about 90,000 jobs that are available in the job-market (BTVET, 2013). Most of these youths end-up in the agriculture sector which employs some 66% of the population (UBOS, 2014). However, the sector remains uncompetitive with high post harvest losses, low levels of mechanization, and unskilled labour force (BTVET, 2013).

Food insecurity is on the rise across Africa due to armed conflicts leading to displacements of farming households. Many youths on the continent also thrive on extractive quick gain activities like tree cutting to earn a living, which leads to degradation of a natural resource base for agriculture making their future unsustainable. Therefore, there is urgent need for schools across Africa to engage young people in subjects like agriculture and natural resources education which have relevance in their everyday life contexts.

In Uganda, Agriculture is a fully fledged subject which is compulsory in all secondary school up to senior two (15 years of age), but the teaching approaches are theoretical and unable to equip learners with employability skills they need for afterschool adult livelihoods. Agriculture graduates, like all other school graduates end up on urban streets in search of white-collar employment. There are still very limited studies conducted on the pedagogical methods used in agriculture and little is known about the efficacy of secondary schools in preparing graduates for agricultural work. This study was, therefore, used to examine the pedagogical methods used by agriculture teachers in secondary school settings, with specific case study of

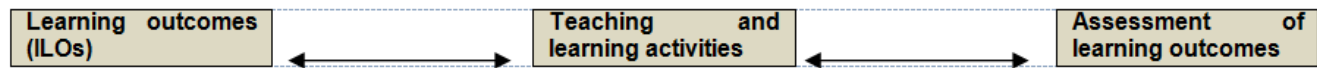


Figure 1. Constructively aligned ILOs, teaching activities and assessment (Biggs and Tang, 2011).

Uganda.

## Purpose of the paper

The purpose of this study is to examine the pedagogical methods used by secondary school agriculture teachers in Uganda in a context of growing youth unemployment and food insecurity. In particular, we examine the teaching and learning environments, teaching methods and roles of agriculture teachers as well as the perceptions of school administrators towards the subject.

## METHODOLOGY

### Analytical framework

The analytical framework for this study is premised on the theory of change which draws on the constructivist learning theory in planning a curriculum for student engagement (Wang and Eccles, 2013).

The change process begins with planning the appropriate intended learning outcomes (ILOs), ensuring teacher behaviors for active engagement of students into the learning process, and putting in place assessment procedures that seek to establish the extent to which the ILOs have been achieved by the learners. The constructivist theory postulates that learners actively construct their own knowledge and meaning from their experience, and that knowledge is not passively accumulated but is actively cognized by the individual (Liu and Mathews, 2005); cognition depends on a person's experience and on learners' biological, social, cultural and language context factors. Students must therefore be actively engaged at cognitive, behavioral and emotional levels to foster maximum learning.

In this light, therefore, we argue that the teaching and learning of agriculture, whether classified as an applied science or as a vocational subject; must ensure that learner plays an active role in creation of own knowledge and that learning experiences should be provided in a variety of local real-life contexts within and outside school in learners' homes or nearby community resources. The teachers' role, therefore, is to ensure that learners can freely share their different points of view through group discussions and active participation in those real life experiences.

Figure 1 shows how the theory is extended to the constructive alignment of the curriculum to ensure that the intended learning outcomes, teaching-learning activities and assessment are appropriately aligned (Biggs and Tang, 2011). In other words, transformative teaching must start with a clear statement of intended learning outcomes that will determine which teaching-learning activities and assessments are needed to foster meaningful learning.

The study was conducted in Uganda to assess the context in which the secondary school agriculture curriculum is implemented. A cross-sectional survey design was used to obtain the data during the months of July to September 2016. The data were collected from 80 agriculture teachers and 57 administrators from 60

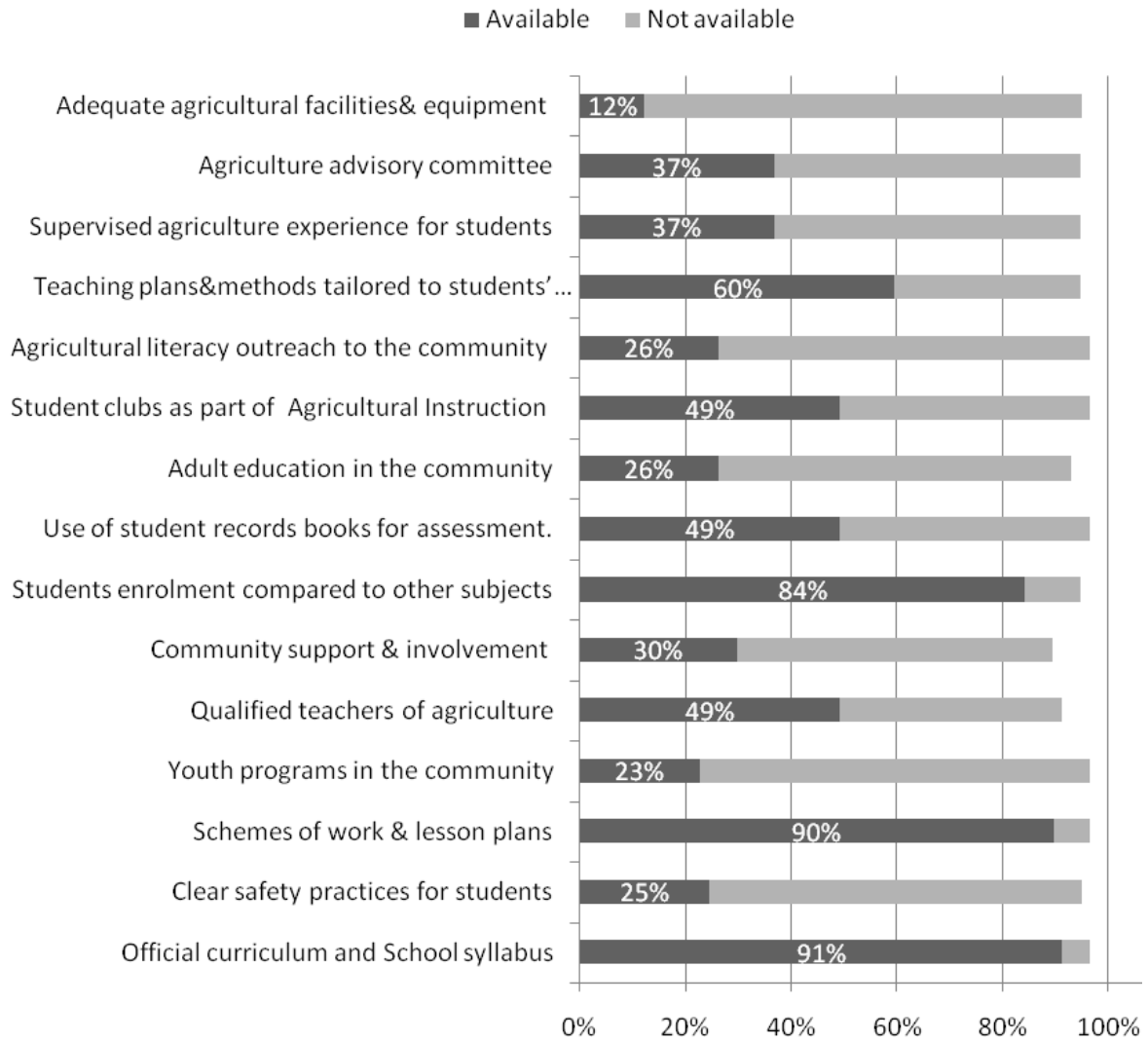
secondary schools, randomly drawn from four regions of Uganda using questionnaires, key informant interviews, and on-site observations of the teaching-learning facilities. Data were also collected from education institutions and key policy makers at the Ministry of Education, Science, Technology and Sports using Key Informant Interviews (KII) and panel discussions. The data were analyzed with descriptive statistics like frequencies, means and percentages using the SPSS computer software version 21.

## RESULTS

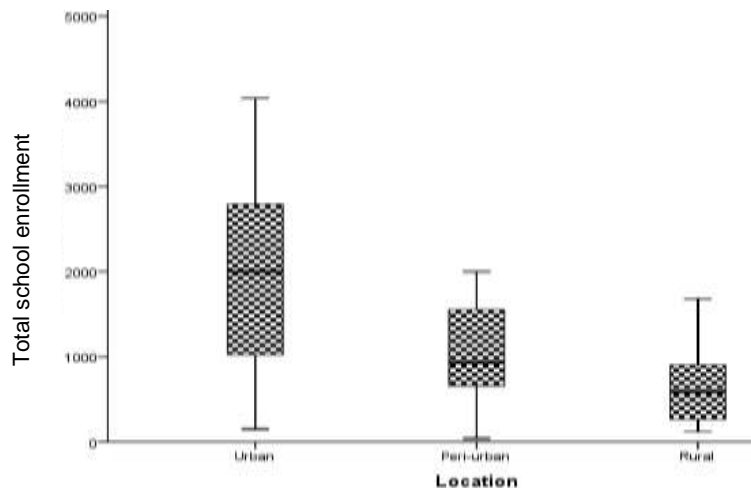
In order to appreciate why the agriculture teachers use certain teaching methods over others, we first looked at how the agricultural learning activities in Uganda's secondary schools are organized and implemented. Figure 2 shows the extent to which the agriculture programmes meet the basic criteria for accreditation of a secondary school vocational curriculum in countries such as the USA (TNCAE, 2016). The results show that whereas student enrolment into agriculture is comparable to other school subjects, the programmes are mostly teacher-centered as exemplified by the official curriculum and syllabuses (91%), lesson plans and schemes of work (90%) and almost total lack of teaching facilities and equipments (12%).

Figure 3 shows the school enrolments by types of school with rural schools having relatively lower student numbers compared to urban areas; reflecting the population densities around their catchment areas. Enrolments for rural schools ranged from a few hundred students to about 1,000 while urban areas had a mean of 2,000 students ranging between 1,000 to over 3,000 students. Overall, the demand for secondary education in Uganda is high due to a rapidly growing population estimated at 3.2% per annum, which may constrain school budgets, and instructional facilities which in turn has implications for pedagogical methods teachers can apply.

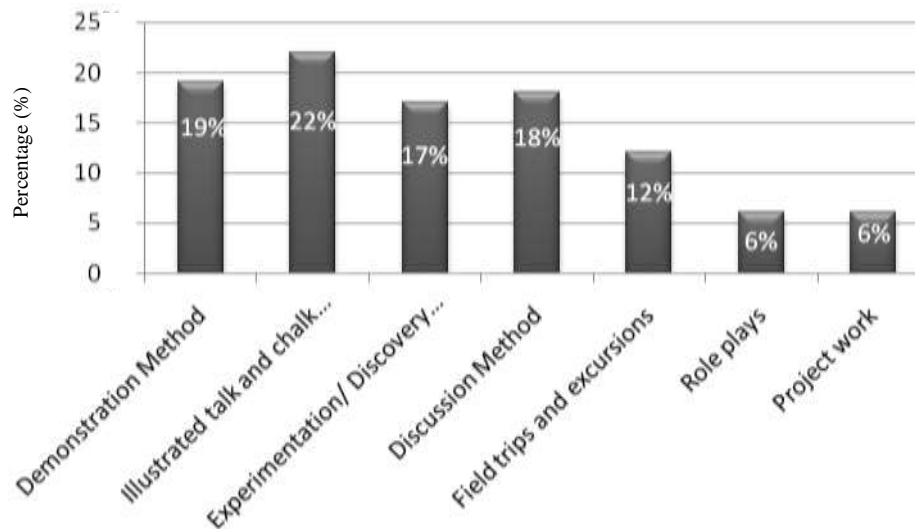
The respondents were asked to state the agriculture teaching methods that are most commonly used by the teachers in their schools. Table 1 shows that seven teaching methods were reported. Of there, chalk-and-talk (22%), class demonstrations (19%), class discussions (18%) and experimentation (17%) were the most reported. The others are class field trips and excursions (12%), role playing (6%) and project work (6%). Except for class discussions and experimentation that may or may not be learner centered depending on how they are planned, the teaching methods that were preferred reflect a teacher-centered orientation of the learning processes. Such approaches have been criticized as inadequate for fostering 'deep learning' leading only to transfer of



**Figure 2.** Extent to which the secondary school programmes met criteria for vocational agriculture.



**Figure 3.** Student enrolments by location of the school.



**Figure 4.** Teaching methods that were reported to be commonly used by agriculture teachers.

**Table 1.** Seldom used methods of teaching agriculture and reasons why as given by the respondents.

Training method not used	Frequency (n=55)
Demonstration method	15
Field trips and excursions	17
Role plays	20
Project work	40
Peer teaching	1
Dictation	1
Lecture Method	3
On farm hands-on training	1

knowledge from teachers to learners.

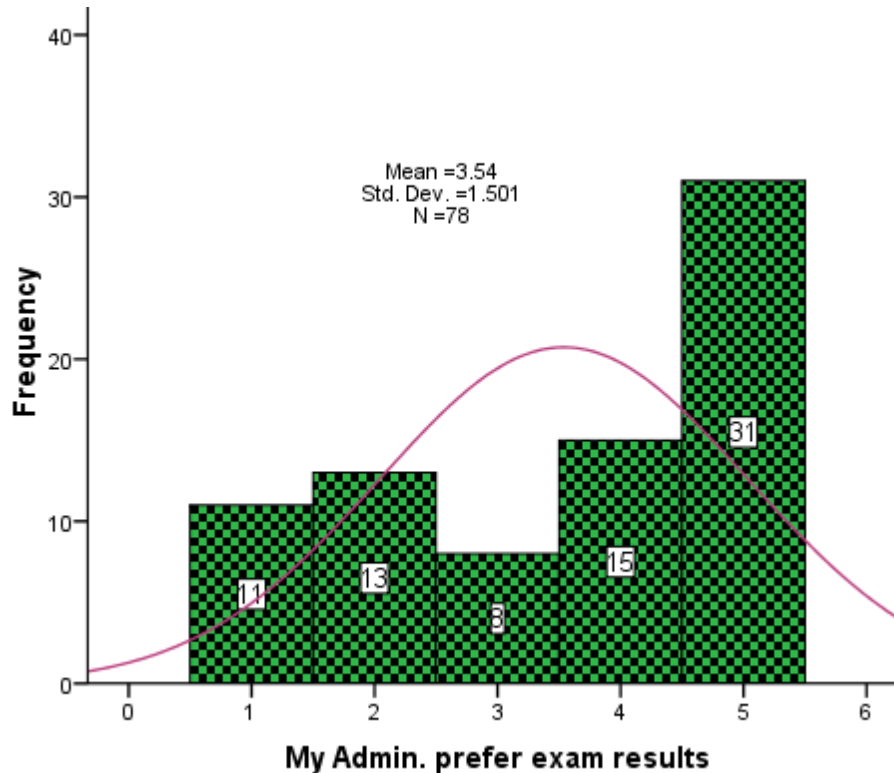
The observations in Figure 4 were corroborated by the findings in the key informant interview where a secondary school teacher described the agriculture teaching and learning situation as follows:

*“The teaching approach in schools is influenced by the major target of completing the syllabus. The agriculture syllabus is very large but has to be covered in three and a half years. In many cases teachers complete it by end of first term in senior four. Teachers mostly use talk-and-chalk method punctuated by discussion method. Teachers may also carry specimen to class for practicals or take students out on study tours/trips to farms or garages. There are no laboratories for agriculture and the teacher has to improvise some storage space for specimen. Even if there is a school farm with crops and animals, the main focus remains on academics and co-curricular activities”* (Personal communication, July 2016)

The aforementioned report by a teacher during the key informant interview vividly explains that teachers are constrained, not only by the desire to complete the teaching syllabus and save time for coaching students to pass examinations, but also by lack of the basic teaching facilities. The respondent also said that despite being classified as an applied science, agriculture is different from other science subjects like physics, chemistry and biology in that it has unique requirements for its own learning spaces such as the need to store bulky tools and equipments. The respondent also pointed out that even where there is a school farm, the priority of the school administrators is towards academic excellence and extra-curricular activities like games and sports. The curriculum assumptions that schools can teach skills seem farfetched under such teaching and learning circumstances (Table 1).

The study findings also show the methods that were said to be seldom used by the teachers with 40 out of 55 respondents saying they hardly use projects, and 20 said they rarely used role-plays. A number of reasons were given not using the methods with 35% of the respondents citing the high cost of the methods like study trips; 14% said there was not enough time on the timetable; and eight percent (8%) said the school had no land for project work. The other reasons given for not using some of the methods include: method being inappropriate for a particular type of school. For example, a prison school does not allow inmates to go for study tours; the method is not appropriate for agriculture; slow learning ability of the students and lack of appeal to the students.

Respondents to this study were also asked if their teaching was constrained by the high expectations towards the national examinations. The responses were scored using a Likert scale of 1 to 5 (1 = strongly



**Figure 5.** Whether school administrators prefer teaching that is focused on examinations.

disagree; 2 = disagree; 3 = not sure; 4 = agree; 5 = strongly agree). The findings indicated only a slight tendency to focus their teaching towards examinations (mean = 3.61; Std. dev = 1.558). However, when asked if their school administrators preferred teaching to the national examinations rather than practical skills needed by the students for life outside school, the respondents were evenly divided.

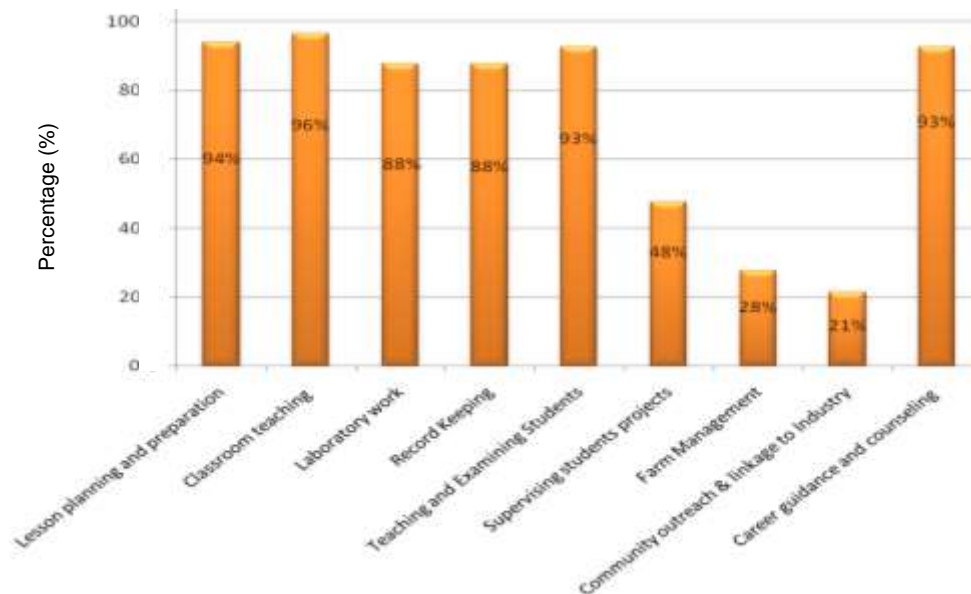
Figure 5 shows the Likert scale responses on a scale of 1 to 5 about the school administrators' attitudes to teaching (1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; and 5 = strongly agree). Results show nearly 50% (46 out of 78) of respondents agreed that their administrators preferred teaching towards national examinations (Mean = 3.5; Std. Dev. = 1.5) compared to the active learning strategies required for enhancing skill acquisition. It is common practice for teachers to gear their efforts towards the standardized national examinations.

However, it is the nature and level of expectations placed on the teachers and students by school administrators and parents that will largely determine the approaches to teaching that teachers apply to achieve the expected results. In the case of Uganda, our assumption was that the high demand for secondary education coupled with the liberalization of education policies would put pressure on schools to work for best results possible in order to attract student enrolments.

In contrast, however, the results show that respondents were evenly divided as whether there is overwhelming pressure for academic results from their administrators. Therefore, in spite of the need to deliver good results in examinations, the lack of practicals is not due to examinations but a lack of instructional facilitation required in fostering active learning (Figure 5).

Respondents were also asked to identify from a list, the tasks that are performed on average day by the agriculture teachers in the school. As would be expected of all teachers, Figure 6 shows that lesson planning and preparation (94%), classroom teaching (93%), examining and marking students' work (93%) and career guidance (93%) were top on the list of tasks reported. However, results also show that tasks such as supervision of students' projects (48%), farm management (28%) and community outreach (21%) which are considered as specialties of agriculture teachers were at the bottom of the list. This would be expected of all teachers that their primary roles in a school are lesson planning and teaching. However, given the unique practical nature of the subject, the lower ranking of project work, farm management and community outreach indicate that the role of an agriculture teacher in this context is mostly classroom-based and may not be very different from those performed by other teachers in school.

Table 2 shows that in the context where teaching facilities are limited, teachers resort to coaching methods



**Figure 6.** Tasks of a secondary school agriculture teacher.

**Table 2.** Methods used by agriculture to prepare students for national practical examinations.

Preparatory approach/ Method used	Total frequency	Percentage (%)	Ranking
Revise past papers	10	9	3
Excursions/visits to farms	31	28	2
More practical classes	64	58	1
No special preparation	4	4	4
Timely completion of curriculum	1	1	5

to help students pass the practical examinations rather than actual mastery of the skills. The methods include: extra classes (58%); field trips and excursions (28%) and revising past papers (9%) while others said they had no specific strategy or that they simply ensure timely coverage of the syllabus (to allow time for revision).

Ideally, every secondary school should have a school farm where students are timetabled for routine farm operations on a daily basis and also receive situated learning opportunities based on real life examples during lesson time. The students, for example, could be timetabled for simple routine operations like cleaning animal pens or barns, measuring rations for different animals on farm or weighing farm products and taking records of egg or milk production. It is such activities that help to model students' attitudes and interest in agriculture than class sermons given by their teachers. Agriculture is a subject that is best learned by doing when students interact with animals or grow and market their own crops to the school kitchen or other roadside buyers. They need to see the fruit of their labor and the benefits

of honest income from their own hands.

The state of affairs in the teaching and learning of agriculture in Uganda was best explained by the following statement from key informants when referring to the agriculture teaching in technical institutions in the country:

*"Instructors in BTVET institutions are of mixed backgrounds. Some are professional agriculture teachers, while others only have the B. Sc in Veterinary Medicine or B. Sc in Agriculture. They are regarded as trainers/practitioners and lack pedagogical skills. The delivery methods for the Certificate in Production Agriculture (CPA) and National Certificate in Agriculture (CPA) are mostly theoretical because instructors were originally trained as secondary school teachers and lack practical skills. Often there are no agronomical practices that are demonstrated. However, efforts are being made to improve the pedagogical skills of teachers at the National Technical Instructors' College, Abilonino in Northern Uganda".*

**Table 3.** Perceptions of school administrators towards the practical competence of agriculture teachers.

Administrators' views/opinions			Specific examples of teacher competence		
Value statement	Frequency (n=53)	Percentage (%)	Statement of example	Frequency (n=37)	Percentage (%)
They demonstrate a low level practical skills	15	28	Lack skills on treatment of livestock (school lost cattle)	3	8
Competent but lack teaching aids	14	26	Lack practice on farming activities	16	43
Competent but not motivated	12	23	Well qualified teachers	14	38
More training required	1	2	Lack skill on training methods	1	3
Competent in both theory and practical	10	19	Rely on consulting people with farms	1	3
Teachers lack reference materials	1	2	Students pass with good grades	1	3
-	-	-	Started a poultry farm	1	3

In the light of this observation, from the KII, we sought to establish the self-efficacy of the agriculture teachers by asking them how they perceived their level of competence. The respondents were asked using a Likert scale measure of 1 to 5 (1 = strongly disagree; 2 = disagree; 3 = not sure; 4 = agree; 5 = strongly agree) to indicate whether they are competent teachers of agriculture. The responses showed that the teachers rated themselves as very competent (Mean = 4.53; Std. dev = 1.071). In other words, the agriculture teachers rated themselves as being competent and able to teach the practical aspects of the subject as well. However, Table 3 shows that school administrators were also evenly divided as whether or not the teachers lacked practical skills (26%) or were actually competent (24%). One specific example about the lack of skills is the inability of the teacher to treat animals, which led to loss of cattle (5%) and a lack of visible practice of the farming activities in the school (28%). Asked about how the subject is taught, 77% of the school administrators said it is

taught theoretically without emphasis on practical skills.

## DISCUSSION

The purpose of this study is to critically examine teaching methods and approaches used for teaching agriculture in Uganda. We sought to assess whether the methods are in anyway geared towards helping young people to become self-reliant and have the abilities to engage in agricultural business. The study findings indicate that the teaching approaches are mostly teacher-centered and meant to deliver high success grades in the National Examinations. This corroborates with the findings of the CURASSE study that students in Uganda are forced to memorize huge volumes of meaningless material only for purposes of passing examinations (Clegg et al., 2013). There is therefore need for improvements that will increase not only the relevance of what is learned but also

preparedness of students for life after school.

It is the view of this study that this is a national policy issue, which concerns the overall nature of the relationship between the education system and labour markets. For example, in the UK, there is the policy belief that there is a shortage of scientists and engineers. To cure that problem there has been a sustained effort over many years to get more young people to study science, particularly physical sciences, and mathematics. These attempts have been mostly only marginally successful suggesting that the Theory of Action and assumptions underpinning the policy instruments being deployed to effect change are not right.

Applying that logic to the Uganda context we have an economy that needs stimulation of its agricultural sector with an influx of young people with the appropriate skills being deemed necessary to provide such stimulation, in addition to more material factors of production. The theory of action underpins the ongoing CURASSE reform as policy instrument for effecting the desired



change. In the Ugandan context, however, there is an additional twist in regard to the massive youth unemployment and under employment. This leads to scrambled competition for the available jobs as young people and their parents/guardians recognize that to be successful in the struggle, a general education will have more purchase than a vocational one. So there is a double challenge for policy makers about how to make the school-based agricultural curriculum more relevant to the supposed needs of the sector, and how to persuade young people to participate and pursue a career in agriculture.

Biggs and Tang (2011) argue that teaching can be improved in two major ways: first, by recognizing that good teaching is a function of institution-wide infrastructure which requires putting in place, the policies and procedures that encourage good teaching and assessment across the whole institution/ education system. Secondly, by shifting the focus from the teacher to the learner, and specifically, to define what learning outcomes students are meant to achieve.

Research also shows that school environments influence the way learners are motivated and engaged with school work. The stage environment fit theory (Wang and Eccles, 2013) advances the view that learning is optimized when a school context provides students with a sense of competence, autonomy and acceptance. The competences, whether cognitive, behavioral or emotional, are enhanced when learners' feel their needs are being met through the school experiences being mediated by the teachers. We therefore argue that the curriculum changes in the school agriculture curriculum should aim at helping the teachers to appropriately engage students in meaningful learning toward after-school applications in adult livelihoods. The focus should not be on what teachers are able to cover in the curriculum but rather what the individual learners are able to attain as a result of their school experience.

The study highlights the expectations placed on teachers and students in an examination oriented education system. Biggs and Tang (2011) relate such exam-driven approaches to McGregor's Theory X and Theory Y. They note that Theory X assumes the pedagogy of control in which teachers think "*students do not want to learn; will cheat if given the slightest opportunity; should not be allowed to make any decisions about their learning; need to be told what to do, what to study and attendance needs to be checked in every lesson. Invigilated examinations make up most of the final grade*" P 40. The students' own self-and peer assessments are out of question, deadlines and regulations need to be spelled out with sanctions imposed for failing to meet them. Biggs and Tang (2011) argue that this *blame-the-student* model of teaching leads to a learning climate based on anxiety.

However, the concern over students' success in examinations is not unique to Uganda. Bentley (1998)

notes that schools are faced with an ever growing challenge in preparing the youth for adulthood in fast paced social, economic and technological changes. He argues that there are two crucial tests of an education system. These are: how well students can apply what they learn in situations beyond the bounds of their formal educational experience, and; how well prepared they are to continue learning and solving problems throughout the rest of their lives. He also notes that many students are unable to apply what they learn at school in situations where it is actually useful and that schools encourage an artificial dichotomy between knowing and doing.

Meaningful transfer of knowledge requires that it is learned and practiced in settings that closely resemble real life situations. Therefore, learning should not only take place inside schools, but also in communities, workplaces and families. This latter point, underscores the role of supervised experiential learning activities that characterize the teaching and learning of agriculture where students explore or manage a project under the guidance of teachers or other capable adult (Retallic, 2005). This does not only broaden opportunities for learning outside the classroom but also provide a window for relating school knowledge to the learners' real-life situations in their communities.

Biggs and Tang (2011) advise that the aim of teaching is to support student learning, not to beat student deviousness. They recommend the specification of intended learning outcomes in order to focus the teaching on what and how students are to learn, rather than on what topics the teacher is to teach. The ILOs specify not only what is to be learned, the topic, but how it is to be learned and to what standard.

In summary, therefore, student engagement in Agriculture curriculum or afterschool agribusinesses will depend on a shift of teaching approaches from the teacher-centered examination driven paradigm to one where students actively engage in autonomous problem solving. This will require not only the retooling of teachers but also a system-wide support that shifts attention from learning to the national examinations to learning for lifelong existence.

## CONCLUSIONS AND RECOMMENDATIONS

1. When assessed against the 11-point criteria used for accreditation of vocational agriculture programmes, secondary school agriculture in Uganda is best suited to classroom teaching approaches that are teacher-centered and inadequate to skill learners with afterschool competences. We suggest that all secondary schools should be required to meet some basic minimum requirements for effective teaching of the subject. This may require furnishing the schools with the required facilities like gardening tools as well as regular inspection by the Education Standards Agency (ESA).

2. School enrolments, especially in urban schools, are exceptionally high and not conducive for fostering active learning strategies that learners require to gain full understanding of agriculture concepts beyond what is required for final examinations. We propose that specific measures should be undertaken to reduce the student: teacher ratios for effective teaching to occur.

3. The seven teaching methods listed by the respondents as commonly used in secondary schools are largely teacher-centered and inappropriate for autonomous learning that learners require to explore the curriculum for lasting learning outcomes, which can lead to transfer of learning to students' homes. We suggest that more innovative teaching methods should be explored to bring about the needed change that will both attract students into agriculture and engage them in active learning. Learning should by the very nature of the agriculture subject be extended beyond the confines of the school to the community and learners' homes.

4. National examinations exert undue effect on the teaching strategies used by the teachers including a rush to complete the syllabus before time in order to engage in coached revision for national examinations. We acknowledge the importance of standardized examination in quality assurance but recommend that continuous assessment methods that foster hands-on proficiency of the learners should be explored. Students' record books could for example, constitute a significant component of the examination system.

5. There are a number of practical teaching methods such as role-plays and demonstration that were said to be less used, and inappropriate for the secondary school agriculture contexts yet these would foster the necessary student engagement in the learning processes. We recognize the significance of using a variety of teaching method if teachers are to fully engage learners at cognitive, emotional and behavioral levels. Therefore, we recommend that appropriate steps be taken to retool the teachers with pedagogical skills through an in-service teacher development scheme.

6. School administrators did not exert too much pressure on the teachers, as previously assumed, to teach to the national examinations but rather it is lack of the instructional facilities and the scramble for time on the timetable that seem to constrain the teachers towards theory teaching at the expense of holistic needed by learners. While some head teachers may exert pressure on teachers for results, we suggest innovative scheduling of extra time for agriculture practicals outside the regular teaching timetable, except in cases where skill is to be covered in class teaching. However, for students' practice and projects, before class and after class time could be considered depending on the particular school context, for example, farm work rosters can be developed together with cleaning up schedules.

7. Teachers may have resorted to coaching students for practical examination through past paper reviews, extra classes and field trips rather than focus on actual hands-

on practical work that can lead to development of skilled school graduates. We suggest that every school should be facilitated to set-up a teaching unit that teachers can use as a show place rather than simply coaching students to write exams. Alternatively resource centers can be set up to pool teaching resources from which teachers can borrow and return on a revolving basis. The use of ICT tools like the teacher-tube or YouTube should be considered.

8. Whereas, there are many tasks that are expected of an agriculture teacher in a secondary school context that lacks technical assistants, the teachers in this study seem to perform the basic roles such as lesson planning and classroom teaching much the same as others who do not teach practical subjects. We would like to highlight the importance of school projects like gardens or school farms in fostering active learning opportunities for students. Therefore we recommend that hiring of agriculture teachers should take cognizance of both teaching and out-of-class workload and if possible, farm technicians should be hired in much the same way as laboratory assistants or librarians.

9. There is a mixed feeling among both the teachers themselves and school administrators towards the competence of agriculture teachers to effectively deliver the practical aspects of the agriculture curriculum and manage school farms.

We suggest that regular retooling of agriculture teachers should be carried out either at district level or national level on an area rotation basis to help them cope with the challenges of a dynamic subject like agriculture.

## ACKNOWLEDGEMENTS

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## CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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