

**FACTORS INFLUENCING THE CHOICE OF AGRICULTURE AS A STUDY
DISCIPLINE BY UNDERGRADUATES: A CASE STUDY OF A DISTANCE
UNIVERSITY'S AGRICULTURE DEPARTMENT**

by

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I declare that the above dissertation is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete reference.

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ABSTRACT

Enrolments in agriculture programmes at universities in South Africa are low when compared to the other programmes. The purpose of this study was therefore to identify factors influencing the choice of agriculture as a study discipline by undergraduates in agriculture, in an open distance education university in South Africa. The study also investigated the impact of the three agriculture curricula taught at school level, as well as how well it prepares students for tertiary education. Both qualitative and quantitative research methods were used. Open distance-learning agriculture students and agriculture educators participated in the survey. A structured online questionnaire and an open-ended questionnaire were employed. The study revealed that two major composite variables, namely family and friends, as well as job considerations, were highly significant in the students' choice of agriculture at tertiary level. The impact of the agriculture curricula taught in the schools in preparation for tertiary education gave learners basic terminology and concepts involved in agriculture. The study also revealed challenges faced by agricultural science educators amongst which were the learners' negative attitude towards the subject, inadequate or lack of infrastructure, and lack of proper guidance and counselling regarding choosing of subjects as factors that could hinder effective teaching and learning of agriculture in South Africa schools.

Students studying through open distance learning indicated convenience, flexibility of studying at own pace, and ample time to spend with family and work, as factors that influenced their choice of studying through open distance learning. Recommendations on how to improve the agriculture curriculum in South African schools and attract more students' enrolment in agriculture as a field of study at tertiary level upon completion of grade 12 are discussed in detail in the study.

Key terms:

Career Choice, FET, Agriculture Curricula, National Senior Certificate, Student enrolments, Universities, Subject choice, Agriculture educators, University students, Career guidance and Counselling, Learners attitude towards agriculture, Parents.

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LIST OF ABBREVIATIONS

GET - General Education and Training

FET - Further Education and Training

NSC - National Senior Certificate

NCS - National Curriculum Statement

CAPS - Curriculum Assessment Policy Statement

OBE - Outcome Based Education

RNCS - Revised National Curriculum Statement

HEIs - Higher Education Institutions

AET - Agricultural Education and Training

CAES - College of Agriculture and Environmental Science

CEDU - College of Education

AgriSETA - Agriculture Sector Education Training Authority

DAFF - Department of Agriculture Forestry and Fisheries

GDP - Gross Domestic Product

SADC - Southern African Development Community

IEASA - International Education Association of South Africa

FFA - Future Farmers of America

ICT - Information Communication Technology

CHAPTER 1 INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

Learners in South Africa begin schooling from Grade R up to Grade 12. Grades 1 to 9 are compulsory and classified as General Education Training (GET) and Grades 10 to 12 classified as Further Education and Training (FET), which is non-compulsory (Department of Basic Education, 2011).

The learning systems in South Africa can be divided into the following phases:

- Foundation Phase – Grade R to Grade 3
- Intermediate Phase – Grade 4 to Grade 6
- Senior Phase – Grade 7 to Grade 9
- FET – Grade 10 to Grade 12 where learners receive matriculation certificates
- The Higher Education and Training Phase – where learners further their studies in colleges and universities

This study focuses on the FET phase, since this marks the transition from secondary education to university or tertiary education in the South African education system. In this phase, learners have already been exposed to the different subjects in the curriculum that help them broaden and deepen their knowledge and understanding as they prepare for their career choice. It is at this phase where choice of subjects has the potential of influencing the students' undertaking of agriculture as a field of study at university level.

Agriculture is one of the optional subjects in the school curriculum that learners can study if they would like to pursue a career in the agricultural sciences field. Agriculture is also an area where one can launch into a career pathway in agriculture by pursuing further studies in the discipline.

Certificates are awarded on completion of Grade 10 and 11, but the National Senior Certificate (NSC) or the Matric certificate, is awarded when the learner completes Grade 12. The matric certificate and the statement of results indicate the subject(s) done by the learner and the marks obtained by the learner for each indicated subject.

The learner is then able to use the statement of results to apply for a programme of his/her choice at any institution of higher learning in the country.

The current curriculum studied by learners in South Africa is the Curriculum Assessment Policy Statement (CAPS). CAPS is a policy document from the Department of Basic Education, which should be implemented by all the relevant stakeholders, schools, and higher education institutions (Coetze, 2012). This curriculum replaces other curricula that were implemented in the schools. These include, among others, Outcome Based Education (OBE), the Revised National Curriculum Statement (RNCS), and the National Curriculum Statement (NCS). CAPS, which is the current curriculum used in South African schools, was introduced by the Department of Basic Education in 2012. CAPS is an amendment of the NCS curriculum.

With CAPS, the curriculum is expected to be more accessible to the teachers. Every subject in each grade will have a single, comprehensive, and concise Curriculum and Assessment Policy Statement (Department of Basic Education, 2011). This means each subject curriculum will provide details on what content teachers ought to teach as assessment. Each subject will have clear topics, the recommended number of assessments given to learners for each term, as well as the type of assessment given to the learners (Department of Basic Education, 2011).

Agriculture is one of the subjects in the CAPS curriculum. It is divided into 3 areas of agriculture curricula namely:

- (i) Agricultural Sciences
- (ii) Agricultural Management Practices
- (iii) Agricultural Technology

The agricultural sciences subject aims at studying the relationship between soils, plants, and animals in the production and processing of food, fibre, fuel, and other agricultural commodities that have economic, aesthetic, and cultural value. Topics in the Agricultural Sciences curriculum Department of Basic Education (2011), include Soil Sciences, Plant Studies, Animal Studies, Agricultural Economics, Basic Agricultural Chemistry, Basic Genetics and Biological Concepts, Sustainable Natural Resource Utilisation, and Agro-ecology.

Since the agricultural sciences curriculum emphasises the theoretical aspects of agriculture as a science, learners are expected to do very few practical sessions. However, unfortunately this does not equip learners with the necessary practical agricultural skills to be capable agricultural practitioners after completion of Grade 12. One of the requirements for offering the subject in the schools is the provision of a well-equipped agricultural sciences laboratory where various practical work or experiments could be carried out. However, most schools in South Africa do not have such facilities, thereby depriving the learners the opportunity to develop skills they could learn from the practical sessions they could have conducted in the laboratories.

On the other hand, the agricultural technology curriculum focuses on the technology used in agriculture. It covers the knowledge of how farmers utilise processes, tools, equipment, structure, and skills to cultivate agricultural land and produce food and agricultural products, through various products and processes, thus sustaining and maintaining quality of life and increasing economic, aesthetic, and sound cultural values (Department of Basic Education, 2011). This curriculum seeks to provide learners with the opportunity to design and make practical projects, operate, repair, and maintain farm equipment, and design and construct farm structures in the agricultural field. The challenges of this curriculum is that not all schools are able to offer it, it can only be offered in agricultural schools with land and the required equipment to carry out the practical sessions (Department of Basic Education, 2011). Another challenge is the lack of theoretical basis in agriculture, i.e. the science content in the subject.

The Agricultural Management Practices curriculum focuses on the study and application of production, economic and management principles that are used in the cultivation, transformation and marketing of food and other agricultural products (Department of Basic Education, 2011). This curriculum aims at providing learners with a sound practice-oriented base that combines both the theoretical and practical aspects of the subject. The main topics in this curriculum include Crop Production and Crop Management, Soil and Water Management, Product Harvesting and Quality Control, Animal Production and Animal Management aspects, Farm Management and Evaluation, Value Adding, Processing and Producer Organisations, Agri-tourism, Business Planning and Entrepreneurship.

This curriculum aims at promoting different skills, which include management skills, entrepreneurial skills, operational skills, marketing skills, and research skills through learners being involved practically in the day-to-day running of agricultural enterprises that could be available in the schools, depending on the ecological region, from production, through processing and marketing of the products. It focuses more on the practical managerial aspects of agriculture and equips the learners with the relevant management and entrepreneurial skills needed in the agricultural field. The limitations of this curriculum are the lack of the science background in the agriculture subject, i.e. the chemistry and the physics content (Department of Basic Education, 2011).

There are few schools offering Agricultural Management Practices and Agricultural Technology due to lack of the necessary infrastructure and equipment to carry out the necessary practical sessions required by these two curricula. Currently, there are 43 special agricultural high schools in South Africa. These schools have farming units to cater for agronomic and livestock demonstrations and materials for training purposes (Madakadze, Masamvu, & Terreblanche, 2014). At senior phase (grades 10-12) the national curriculum requires that learners take seven subjects, two languages, Mathematics or Mathematical literacy, Life Orientation, plus any three subjects of the learner's choice. In the field of agriculture science, the learner can choose from one of three subjects that are offered: Agricultural Sciences, Agricultural Management Practices and Agricultural Technology (Department of Education, 2015).

After completion of the Grade 12 school exit exams, and having done agriculture as a subject, or not having done agriculture but having done other sciences like Physical Sciences or Life Sciences, learners can choose to further their studies in the field of agriculture at tertiary level in South Africa. Alternatively, they can enrol in disciplines other than agriculture in a university, college or any other institution of higher learning and use agriculture as one of their science subjects.

Learners who eventually enrol for an undergraduate agriculture programme can be divided into 3 categories:

- (i) Learners who have done agriculture as a subject at FET phase of education.

- (ii) Learners who have experiential background on agricultural practices, maybe from staying on a farm, but have not done the subject at senior phase.
- (iii) Learners who have not done the subject at all and have no experiential background on agriculture.

1.2 ENROLMENTS

Various Higher Education Institutions (HEIs) of learning offer agriculture programmes and related courses in South Africa. These include colleges, universities of technology (previously known as Technicons) and traditional universities that offer a broad range of general formative and professional programmes at both undergraduate and post graduate level in South Africa (Education, 2014). These include Cape Peninsula University of Technology (CPUT), Central University of Technology (CUT), Mangosuthu University of Technology (MUT), Durban University of Technology (DUT), and Tshwane University of Technology (TUT). There are approximately 11 agricultural colleges, five universities of technology, and 15 universities offering a variety of agriculture programmes and a variety of agricultural qualification in South Africa (Department of Agriculture, 2008). These include University of Fort Hare, University of KwaZulu-Natal, University of Zululand, Northwest University, University of Free State, University of Pretoria, Stellenbosch University, Rhodes University, University of Cape Town, University of Limpopo, University of Venda, University of Western Cape, University of Witwatersrand, Nelson Mandela University and the University of South Africa (UNISA). UNISA is one of the traditional universities offering a range of professional qualifications and is the largest university offering distance-learning education as a mode of study in South Africa (Education, 2014).

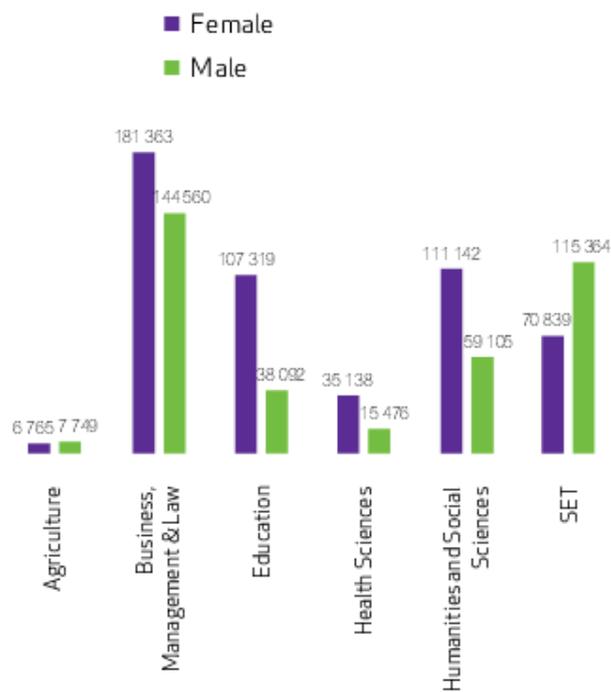


Figure 1.1: Enrolment in a major field of study by gender (Fongwa, 2012; Source: HEMIS data, 2010)

Figure 1.1 shows enrolments by gender in different fields of study in the universities in South Africa. The agriculture field of study has the lowest enrolment when compared to other fields of study in South Africa.

Table 1.1 shows Agricultural Education and Training enrolment per university in South Africa and has been extracted from a report by Madakadze *et al.*, (2014).

Table 1.1: Agricultural education and training enrolments per university in South Africa (Source: Modernizing African Food Systems (MAFS) paper No: 9, May 2014)

University	Year of enrolment							
	2004	2005	2006	2007	2008	2009	2010/11	2011/12
Fort Hare	362	415	583	581	159	222	268	268
North West	856	786	757	606	217	179	619	681
NMMU	--		104	479	412	396	814	256
Free State	823	729	879	890	263	344	288	357
KZN	474	621	466	2109	--	230	306	263
Limpopo	544	681	455	804	328	347	1114	-
UP	803	1220	1592	2987	1220	1423	386	200
UNISA		1597	1526	2917	1309	840	5427	6893
Stellenbosch	1153	1742	966	1965	356	335	902	1793
Venda	389	404	362	575	66	133	85	435
Zululand		107	121	124	---	5	226	--
Western Cape			103	390	18	23	476	461

Table 1.1 indicates that UNISA has the highest enrolment in AET compared to the other universities in South Africa.

The following tables have been extracted from the Council of Higher Education Vital Statistics published in the year 2014 (Education, 2014). They show the enrolments in the traditional universities and universities of technology from the year 2007 to 2012.

Table 1.2: Enrolments in traditional universities from 2007 to 2012 (Source: Council of Higher Education Vital Statistics, 2014).

		ENROLMENTS FROM 2007 TO 2012					
		2007	2008	2009	2010	2011	2012
TRADITIONAL UNIVERSITIES	UCT	21 188	22 317	23 787	24 772	25 301	25 085
	UFH	8 857	9 338	10 016	10 741	11 144	12 044
	UFS	24 684	26 193	27 241	29 901	31 588	32 375
	UKZN	37 943	37 188	38 864	41 224	41 762	41 884
	UL	16 345	17 147	16 299	18 025	20 504	22 249
	NWU	44 854	47 008	50 589	55 732	56 641	58 752
	UP	48 954	53 106	55 734	57 114	58 128	57 508
	RHODES	6 075	6 327	7 012	7 169	7 278	7 395
	SU	22 799	23 983	25 693	27 344	27 265	27 510
	UWC	14 927	15 074	16 203	18 059	18 764	19 591
	WITS	25 156	26 096	29 234	29 498	29 004	30 436

Table 1.3 shows figures of enrolment of students in the Universities of Technology in South Africa.

Table 1.3: Enrolments in Universities of Technology from 2007 to 2012 (Source: Council of Higher Education Vital Statistics, 2014).

		ENROLMENTS FROM 2007 TO 2012					
		2007	2008	2009	2010	2011	2012
UNIVERSITIES OF TECHNOLOGY	CPUT	28 953	29 367	30 958	32 167	32 506	33 509
	CUT	10 477	10 894	12 205	12 583	12 644	12 724
	DUT	22 782	22 381	24 026	25 184	24 840	24 875
	MUT	9 828	9 128	9 680	10 033	10 286	10 802
	TUT	50 726	51 613	52 688	51 785	50 075	51 711
	VUT	16 146	16 947	19 407	21 416	21 861	21 201

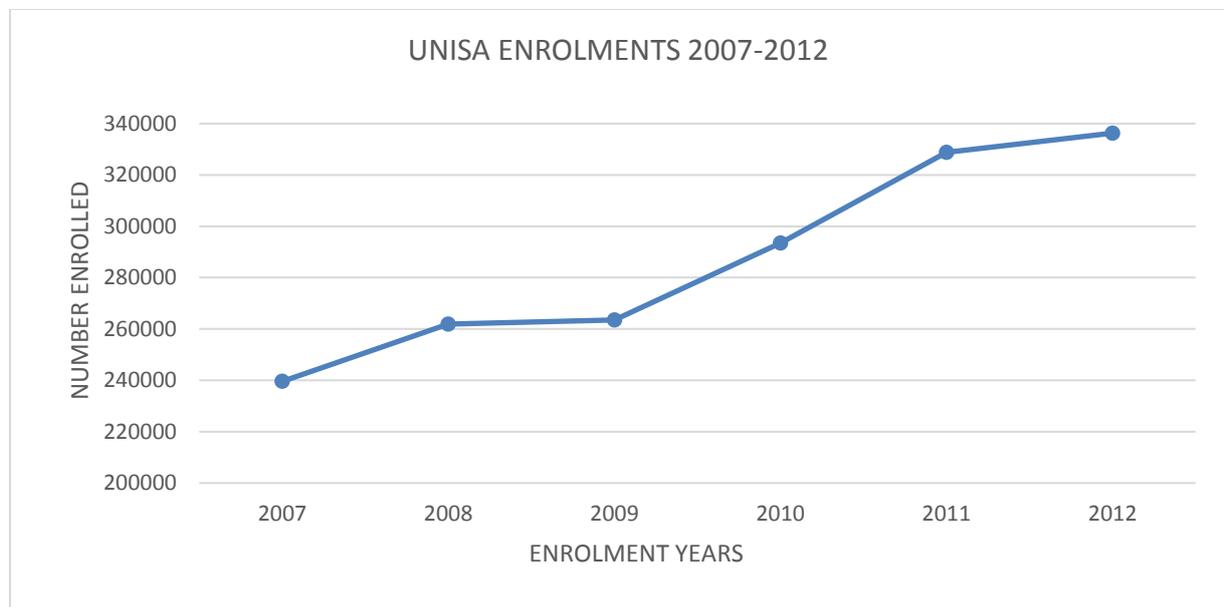


Figure 1.2: UNISA statistics of enrolments from 2007 to 2012 (Source: Council of Higher Education Vital Statistics, 2014)

When studying the different statistics on Tables 1.1, 1.2, 1.3 and Figure 1.2 above, UNISA has the highest enrolment of students in their university.

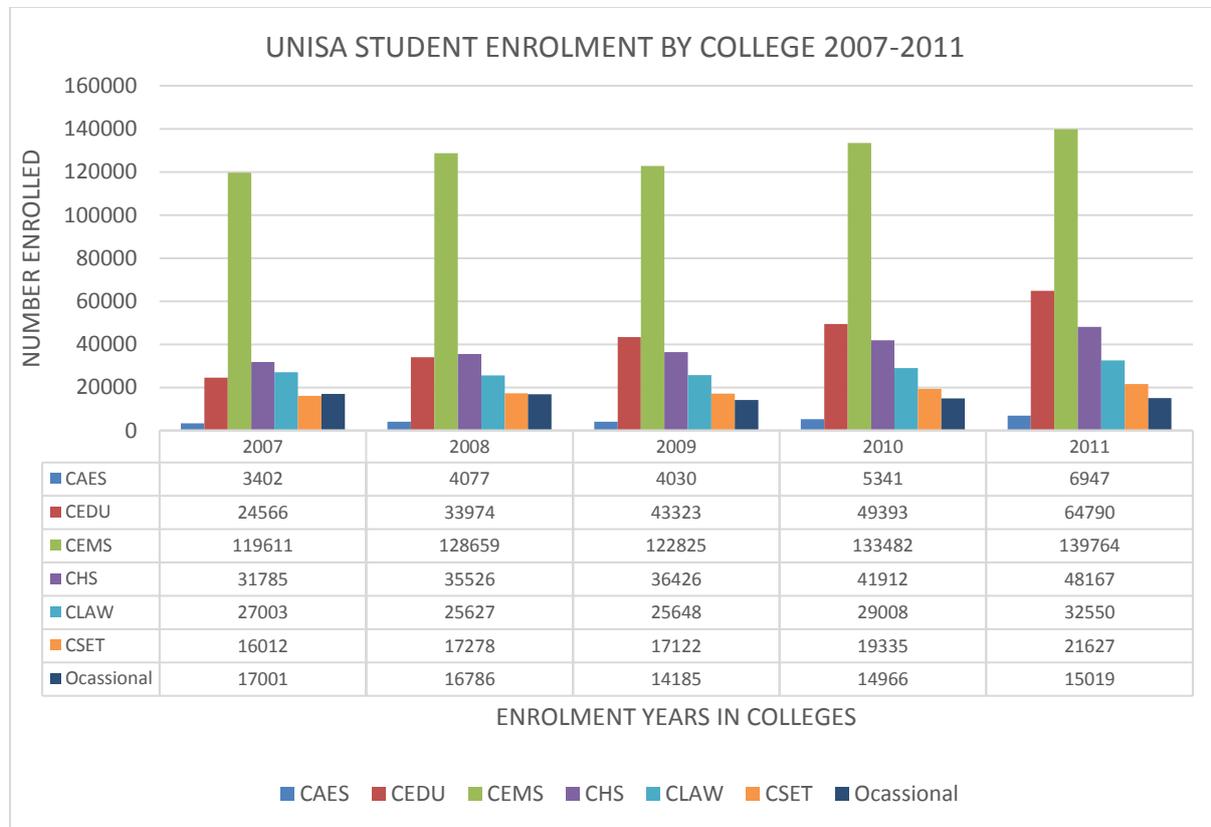


Figure 1.3: UNISA student enrolment by college 2007 - 2011 (Dion & Barnes, 2012; Source: UNISA Facts and Figures, 2012)

Enrolment in an agriculture program in the College of Agriculture and Environmental Science (CAES), as indicated in Figure 1.3, in the University of South Africa remains very low over the years when compared with other programmes offered by the university. Even though over the years it has shown a very slight increase of average 1.7%, it remains the lowest (Dion & Barnes, 2012). UNISA has the highest enrolment of the universities in South Africa, as indicated by Table 1.1, but has the lowest agriculture enrolment when compared to the total number of students enrolled by the institution. Increased enrolment by learners in the field of agriculture is vital to meet the demand for more graduates who are equipped to fill positions in the department of agriculture and the agricultural sector or industry. The Department of Higher Education and Training (2012) states that graduation rates in the higher education institutions are generally lower than that set by the National Plan for higher education. In 2012,

the average graduation rate of doctoral students stood at 13 %, while masters students and undergraduate degree and diploma students was at 21% and 15% respectively.

The students' choice of studying agriculture at university level can be influenced by several factors, which include among others: family, friends, social background, profession of the parents, level of education of parents, and job opportunities after completion of university (Fizer, 2103). However, learners can be guided by the interest developed by the learner at secondary school level. Educators teaching the subject, methods used when teaching the subject, and their personality, career guidance and counselling can also influence the learner's choice of the subject.

As cited by Thielen (2012), studies by several researchers (namely Barkley& Parrish, 2005; Cecchettini *et al.*, 2009; Donnermeyer & Kreeps, 1994; Esters,2007; Esters & Bowen, 2004; Frick *et al.*,1995; Love & Yoder, 1989; Wildman & Torres, 2001) have shown that the more exposure students have to agriculture the more likely they are to major in agriculture.

A study by Dyer and Breja (2003) identifies challenges faced in learner recruitment into agriculture education in secondary schools as follows: finding time to recruit, competing with student's involvement in other activities, gaining access to students, lack of guidance counsellor support, increased graduation requirements, image of agriculture, and lack of interest in agriculture. The challenges named could also be applicable to the limited opportunities for learners in South Africa to be exposed to studying agriculture while in high school, thus affecting their exposure to opportunities in this field of study when they further their education.

Agriculture as a subject has been removed from the South African curriculum at primary school level, which affects its uptake by students at secondary school level and subsequently, high school level. In addition, few agriculture school teachers are specifically qualified to teach agriculture, and teaching and learning support materials as well as necessary equipment are not readily available in the South African school context. As a result, Agricultural Education and Training (AET) at the secondary level (NQF levels 2 – 4) is poorly delivered to students. High schools offering agriculture are often ill equipped, both in terms of qualified teachers and of relevant equipment and resources for practical training. This is particularly true in the previously disadvantaged

areas of the country where agricultural chores have been meted out to students as a form of punishment in the past (Agriculture, 2003).

At most high schools in South Africa, agriculture studies and course work are not available (Department of Agriculture, 2003). For example, in the Middelburg 2 education circuit of the Mpumalanga Province, out of twenty high schools only three high schools offer agriculture studies to learners. Furthermore, the agriculture programmes offered to learners in the different schools vary from Agricultural Sciences, Agricultural Technology, to Agricultural Management Practices.

At tertiary education level, learners have a variety of programmes of study from which to choose. However, not all learners will choose a particular study programme based on the same factors. Esters and Bowen (2004) found that parents and/or guardians were the most influential individuals in helping students decide to enrol in school agriculture education programmes, and that above 50% of events and experiences that influenced their decision included recruitment activities, interest in animals, agriculture career aspirations, and parents. Esters and Bowen's research (2004) focused mainly on factors leading to urban students to enrol in high school agriculture courses; however, there is limited research on factors influencing the uptake of agriculture as a field of study at tertiary level.

This study investigated the possible factors influencing undergraduates' choice of agriculture as a study discipline in an open distance learning university in South Africa. It also investigated the possible obstacles to students' choice to study agriculture. By studying the different factors influencing students' choice to major in agriculture as a field of study, may provide insights on how to market agriculture as a discipline to learners. It will also contribute towards possible solutions as to how learners can be motivated to take up agriculture as a career, thus increasing the number of learners enrolling for the study programmes as a field of study, resulting in more agriculturists in the country and increasing food security, which would improve the economy of South Africa. On completion of an undergraduate programme in agriculture, it is expected that learners will have acquired the necessary knowledge and practical skills that would make them competent in the agricultural sector.

1.3 STATEMENT OF THE PROBLEM

Agriculture is one of the subjects that teach learners skills that could be used in food production in South Africa. Learners could use skills acquired at school as a means of earning a livelihood, achieving food self-sustenance, or supplementing the income in the work place. They can also get employment in the agriculture sector or start their own businesses and become entrepreneurs who would contribute to the development of their communities. Findings from a study by Dlamini (1999) reveal that students' career choices in the faculty of agriculture were influenced by the practically oriented courses studied in agriculture, which allowed for opportunities of self-employment upon graduation from the university.

Louise (2012) states "The primary agriculture sector contributes about 3% of South Africa's Gross Domestic Product (GDP) and 7 % to formal employment". The agro industrial sector comprises about 12% GDP for the nation (Louise, 2012). However, upon completion of grade 12, a few learners in the country enrol for an agriculture programme at university level. More equipped human resources need to be recruited into the agriculture industry in order to sustain food production in the country in the near future.

Only 43 special agricultural secondary schools in the provinces offer Agricultural Management Practices and Agricultural Technology as a formal subject. There are 3 schools in the Western Cape province, 3 schools in the Eastern Cape province, 2 schools in the Northern Cape province, 7 schools in the Free State province, 7 schools in Limpopo province, 9 schools in Mpumalanga province, 4 schools in Kwazulu-Natal, only 1 school in Gauteng province and lastly 7 schools in North West province. These schools usually have a farming unit that caters for agronomic and livestock demonstration purposes and material for training purposes. There are about 2 527 academic schools in South Africa offering agricultural sciences (Madakadze *et al*, 2014).

According to the statistics from the report by Madakadze *et al* (2014), the results of grade 12 learners in 2011 as indicated by Table 1.4, show that 77 719 students wrote Agricultural Sciences, 1 100 wrote Agricultural Management Practices, and 590 wrote Agricultural Technology examinations in the country. Students obtained 71%, 99%,

and 100% pass rate respectively in the three (3) subjects written. Out of the 77 719 students that wrote agricultural sciences only 12 773 (16.5%) were able to obtain marks above 50% as indicated by the statistics.

Table 1.4: Agriculture results at National Senior certificate from 2008 to 2013 (Source: Modernising African food Systems paper no: 9, 2014)

Subject	2008		2009		2010		2011		2012		2013	
	Wrote	% Achieved	Wrote	% Achieved	Wrote	% Achieved	Wrote	% Achieved	Wrote	% Achieved	Wrote	% Achieved
Agricultural Management Practices					1128	100	1 100	99	1 223	100.0	1 417	100
Agricultural Sciences	85 668	52.1	90 136	52	85 523	63	77 719	71	78 148	73.7	83 437	81
Agricultural Technology					534	99	590	100	675	99.3	688	100
Total	85668		90136		87 185		79 409		80 046		85 542	

In 2011 77719 students wrote the examinations and the results in agricultural science were as follows:

- 21432 (27.6%) failed (< 30%)
- 25515 (32.8%) pass (30 – 39%)
- 17991(23.1%) pass (40 – 49%)
- 8808 (11.3%) pass (50 – 59%)
- 3043 (4%) pass (60 – 69%)
- 804 (1%) pass (70 – 79%)
- 118 (0.2%) pass (80 – 100%)

There are limited chances of students enrolling for an agriculture programme in an institution of higher learning with marks less than 50%. Agricultural Sciences is a subject that can also be studied by students who are not taking mathematics and science at FET level. That could also decrease the students' chances of qualifying to study for a BSc agriculture programme at an institution of higher learning, since mathematics and science are a pre-requisite for enrolling for a BSc programme in any institution of higher learning. This further means that students entering tertiary Agriculture Education and Training (AET) programmes will come from a pool of 43 agriculture secondary schools (Higher Education and Training, 2012), that offered Agricultural Management Practices and Agricultural Technology, which form a minority of the students doing the three agriculture curricula.

Universities in the country are faced with a challenge of having a few learners enrolling for agriculture as a field of study, thus producing fewer graduates in the field of agriculture (Fongwa and Wilson-Strydom 2012). Figure 1.1 indicates that more students enrolling at universities in South Africa prefer studying Business Management and Law, followed by Science, Engineering and Technology, and the least enrolments being Agriculture. As the agriculture, food and natural resources industries continues to expand in South Africa, a supply of qualified employees in the agriculture industry is of critical importance. Therefore, because there is a need for agriculture employees since agriculture is expanding in the country, student recruitment into the agriculture stream at tertiary level is a critical concern in South Africa. A decline in the number of learners enrolling for agriculture could imply that food security in the country could decline (Department of Agriculture, 2009). The graphs below from Fongwa and Wilson-Strydom (2012) show graduation patterns by major fields of study in South Africa.

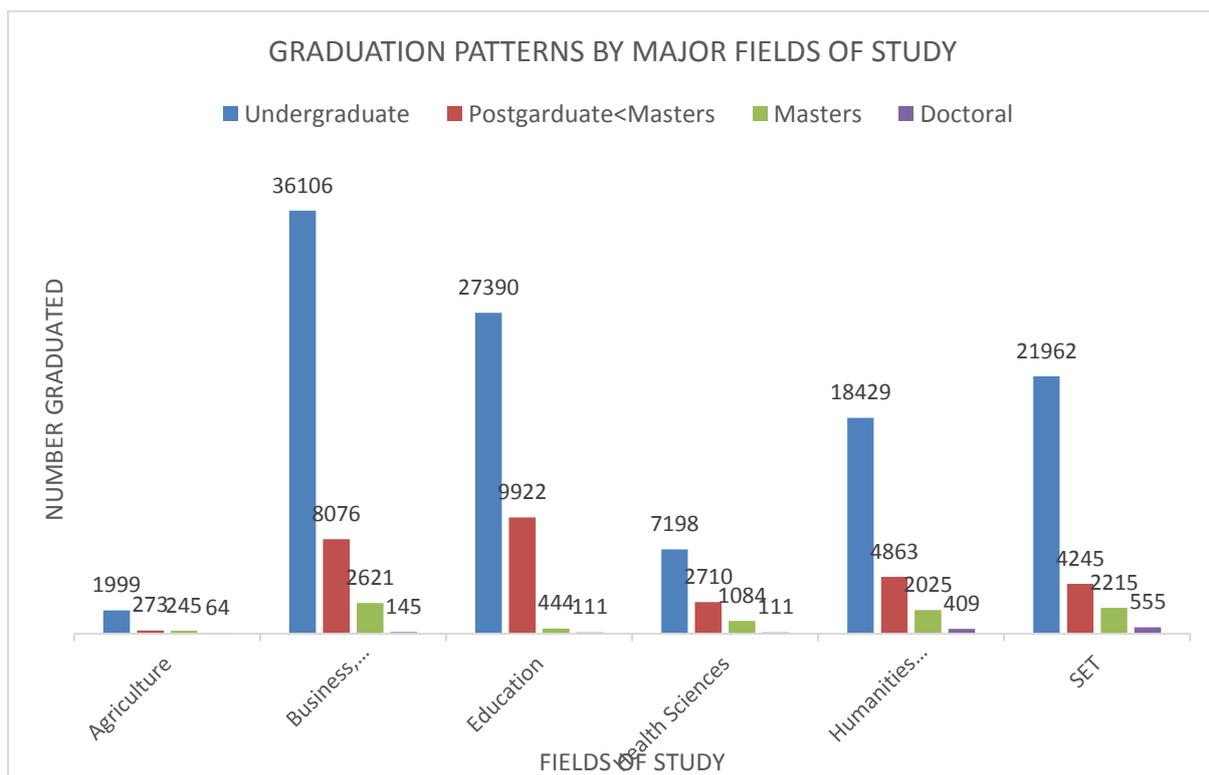


Figure 1.4: Graduation patterns by major fields of study (Fongwa & Wilson-Strydom, 2012)Source: HEMIS data (2010)

Figure 1.4 shows that, in all fields of study, the highest number of graduates comes from undergraduate programmes. Agriculture still has the least number of graduates compared to the other fields of study in all categories of levels of study.

According to Figure 1.3 on student enrolments, it shows that more students enrolling at UNISA prefer economic studies as opposed to the other fields of study, with agricultural sciences having the lowest enrolment. Agriculture in general is taken for granted and not perceived as a science, hence this then affects people who have been raised in a farming background to enrol for an agriculture program, since they do not consider agriculture as a study discipline but as a sign of poverty, more especially if not exposed to agriculture at FET level. On completion of their studies, most of them work in other industries besides agriculture, this could be attributed to the stigma that agriculture is for poor people and the elderly and that when working agriculture, it means one has to work very hard all the time, hence they look for jobs in other industries. This impact negatively on the skilled human resource in the agriculture sector.

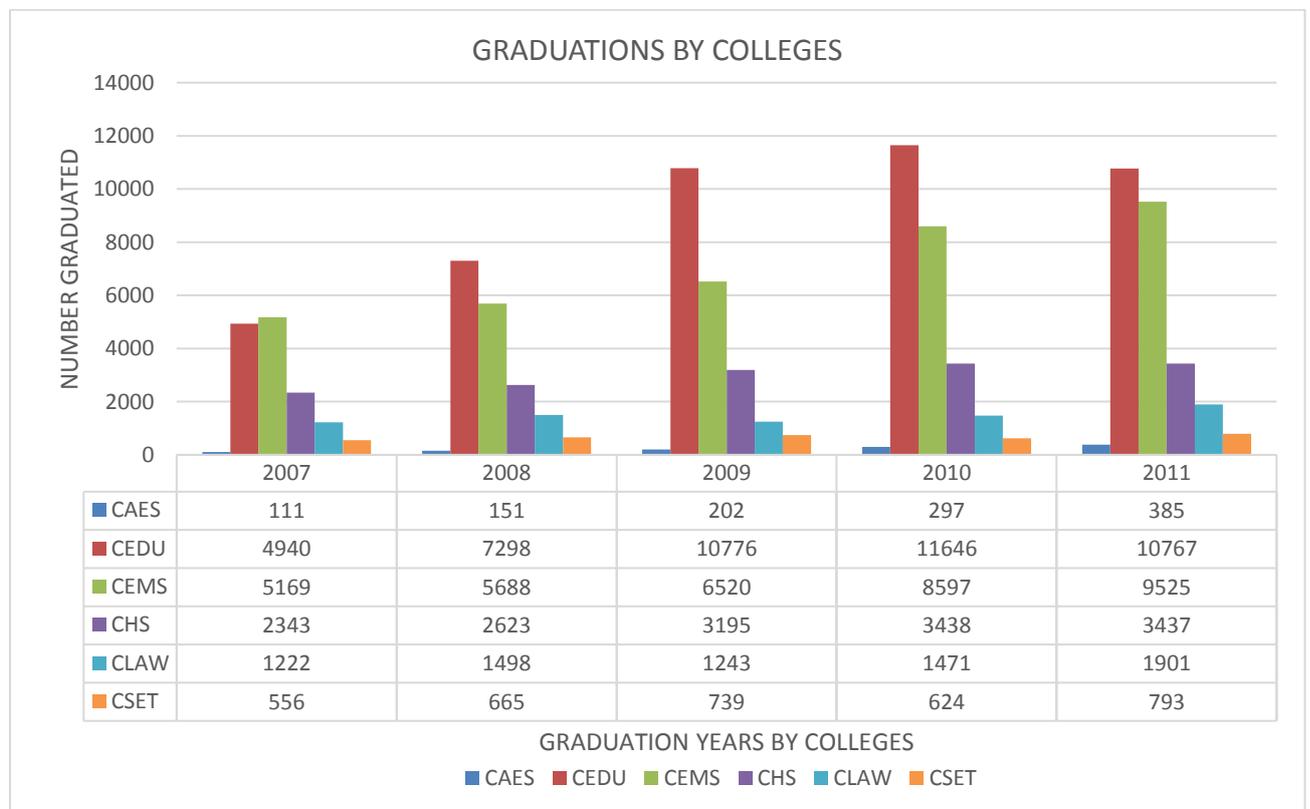


Figure 1.5: Graduations by college 2006 – 2010 at UNISA (Fongwa, 2012)

Figure 1.5 shows graduations by college at UNISA, College of Education CEDU) (having the highest number of graduates), and the College of Agriculture and Environmental Sciences (CAES) having the lowest numbers of graduates, even though it shows a slight increase from 2006 to 2010. This implies that few qualified agriculturists enter the job market upon graduation from university. One major question one can ask is what will happen to food production and the country's economy in the near future? This could affect negatively on the country's economy, food security, and health issues relating to food issues. From the statistics in the figures above, the problem of recruiting and graduating more students has continually existed since 2006 or even before.

It is mentioned that the study of agriculture, according to Study Agriculture in the US (2011), will help solve problems in the world regarding hunger, health issues related to food, and will increase the quality and quantity of food and other agricultural products for the growing South African population. The question is what could be done to motivate learners such that enrolment of learners into an agriculture programme increases.

Some of those who eventually enrol into agriculture degree programmes have no knowledge and experience at all in the agriculture field, some do have knowledge from agriculture learnt at school, and some have no theoretical and subject content knowledge, but only an experiential background in agriculture. Could it be that the learners who eventually enrol for the programme have chosen the right type of agriculture curriculum while at school and developed an interest or liking for the subject? Others have not been offered the opportunity to study the subject at school, or they are motivated enough to like the subject from their backgrounds e.g. background of growing on a farm. It is the aim of this study to determine what influences the learners to choose agriculture as a study discipline at college or university level.

1.4 JUSTIFICATION FOR THE STUDY

Many studies by different researchers have looked into factors influencing students' college study programme-choice decision (Thielen, 2012). Those cited by Thielen (2012) have all examined factors that influence students' college choice decision, but very few studies have focused on factors influencing the choice of agriculture as a study discipline by undergraduates in an open distance learning university. Open distance learning (ODL) is a route chosen by most people who are either actively employed or occupied with other duties (such as full-time housewives). I have chosen to explore an ODL institution as I am student in this institution and this gives me easier access to information about the institution. Studies by Esters (2007), Barkley and Parish (2005), Wildman and Torres (2001) focused on factors leading students to choose an academic major in agriculture, where their target population were students with an agriculture background. Very few studies focus specifically on students with or without an agriculture background and factors that led them to further their studies in agriculture as a field of study. This study will explore this particular aspect.

In South Africa, there is a need to recruit more agriculture learners and produce skilled graduates in the agriculture field (AgriSETA, 2010). One of the factors affecting development in the agriculture sector in the country is skills demand and supply. The sector is characterised by the need for highly skilled and qualified farm managers as well as technical staff on one hand, and large numbers of unskilled workers on the other hand (AgriSETA, 2010). "In South Africa we are still faced with a situation of high demand of skilled and experienced labour against an oversupply of unskilled labour, and this results in an unbalanced labour demand and supply in the country" (Samson, 2012:2). Table 1.5, from a report from the Department of Labour (2012), shows employment by occupation, and indicates that by March 2012 there were about 61 000 skilled agriculture employees in different occupations, as is presented in the table.

Table 1.5: Employment by occupation from April 2011 to March 2012 in ('000)

Main occupations	Apr-Jun 2011	Jul-Sep 2011	Oct-Dec 2011	Jan-Mar 2012
Managers	1 124	1 130	1 130	1 102
Professionals	762	763	745	747
Technicians	1 469	1 440	1 498	1 532
Clerks	1 358	1 426	1 523	1 419
Sales and services	1 944	1 975	1 960	1 969
Skilled agriculture	71	61	67	61
Craft and related trade workers	1 576	1 655	1 637	1 605
Plant and machine operators	1 121	1 097	1 126	1 106
Elementary occupations	2 824	2 894	2 933	2 983
Domestic workers	876	878	878	896
Total	13 125	13 318	13 497	13 422

Source: Stats S.A, Quarterly Labour Force Survey (QLFS), own calculations

Agriculture sector employment is based on those working in the Department of Agriculture Forestry and Fisheries (DAFF) and those working in production and processing at farms and factories. The Agricultural Education and Training strategy developed by the DAFF highlights five (5) major priority skills needed in agricultural production namely, agricultural production, agricultural engineering, agricultural economics, agricultural development, and veterinarians (Agriculture, 2003). AgriSETA has estimated that the demand for skilled employees at different levels in the next five (5) years is 510 686, based on data analysis over the last five (5) years and projected demand for the formal and commercial agriculture sector (AgriSETA, 2010).

Therefore, it is necessary to study why learners major or do not major in agriculture by identifying the factors that influence undergraduates' choice of agriculture as a study discipline in an open distance university offering agriculture in South Africa.

In identifying these factors, universities in South Africa can be in a better position to develop strategies on how to recruit more learners that enrol for the agriculture programme at tertiary level. In addition, the Department of Basic Education will be in a better position to improve on strategies of exposing learners to the agriculture subjects at school, such that their exposure to the subject could influence them to take up the subject at tertiary education level. The researcher believes that, by so doing, the learners will benefit by learning about the subject, acquiring skills and learning about opportunities in the agriculture sector and its diversity. The universities will also benefit higher enrolment in this discipline.

1.5 THEORETICAL FRAMEWORK

The theoretical framework for this study is based upon the Social Learning Theory of Career Decision-making (Krumboltz, 1976; Krumboltz, 1979; Mitchell & Krumboltz, 1990). This theory covers a twenty-year lifespan and explains how people choose their career paths. The theory addresses how people's personal experiences and the people who surround them both influence how they choose their careers. The places they live, the careers of people they know, and things they have overheard about different careers all play a role in guiding people to make a decision about their career.

Krumboltz (1979) conducted a study on the factors that influenced students' decision to select a major within available agricultural disciplines. The study was conducted on fulltime college students majoring in an agricultural discipline. Krumboltz and Mitchell (1979) studied the influence of the factors on students' selection of agriculture major. These factors included "1) exposure to agriculture, 2) family and friends, 3) College of agriculture recruitment activities, 4) professionals, and 5) job considerations" (Krumboltz, 1979, p48). The results of this study revealed that the most influential factor was "prior experience in agriculture" (Krumboltz, 1979, p54). Other findings indicated that "personal role models" also influenced a students' decision to major in agriculture. The opportunity to work outdoors was also indicated (Krumboltz, 1979, p58).

Kumboltz's study (1979) provides a basis for developing recruitment guidelines for the faculty in agricultural education and others who seek to boost enrolment. Many students who choose a major in agriculture have prior experience and knowledge about agriculture. These students may have been exposed to some type of agriculture experiences such as living on a farm, working on a farm, hunting, and working with plants and animals. The theory identifies the interaction of genetic factors (e.g. race), environmental conditions (e.g. social and economic forces), learning experiences (e.g. associative and instrumental), and performance tasks or skills (e.g. work habits) as influential in carrier decision-making.

(i) Genetic factors are the factors that are inherited and not learned, e.g. race, gender, physical appearance, intellectual ability etc. Some people are born with specials abilities in arts, writing, music, sports, farming etc. The greater an individual's innate

genetic abilities the more likely they are to respond to learning and teaching in that particular area.

(ii) Environmental conditions include social, cultural, political, and economic consideration, also climate, and geography. These factors are also outside the control of an individual.

(iii) Learning experiences are instrumental learning experiences and associative learning experiences.

(a) Instrumental learning experiences occur when a learner observes the consequences of their own actions. E.g. when a learner gets good marks or excels in a certain subject, the learner will be more likely to pursue a career in that field than if he/she does poorly.

(b) Associative learning experiences occur from observations, reading, or hearing about different occupations. It is through experiences over time with relevant personal characteristics that an individual learns skills relevant to decision-making, e.g. children may learn and read positive messages about the different sporting heroes and negative messages about politicians. The child would want to associate himself/herself with what produces a positive or negative effect in the individual, which will be relevant in career decision-making.

(iv) Task approach/performance skills result from the interaction of the first three influences; it is an interaction between individual and environment. These include personal standards of performance, work habits, and emotional responses. Previously learned tasks approach skills that are applied to a new task or problem and both affect the outcome of that task or problem and may themselves be modified.

This theory will apply in the study because the factors that influence students' choices, which include family and friends, exposure to agriculture, and role models, will be investigated.

The social learning theory of career decision-making suggests that maximum career development of all individuals requires each individual to have an opportunity to be exposed to the widest array of learning experiences regardless of gender, race, or ethnic origin (Mitchell & Krumboltz, 1990). It is stated that each of these influences

plays a part in all career decisions that are made, but different combinations of interactions of the influences produce a multitude of different career choices that individuals make (Mitchell & Krumboltz, 1990). This theoretical framework will be employed in identifying factors that influence the choice of university agriculture programmes.

1.6 PURPOSE OF THE STUDY

The purpose of this study is to identify the factors influencing the choice of agriculture as a study discipline by undergraduates of a distance university's agriculture department in South Africa. The study will focus on the following objectives:

- i) To determine what influenced the students to enrol in an agriculture field of study.
- ii) To determine what influenced the students to enrol for distance education in agriculture.
- iii) To describe the extent to which the factors influenced the selection of the programme of study.
- iv) To conduct an analysis of the impact of the three FET agriculture curricula under CAPS and determine their relevance in preparing students for tertiary education.
- v) To devise a relevant strategy of attracting more students enrolling for the subject as a field of study

1.7 RESEARCH QUESTIONS

The following questions have been formulated to guide the research. With the main research question being:

What factors influence students' choice of agriculture as a study discipline at undergraduate level at an open education university?

The research question will be fulfilled by finding out:

What is the demographic profile of students who are studying agriculture at UNISA through distance learning?

Which individuals (parents, teachers, community members, etc.) influenced their career choice and how?

What events/experiences most influenced students' choice of a career in agriculture?

How relevant is the agriculture that students learnt at high school to the one they are studying now at tertiary education level? How well does it prepare them for tertiary education? Does it motivate them to take up a career in agriculture?

What could be done to encourage more students to take up agriculture as a career/field of study after completing high school in South Africa?

Why did they choose an open distance learning institution for studying agriculture?

1.8 DEFINITIONS

The researcher has identified some of the terms in an effort to help the reader in understanding the contents of the research.

Agriculture: the science or art of cultivating the soil for production of crops, and raising of livestock.

Agriculture science program: programs such as animal science, general agriculture, food science, plant science, soil science, forestry etc. are taught in the college of agriculture in a distance university's agriculture department of South Africa.

Distance learning: the acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance, no face to face lecturers or daily contacts with students.

Enrolment: act of accepting pupils into an institution's academic programme

Factors: are all the several things to contribute or cause influences in the enrolments in tertiary education.

Influence: to have an effect in causing someone to act in a particular way without the use of direct force or command.

Career choice: the desire for upward mobility through the choice of subjects, tertiary education institution, career, and the highest academic qualification a person would like to hold.

Tertiary institution: any institution that offers training of highly skilled specialists in the field to a person who has successfully completed high school

1.9 ASSUMPTIONS

1. Learners who participated in the study will represent a variety of agriculture majors in the college of agriculture.
2. The learners were familiar with the research instrument to be used for the study, which is a questionnaire.
3. Responses from learners were assumed to be true, accurate, and to the best of their ability.

1.10 LIMITATIONS

1. Few schools in the Middelburg 2 circuit that offer agriculture as a subject.
2. The study was limited to a small size of population for both Educators and university students.
3. Educators were given limited time to respond to the questionnaire as they had to start with the meeting they had come for. This made the educators not to be able to elaborate on some responses.

1.11 DELIMITATIONS

1. The study was limited to only one institution of higher learning that offers the subject, distance education, and not full time students at undergraduate level.
2. Undergraduate students at a distance education university in South Africa were identified and used as a case study.
3. Only Mpumalanga, Nkangala region, and Middelburg 2 Circuit agriculture educators were used for the study due to time constraints and ease of accessibility since they are within reach.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Agriculture is a set of activities that transforms the biophysical environment for the production of animals and plants for human use. Agricultural sciences is a broad field that includes parts of natural, economic, and social sciences used in the practice and understanding of agriculture. The Department of Agriculture developed the Agricultural Education and Training Strategy in an attempt to improve agricultural production through the rendering of quality agricultural education and training services (Department of Agriculture, 2008). The study of agriculture will therefore help solve food and health-related issues for the growing population. Strong agricultural education and training systems are fundamental to the quality of human resource capacity and ultimately, to agricultural productivity gains that are necessary for economic growth and poverty reduction in developing countries (Kruijssen, 2009).

Agriculture is mostly thought to be just about the farm, an ancient practice. However, it is no longer an ancient practice, but is now cutting-edge technology. It is a very wide field (Study Agriculture in the US, 2011). People in the world need agriculture to survive, the students can use the knowledge and skills acquired in the learning institutions to help the country with food production issues and educate the children of the future about sustainable agriculture. One of the findings from a study by Dlamini (1993) shows that students' career choice in the faculty of agriculture at the University of Swaziland was attributed to the programme offering practical oriented courses, which allow for chances of self-employment upon completion of study.

Agriculture is viewed as a vital means through which poverty and unemployment can be addressed, and one of the long term strategies conceived so far is to improve participation in education and training. However, the agricultural sector in South Africa in terms of actual size of production, education, and technological expertise, is still primarily in the hands of white South Africans. Therefore, the challenge is to bring the previously excluded black community into the mainstream economy through job creation and entrepreneurship, and Agriculture is clearly one important avenue to redress past inequalities. This will not be possible without addressing, among others, problems such as illiteracy and low education levels, which are most prevalent in rural

South Africa, and where agriculture is most likely to play an important role in resolving both economic and human development (Department of Agriculture, 2009)

Agriculture in South Africa contributes around 7% of formal employment, which compared to other parts of Africa, is relatively low, as well as providing work for casual labourers and contributing about 2.6% of GDP for the nation (Louise, 2012). Agricultural employment in South Africa's commercial farming sector is declining at an alarming rate (Aliber, 2000). With Agricultural employments declining in the country, less students at tertiary level take up the subject as a career subject.

The demand for higher education in African countries is on the rise. Although there is an increasing demand for Higher Education in the Southern Africa region, levels of higher education provision and enrolment rates in Southern African Development Community (SADC) countries are amongst the lowest in the world. In Southern Africa, tertiary enrolment rates in 2010 were about half of what they were in the rest of Africa, and less than a sixth of what they were in the whole world. This demonstrates a gap that has manifested between the SADC region tertiary enrolment rates and the rest of the world (Kotecha, 2012). The poor enrolments are attributed to a strong past policy focus on primary education.

2.2 ENROLMENTS

Enrolments in Agricultural programmes have been declining in many countries, particularly Africa. A similar trend is feared to be the case in Zimbabwe (Garwe, 2015). The reasons for the declining trends in enrolment include poor employment, career development and remuneration, lack of prestige and status of the profession, and quality and relevance of the programmes (Garwe, 2015). South Africa is part of the SADC region and has low enrolments in Agricultural programmes in their Universities. The problem of low enrolments is not only affecting South African universities, but it is also a concern for universities in the SADC region (Garwe, 2015). Among high school graduates, interest in agriculture is declining as a career choice, and agriculture is burdened with misconceptions due to lack of information and awareness (Kruijssen, 2009).

In South Africa, there are five (5) Universities of Technology offering Agricultural Education and Training (AET), 11 traditional universities that offer theoretically oriented degrees, and six (6) comprehensive universities offering a combination of academic and vocational diplomas and degrees (Madakadze *et al*, 2014). Secondary agricultural education and training is provided by approximately 1 500 secondary schools.

Almost one third of all higher education institution enrolments in South Africa are from the University of South Africa, which offers mainly distance education programmes, while Tshwane University of Technology has the highest number of students enrolled in contact programmes.

Demand for higher education in South Africa clearly outstrips supply. This is evident when there is a fierce competition for available space in the universities during the application and registration period (Fongwa & Wilson-Strydom, 2012). In recent years, student enrolment numbers have increased to about 892 936 in the year 2010. According to the statistics from the International Education Association of South Africa (IEASA), overall enrolment by field of study in 2010 shows the largest enrolments in the fields of Business, Management and Law (36.5 percent). This is followed by Science Engineering and Technology (20.9 percent), followed by Humanities and Social Sciences (19.1 percent), Education (16.3 percent), Health Sciences (5.7 percent), and Agriculture (1.6 percent).

The graph as per Figure 1.1 shows enrolments by gender in different fields of study in the universities in South Africa. The agriculture field of study displays the lowest enrolment when compared to other fields of study in South Africa. It is evident that throughout all the universities in South Africa, the agriculture programme of study has the lowest enrolment, followed by health sciences.

Low enrolment in the agriculture college is not only a concern for the University of South Africa (UNISA) but also a concern for universities in Sub-Saharan countries. In most countries, the share of agriculture in total tertiary education has been declining slightly over the years (Kruijssen, 2009). Dlamini (1993) cited Johnson who reported that US college enrolments in agriculture were not keeping pace with the demands for graduates.

Table 2.1 below, from Technical and Institutional Capacities of AET Institutions in Southern Africa, shows Agricultural Education and Training enrolment figures per University of Technology, in South Africa.

Table 2.1: Agricultural education and training enrolments per University of Technology in South Africa

University	Enrolment year							
	2004	2005	2006	2007	2008	2009	2010/11	2011/12
CPUT	112	130	85	372	521	293	2145	1089
CUT	95	213	187	272	98	106	133	132
MANTEC	449	407	581	725	831	242	633	285
DUT	139	148	892	793	816	295	328	278
TUT	1727	2137	1854	1583	1628	584	1708	960
TOTAL	2522	3035	3599	3745	3894	1520	4907	2744

The table above shows that the Cape Peninsula University of technology (CPUT) has the highest enrolment in Agricultural Education and Training, followed by Tshwane University of Technology (TUT), then Durban University of Technology (DUT). Table 1.3 indicates the total enrolment in the universities of technology. In 2012, CPUT had 33 509 registered students, while TUT had 51 711 registered students in the institution, and DUT had 24 875 students. From the statistics, Agricultural Education and Training students constitutes about 3.2% at CPUT, 1.8% at TUT, and 1.1% at DUT of the total enrolment in these 3 universities.

There are three universities with the highest AET enrolment, namely Stellenbosch University, UNISA, and University of Pretoria. These three universities together, account for more than 55% of the total AET enrolment (Department of Education and Training, 2013). As per statistics on Figure 1.2 and Table 1.2 from the Council of Higher Education, the total enrolments in 2011/2012 at the University of South Africa (UNISA), University of Pretoria (UP), and Stellenbosch University (SU) was 336 286, 57 508, and 27 510 registered students respectively. Statistics from Technical and Institutional Capacities of AET Institutions in Southern Africa show that the AET enrolment in these three universities in the year 2011/2012 was 6 893, 6 395 and 1 793 respectively, with UNISA having the highest enrolment of AET students, followed by UP and then SU. From the statistics, AET students constitute about 1.9 percent at UNISA, 11.1 percent at UP, and 6.5 percent at SU. This shows that both

Universities and Universities of Technology are facing low enrolment rates in South Africa.

According to statistics from the University of South Africa in 2011, of the 328 864 registered UNISA students in 2011, only 6947 (2.1%) of students enrolled with the College of Agriculture and Environmental Sciences (CAES) (Dion & Barnes, 2012). From the statistics, this college has the lowest number of students compared to the other colleges in the university. Refer to Figure 1.3 on Student Enrolments by college 2007 – 2011.

The declining trend in the share of enrolments in agriculture degree programmes as a proportion of total enrolment was also reported in 23 sub-Saharan countries. Data on total enrolments in tertiary education and in the field of agriculture in the sub-Saharan is given in the table below. The enrolments differ among countries, but with a general trend that ranges from 0% (Namibia) to 5.1% (Guinea) (Kruijssen, 2009).

Table 2.2: Enrolments in total tertiary education and in the field of agriculture (Source: Kruijssen, 2009)

Country	Total enrolment in tertiary education			Total enrolment in broad field of agriculture, tertiary level			Share of agriculture in total enrolment**		Share of women in total enrolment in tertiary education***		Share of women in agriculture, tertiary level**	
	Latest number	Annual growth	Years*	Latest number	Annual growth	Years*	Latest share	Annual growth	Latest share	Annual growth	Latest share	Annual growth
Burkina Faso	33459	30%	1999-2007	321	n.a.	2007	1.0%	n.a.	30.9%	1.0%	21.8%	n.a.
Burundi	17061	34%	1999-2006	392	n.a.	2002	3.7%	n.a.	30.6%	0.2%	15.1%	n.a.
Cameroon	120298	11%	1999-2006	696	4%	2004-2006	0.6%	-0.1%	41.8%	0.7%	n.a.	n.a.
Congo	12456	4%	1999-2003	380	-8%	2001-2002	3.1%	0.0%	15.8%	-1.3%	31.3%	12.5%
Eritrea	4612	3%	1999-2004	416	9%	1999-2004	9.0%	0.3%	13.1%	-0.1%	6.5%	-0.6%
Ethiopia	210456	38%	1999-2007	17884	33%	1999-2007	8.5%	-0.1%	25.5%	0.8%	15.5%	-0.2%
Ghana	140017	22%	2000-2007	3019	8%	2000-2004	4.3%	0.0%	34.2%	1.3%	20.4%	1.8%
Guinea	42711	51%	2003-2006	4670	204%	2004-2006	10.9%	2.8%	21.4%	1.9%	17.0%	4.3%
Kenya	102798	4%	2000-2004	6969	5%	2000-2001	7.4%	-0.1%	37.5%	0.6%	27.4%	-0.2%
Lesotho	8500	16%	1999-2006	356	36%	1999-2006	4.2%	0.2%	55.2%	-1.2%	60.7%	2.5%
Madagascar	58313	11%	1999-2007	1362	10%	2005-2007	2.3%	-0.1%	47.0%	0.2%	41.3%	2.3%
Malawi	6458	13%	1999-2007	490	n.a.	1999	15.4%	n.a.	33.6%	1.2%	24.5%	n.a.
Mauritius	16773	17%	1999-2006	318	-1%	1999-2006	1.9%	-0.4%	52.9%	1.0%	56.9%	1.6%
Mozambique	28298	29%	1999-2005	1477	0%	2004-2005	5.2%	-1.4%	33.1%	0.5%	26.5%	8.7%
Namibia	13185	0%	2001-2006	298	9%	1999-2003	2.5%	***0.3%	46.7%	0.2%	38.9%	0.9%
Sierra Leone	9041	17%	2000-2002	1360	315%	2000-2001	15.3%	10.4%	28.8%	0.0%	19.6%	-30.7%
South Africa	741380	2%	1999-2006	13452	8%	2000-2006	1.8%	0.1%	55.1%	0.2%	43.3%	1.0%
Swaziland	5692	2%	1999-2006	345	4%	1999-2006	6.1%	0.1%	49.8%	0.3%	17.7%	-3.3%
Tanzania	51080	28%	1999-2005	2417	15%	1999-2005	4.7%	-0.3%	32.4%	1.9%	26.2%	0.7%
Togo	18455	11%	1999-2001	166	n.a.	2000	1.1%	n.a.	16.9%	-0.3%	7.2%	n.a.
Uganda	88360	24%	1999-2004	1403	11%	1999-2004	1.6%	-0.1%	38.4%	0.8%	22.1%	0.9%

Note: The data in this table may be incomplete. n.a.: data not available. *Earliest and last year for which data is available. Absolute number refers to data from latest year available. **Years are same as for agricultural enrolment. ***Years are same as for total enrolment in tertiary education. **** Based on years 2001-2003. Source: <http://stats.us.unesco.org/>, accessed on 14 April 2009.

Some countries like Guinea and Sierra Leone have seen a high annual growth rate in the number of students enrolling in agriculture, whereas most other countries had little to moderate growth. The share of agriculture enrolment in total tertiary education ranges from 0.6% (Cameroon) to 15.4% (Malawi).

Osborne and Dyer (2000) state, decreasing enrolments in the university of agriculture programmes across the United States during the 1970s and 1980s coincided with a more severe decline in high school agriculture enrolments. Consequently, some colleges of agriculture had successfully directed their recruiting efforts more towards sub-urban and urban students with little or no agriculture background in an attempt to reverse the trends of declining enrolments.

A study by Garwe (2015) on Trends in student enrolments in agricultural degree programmes in Zimbabwe revealed that despite the importance of agriculture in Zimbabwe, the negative trends in enrolment in agriculture related programmes would continue to worsen the negative perceptions and the limited high school science graduate base. The study also revealed that the benefits of agriculture as a fulfilling career path, needs to be promoted. The researcher recommended that the Zimbabwean government should put in place critical enabling factors in the agriculture value-chain to increase motivation, profitability, and success of agricultural enterprises.

In New Zealand, Carter (2008), as cited by Garwe (2015) reported a drastic decline in student enrolments in agriculture programmes of study. A large number of the enrolled students were already employed and undergoing further training, rendering the number of new students even much lower. Low agriculture enrolments have also been reported in Nigeria. Despite the enormous prospects offered by the agriculture profession in that country, enrolments in agriculture related programmes are one of the lowest (Adebo & Sekumande, 2013).

In spite of the agriculture enrolment trends globally, the researcher also studied three categories of learners who eventually enrol for an undergraduate agriculture programme at an open distance learning university in South Africa. These categories are learners who have done agriculture as a subject at secondary phase, learners who

have experiential background on agricultural practices, and learners who have not done the subject at all and have no experiential background.

Statistics from SARUA of profiles of Higher Education graduation patterns in South Africa follow the enrolment patterns, with the largest number of graduates seen in Business, Management and Law, followed by Science, Engineering, and Technology. Agriculture had the least number of graduates. South African education still shows high levels of dropouts and generally low levels of throughput and success. Fongwa and Wilson-Strydom (2012) state “A key aspect in the South African Higher Education is the lack of production of adequate skills relevant to the economy”. There has been very little output in the number of skills produced in areas of Engineering and Technology, Natural Sciences, Human and Animal Health, and in Teacher Training, which directly affects the readiness of school leavers entering the higher education system (Fongwa & Wilson-Strydom, 2012).

Agriculture human resource development remains a critical concern to meeting the country’s challenge of agricultural development and food security (Department of Agriculture, 2008). Generally, the school programme of Agricultural Education and Training was poorly controlled and lacked coherence and coordination. In addition, most educators were not qualified in agricultural sciences (Didiza, 2005). The challenge of well-trained educators in both agriculture practice and agriculture theory remains high at school level. This also affects learners in the schools, as that means they are also disadvantaged in terms of accessing AET.

2.3 ROLE OF CAREER GUIDANCE AND COUNSELLING IN THE AGRICULTURAL SECTOR

Career guidance is a vital process in assisting learners’ choice of a career path in the future. It is a lifelong process that assists them with choosing the correct choice of subjects that will suit their personality and career needs. Career counselling is regarded as an interactive, co-constructive process between counsellor and client whose relationship is characterised by compassion, truthfulness, and mutual respect (Maree, 2013; Savickas, 2011). Career guidance and counselling is sought when an individual needs confidential guidance and help about possible career movements or changes. Counsellors will help individuals choose a career to suit their expectations

and needs, and will also make sure they have as much information as possible about the career path they are considering, as well as ensure it suits their personality. Olatunji and Oporum (2012) blame lack of information on agriculture on the low students' choice of a career path in agriculture. Moreover, career guidance should be introduced and invigorated at all school levels of the educational system to bridge the gap to students about innumerable job prospects in agriculture.

The agriculture curriculum is introduced at FET level in schools in South Africa. The GET phase in the South African education system does not expose learners to agriculture as a science but it is blended with Natural Sciences. There is a need to introduce agricultural science as a separate learning area at the GET phase so that learners can have a chance to be introduced to agriculture at earlier stages. This will also give them a chance as they develop to decide whether they want to follow a career in agriculture or not, instead of discovering late about agriculture, thus making it difficult for them to venture into a field they do not know well and are not sufficiently exposed to (Department of Agriculture, 2009).

In South African schools, there are no professional counsellors to help the students choose a career path that best suits their needs and considerations instead the career guidance is left to the Life Orientation educator to do (Department of Agriculture, 2008). Learners from middle-class families attend well-resourced schools that are able to seek the services of private psychologists to assess a group of learners at a fee. However, most learners from low-socio economic backgrounds attend poorly resourced schools and have no access to modern, up to date psychological assessment aimed at career counselling. Instead, this is left to the life orientation educators (Maree, 2013). Career counselling should be promoted at schools, especially in the most remote and poorest regions, informal settlements, and townships.

Learners at Grade 12 are taken to career expos where they assume the learners will be in a position to gain enough information about the different career opportunities. Watts (2006) is of the opinion that career guidance and counselling is crucial for the success of lifelong learning policies. Rosenberg *et al.* (2009) argue that during career expos organisations tend to promote what they do, with students not being exposed to the job and career opportunities in the organisation. In addition, because high school

students are too many and many organisations may be exhibiting, the learners may have little time at each exhibition and may therefore have little time to interact with the representatives of the organisations on display.

Inadequate career guidance for students in the upper grades (10, 11, and 12) could lead to problems such as (Varalaskshmi & Moly, 2009):

- Students having little insight into the most appropriate career direction for their abilities, interests, and values; As a result, they are not in a position to select the most suitable career choice at tertiary level.
- High dropout rates in the first year of tertiary education, due to learners taking up tertiary education irrespective of suitability.
- Students leaving school with very little knowledge on employment opportunities.

Findings, from a report by the Department of Agriculture (2009), reveal that career guidance is very limited or totally absent in some schools and communities in South Africa. Part of the problems are linked to the fact that people who are supposed to disseminate agricultural education and training information, such as agriculture educators in schools, have limited information themselves. The report recommended focused career guidance efforts be directed at young people (both in and out of school youth), females, and disabled persons in order to change the perception about agriculture as a career, and encourage such groups to consider agriculture as a career path worth following. Awareness on agriculture in the schools can be done in the form of agricultural education days or weeks in schools, agriculture road shows in communities, advertisements, and talk shows on the media (both print and electronic media) etc.

A study by Osborne (2000) also revealed that the most influential people on agriculture students' career plans included agriculture teachers, parents, other teachers, and guidance counsellors. Vaughan (2007) confirmed that learners among the American youth perceive a lack of career guidance and counselling in their schools, and often cannot name anyone beside their parents who have assisted them in career guidance.

A study by Vaughan and Gardiner (2007) state that career planning is a lifelong process, which encompasses choosing a programme of study or an occupation, getting a job, growing in the job, possibly changing careers, and eventually retiring. The career planning process covers all these areas. Guidance counsellors can also help students by trying to match the personalities of students to careers that would fit them best (Alfred-Davidson, 2009) as cited by (Egunjobi & Taofiq, 2013). This study focused mainly on career choice and the process one goes through in selecting a programme of study or occupation. How learners choose their programme of study should be influenced by the subjects studied at school level, especially the FET phase, since this marks the transition from secondary education to university/tertiary education. Dyer and Breja (2003), has indicated that prior experience in agriculture and enrolment in high school agriculture programs were the strongest predictors of students' enrolment and retention in colleges of agriculture.

The Department of Education in South Africa is emphasising on improving matric results, while no attention is given to career guidance and counselling (Mhlanga, 2011). A large number of South Africa learners are not able to pursue their studies at institutions of higher learning due to lack of proper career guidance and counselling at schools. Proper career guidance would have assisted students with early applications at universities for further education and training colleges, and selection of career paths at an early stage. The South African education system should at least prepare learners from grade 10 onwards when it comes to choosing career paths. This will allow learners to select subjects that correspond with their plans for the future (Pulse, 2011). This will give students the confidence to decide what they want to be in the future. Good career guidance for the students could help free the country from social ills such as crime, poverty, and unemployment.

Findings from a study on "Factors influencing Minority Enrolment in Agricultural Education" by Detexter (2003) indicate that teachers' influence contributed significantly to the number of learners being involved in agriculture because of career possibilities. There is a possibility of income and livelihood sustenance in agriculture. He recommended that the study be replicated and a more positive projection of agriculture needs to be implemented by schools. Past studies conducted by Dyer *et*

al. (1999) and Washburn *et al.* (2002), reported high school agriculture teachers to have demonstrated the most influence on students entering Colleges of Agriculture.

Recommendations from a study by Olatunji and Oporum (2012) state that vigorous and sustained effort should be made by teachers and guardian counsellors to positively influence students' choice of agriculture at secondary level where they usually select senior school certificate subjects. This can be done by organising career day in which students can be exposed to a wide variety of opportunities for employment offered by agriculture, and the numerous courses and career options available in the area of agriculture.

Dlamini (1999) recommended that adequately trained personnel for career guidance and counselling in schools should be especially employed to offer career advice to students. This will allow the personnel time to research the latest information on the different careers and will assist learners with up to date information on the relevant careers in the market at that time.

2.4 INFLUENCE OF PARENTS, GUARDIANS, AND AGRICULTURE TEACHERS IN AGRICULTURAL CAREER CHOICE

Parents and guardians play a very important role in their children's lives, they can be very influential when it comes to their children's plans of career choice, especially if they are academically inclined and are enlightened about the importance of good career choice, from the time the learner is at school up to tertiary level. Parents may serve as role models for their children without conscious intent. Osborne and Dyer (2000) reveal that people who exert the most influence on agriculture students' career plans included agriculture teachers, parents, other teachers, and guidance counsellors.

It is more likely that a student takes up his or her parents' career path because the learner will be more knowledgeable about that career from the parents' knowledge and experiences. Fizer (2013) from findings of his study states the factor that most influenced students' choice was family. Herren *et al.* (2011) as cited by Fizer (2013) found that parents and guardians were people who most influenced students when choosing a major in an agricultural field. On the other hand Wildman and Torres 2002),

found that family and friends were moderately influential when choosing a major. This could be because students' knowledge of jobs is based on the jobs of their parents and other adults prominent in their lives.

Several factors have been found to be theoretically and empirically related to career choice process. Some of these factors include gender, parents' occupation, parents' level of education, parents' level of influence, and self-esteem (Fizer, 2013). Findings from a study on "Factors influencing students' selection of a programme of study at the University of Swaziland" by Hadebe (2010), reveals that there was a significant relationship between academic qualification of the parents and the selection of the programme of study. There was also a significant relationship between the programme of study and the mothers' academic qualification and the fathers' academic qualification of study. This means that parents do help in students' choice of their optional subjects in their career. It also shows that counsellors, other teachers, and parents, as reported by the participants of the study, were the most influential individuals assisting students' selection of their programme of study. Students were motivated by seeing successful professionals and parents on the desired field of study. It also shows that students selected the programme of study they are currently in because they hope to be employable upon graduation. They want to be employable and earn a decent salary.

Dlamini (1999) studied the factors influencing first year students' career choice in the Faculty of Agriculture at University of Swaziland and found that students' career choice in the Faculty of Agriculture is attributed to students' own interest, mother, father, sister, brother agriculture teacher, and friends. Availability of employment in the profession, the known positive contribution of agriculture to national development, and prospects of a good salary were other factors that made students choose agriculture as a field of study (Dlamini, 1993). Students' better performance at high school level in the subjects, which happen to be the entry requirement at the Faculty of Agriculture, was also a factor to arise interest to enrol in agriculture.

Wildman and Torres (2001), in their study, determined the degree to which a wide variety of factors affected students' choice of agriculture as a major by administering a questionnaire and gathering the relevant data. In their study, students' demographic and academic characteristics, types of exposure to agriculture, perceptions of family,

friends, professionals in agricultural fields, and prior experience in agriculture, played a most influential role in selecting agriculture as a major. Other significant factors included the friendly atmosphere of the College of Agriculture, professionals, role models, and job opportunities upon completion of study.

Results from a study by Rayfield (2013) revealed that there were components of secondary agricultural education that do not significantly influence students' choice of agriculture at college level. The participation of learners in agriculture did not appear to influence respondents' enrolment in a college of agriculture and in life sciences. However, "working with people", "working with plants", and "working with animals" was being highly considered when choosing a major in agriculture (Rayfield, 2013).

According to the findings of a study by Esters (2005), parents or guardians and friends were the individuals, most influencing students' choice of career. The former students interviewed in the study indicated that they chose a career in agriculture because of high school educational experiences, work experiences, career interests, and other personal factors. Therefore, taking up agriculture at high school level can have some influence on the students' future career choice. One of the recommendations made by Esters (2005) was that future research should be done to replicate the study and examine the validity of the findings.

2.5 LEARNERS' ATTITUDE TOWARDS AGRICULTURE

Learners' attitude towards agriculture as a subject plays a very important role towards selecting the subject as a career option at university level (Kidane, 2014). Most of the youth in South Africa are not exposed to agriculture on a day-to-day basis, only the children staying on the farms and those who have a background in agriculture know the importance of agriculture in the community and the country as a whole. The learners do not have vegetable gardens in their schools or vegetable patches in their homes where they would grow fresh vegetables from seedlings, up to maturity where they may be used as relish. The learners are also not exposed to the agriculture youth clubs like the 4-S, 4-K, 4-B, and 4-H clubs from countries like Swaziland, Kenya, Botswana, and the United States of America (USA) respectively. 4-H is a volunteer organisation that teaches young men and women about agriculture (Battle, 2003) in Fizer (2013). These clubs encourage learners to participate in agricultural projects for

their own benefits. This can help stimulate learners' interest in the field of agriculture. Schools need to be encouraged to start small animal projects (i.e. poultry, rabbits) and school gardening projects in order to demonstrate agriculture skills and also encourage the youth to further pursue their studies in agriculture. Students who grew up on a farm or participated in Future Farmers of America (FFA) or 4-H often go into a career field involving agriculture (Fizer, 2013).

Observations from a study by Ikehi (2013) show that most people practicing agriculture as a means of livelihood are often old and uneducated youth. Findings from the study show that agriculture was not seen as a reputable science course of study due to the tedious nature of its applied practical and poor wage or capital returns in the agriculture sectors and poor societal values of farmers in south Nigeria. It also indicates that youth in Nigeria felt negative towards the study and practice of agriculture due to the presence of other better payable jobs available in the petroleum industries. The presence of these industries is influencing the youth to study courses other than agricultural sciences, shifting the interest from agriculture to other fields of study. In addition, the researcher recommends that efforts should be made by government and societies to encourage youths into the agriculture sector to boost production and enhance the economy of the nation. Establishment of agriculture scholarship funds should be made available by the government.

This could also hold true for South African learners, because with the many industries and mines in the country, learners feel that on completion of grade 12, they will find work in the mines and industries where they will be able to get better paying jobs as opposed to practicing agriculture.

A study by Garwe (2015) indicates that students have negative perceptions towards the agriculture career and thus opt for other more prestigious careers. These perceptions are well engrained in society, and they experience them at home, at school, and even at university. She suggested that these negative perceptions could be overcome through awareness campaigns by universities during career and open days.

A report by the Department of Agriculture (2003), “Strategies for Agriculture in Rural Development in South Africa”, shows that one of the challenges facing Agricultural Education and Training is agriculture’s negative career image. Research indicated that agriculture has a negative image as a career choice in the eyes of the youth in South Africa (Department of Agriculture, 2009). It is seen as work for the poor and the elderly, and not as being profitable. Further, agriculture is seen in a very narrow context and is equated solely with primary production and not viewed as a profitable business incorporating value-adding elements.

Another challenge highlighted by the Department of Agriculture (2003) report was that of higher education qualifications in agricultural sciences, which faces two challenges. The first being the general reduction in number of students entering into agricultural sciences, and secondly, is the scant number of agricultural scientist coming from historically disadvantaged populations. The former is in large numbers due to the negative image as a livelihood or career presented by agriculture. The latter is due to the poor quality of mathematics and science in secondary schools. A large percentage of learners in secondary schools study mathematical literacy as opposed to mathematics, and a very small percentage of learners study physical sciences in the secondary schools. This reduces the learners’ chances of enrolling for an agriculture related field of study at university level. For a learner to be accepted into an agriculture field of study at university level, mathematics and physical sciences are pre-requisite subjects.

One of the strategies of the report by the South African Department of Agriculture, Forestry, and Fisheries on Agricultural Education and Training Barriers (Agriculture, 2003:68 – 74) is to remove access barriers to AET by:

- (i) improving the image of agriculture as a career and livelihood choice by developing a high impact public education programme promoting the image of agriculture particularly among youth and children; and
- (ii) encouraging higher-level study (Masters and PhD) of the agricultural sciences, especially the critical skills in short supply, to produce high-level, highly qualified scientist who add value to the agricultural science knowledge base.

From the report, it is clear that emphasis should be placed on integration of training focusing on scarce and critical skills in the agriculture sector.

2.6 CONCLUSION

The reviewed literature is based on and related to some of the factors influencing choice of agriculture as a study discipline by undergraduates at university level. A number of factors have been found to influence the choice of a field of study including family and friends, professionals, role models, prior exposure or experience to agriculture, job considerations, and college of agriculture recruitment activities.

However, the factors revealed in this literature review are related to some of the factors included in the Social Learning Theory of Career Decision Making by Mitchel and Krumboltz (1979). The theory addresses how people's personal experiences and the people who surround them, both influence how they choose their careers. The places they live, the careers of people they know, and things they have overheard about different careers, all play a role in guiding people to make a decision about their career. It also identifies the interaction of genetic factors (e.g. race), environmental conditions (e.g. social and economic forces), learning experiences (e.g. associative and instrumental), and performance (tasks) skills (e.g. work habits) as influential in carrier decision making. This theory has been chosen as the theory informing this research (see Chapter 3 of this dissertation).

The reviewed literature revealed the factors affecting tertiary agriculture enrolment to be career guidance and counselling, parents or guardians, agriculture teachers, and learners' attitudes towards agriculture. The study investigated family, friends, exposure to agriculture, professional's influence, and job considerations as factors influencing the choice of agriculture as a study discipline by undergraduates in the university's Department of Agriculture.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter entails the description of the study, research design, how the research was conducted, and how the data collected from the research was analysed.

3.2 RESEARCH DESIGN

According to Burkingham and Saunders (2004), a research design is a plan or guide for data collection and interpretation, with sets of rules that enable the researcher to conceptualise and observe the problem under study. The researcher made use of mixed method approach, qualitative and quantitative approach, where a structured online questionnaire was administered to distance education learners studying agriculture with a distance learning university, to determine what influenced the students to take agriculture as a study discipline and the factors that influenced them to study in a distance learning university. Babbie (2002) defines qualitative study as a study that subscribes to the inside perspective of social action, where information is drawn from the natural environment. Qualitative methodology addresses the manner of generating data by under-scouring its contrast to quantitative methodology that is so pervasive in conventional research (Stephen, 1997). As with this study, the qualitative research forms a smaller component of a larger part of the study, which is quantitative research. An unstructured questionnaire was administered to agriculture educators in the Middelburg 1, 2, and 3 circuits to determine the impact of the three agriculture curricula taught in the schools, especially how they prepared students for tertiary education.

3.3 STUDY POPULATION

The target population for the descriptive study was 46 part-time students studying agriculture through open distance learning at a university in South Africa undergraduate level, especially the first years, as they were fresh from school, and Agriculture Educators in the Middelburg 1, 2 and 3 circuits in the Nkangala district, in Mpumalanga Province. All 2014 first-year students that enrolled for the agriculture programme of study were requested to participate in the study. There are currently six

schools offering agriculture as a subject in the Middelburg 1, 2, and 3 circuits, assuming that each school has a minimum of two agriculture teachers, since this subject is an optional subject, all FET agricultural sciences educators from the different schools teaching agriculture at senior phase will be requested to participate in the study.

3.4 INSTRUMENTS

The study utilised a mixed methodology approach, using both quantitative and qualitative techniques. The following research instruments were used for the study:

- A. Questionnaires
 - (i) Structured questionnaire
 - (ii) Unstructured questionnaire

i) Structured questionnaires

These are (most often) paper and pencil set of structured and focused questions, they save time because individuals can complete them without any direct assistance or intervention from the researcher (Salkind, 2009).

The research instrument used for quantitative data collection was an online structured student questionnaire because it contained questions that were objective, straight forward, and could be easily answered by the respondents (even in the absence of the interviewer). The data collected from closed-ended questions are easier to analyse as opposed to open-ended questions. The online questionnaire was developed using kwiksurveys.com. The questionnaire was designed to solicit information from students who enrolled for an agriculture programme by distance learning to determine the factors that have led them to choose agriculture as a major in their field of study. The content of the questionnaire was influenced by a study by Mitchell and Krumboltz (1990) on Social Learning Theory of Decision-making. The theory addresses how people's personal experiences and the people who surround them, both influence how they choose their careers. The places they live, the careers of people they know, and

things they have overheard about different careers all play a role in guiding people to make a decision about their career.

Closed-ended questions were used in the online questionnaire. A list of first-year agriculture students and their email addresses was requested from the statistics department of the university. The questionnaire was emailed to each one of the first-year students studying agriculture using their university email addresses, where the first-year students were requested to partake in the research by completing the online questionnaire. Initially, a pilot study of the questionnaire was done with a small group of persons to test whether the respondents interpreted the questions correctly and whether the response categories provided are suitable. Responses from the pilot study were used to make some adjustments on the questionnaire before the final questionnaire was drawn.

The researcher's supervisor in the College of Agriculture and Environmental Sciences reviewed the questionnaire for face and content validity. The questionnaire was designed to gather certain key factors influencing the choice of major in agriculture using a five-point Likert-type scale. It was divided into three major sections:

Section A: Demographic and Academic characteristics – this had nine (9) components:

- Ethnicity
- Gender
- Age
- Community of origin
- Classification of level in college
- Type of school attended
- Location of school
- Type of agriculture curricula offered by your school

Section B:

i) Factors influencing students' choice of Agricultural sciences as a choice of career: A 5-point Likert scale was used to represent the level of influence:

- Very Influential/ strongly agree = (1)
- Moderately Influential / Agree = (2)
- Undecided/ neutral = (3)
- Slightly Influential / disagree = (4)
- Non Influential/ strongly Disagree = (5)

The factors were divided into 4 groups:

- Family and friends
- Exposure to agriculture
- Professional's influence
- Job considerations

ii) Factors that influenced the student to choose distance learning

The 5-point Likert scale was used to represent the level of influence on the eight (8) possible reasons why they chose to study through open distance learning:

- Strongly Disagree SD = (5)
- Disagree D = (4)
- Neutral N = (3)
- Agree A = (2)
- Strongly Agree SA = (1)

Section C: Suggestions to improve the uptake of Agriculture as a field of study

The 5-point Likert scale was used to represent the level of influence:

- Strongly Disagree SD = (5)
- Disagree D = (4)
- Neutral N = (3)
- Agree A = (2)
- Strongly Agree SA = (1)

Student information was requested from the university's ICT department on 14 August 2014. The students' information from the ICT department was sorted according to the

modules, student numbers, and university students' email addresses. Learners' modules included AGR101U, AGR102V, AME1015, ASA101L, ASA102M, ASA103N, ASP101N, SSW101D, SSW102E, and SSW103F.

Unstructured questionnaires

An unstructured questionnaire is one of the basic tools used in survey research. It can be helpful if one wants to obtain information that otherwise may be difficult to come by, including first-hand knowledge of people's feelings and perceptions (Salkind, 2009). Questionnaires can have three types of formats, namely structured, semi-structured, and unstructured questions. Structured questionnaires have closed-ended questions that require an exact answer and unstructured questionnaires have open-ended questions. For this study, the researcher administered semi-structured questionnaires to 10 agriculture educators who had attended an agriculture cluster meeting from different schools in the Nkangala region, Middelburg 1, 2 and 3 circuits. These three (3) circuits form a cluster. Semi-structured questions are useful for allowing the respondent to elaborate on his/her responses, investigating complex behaviours, opinions, and emotions, and for collecting a diversity of experiences (Clifford, 2010). This will provide a free exchange of detailed responses. These educators, with their experience and knowledge, understand the agriculture curricula taught in the schools and the challenges faced in ensuring efficient implementation of the curriculum.

The purpose of this questionnaire was to verify how the three (3) types of agriculture curricula taught at FET level, offered by NCS, prepared and motivated learners for tertiary education in an agriculture programme at tertiary level. A questionnaire with a cover letter, consent form, and a permission letter from the Department of Basic Education (DBE) circuit offices to conduct the research from Middelburg II, was used to collect the responses from the educators, after they had read and signed the consent form to partake in the survey.

3.5 DATA COLLECTION

Data collection as defined by Burns and Groove (2003) is a precise, systematic gathering of information relevant to the researcher's purpose. The researcher used questionnaires to gather the relevant information from the respondents.

Online structured questionnaires

An online survey using kwiksurveys.com was used to administer the questionnaire, designed by the researcher in July 2014. A pilot study of the online questionnaire was done on 2 August 2014, where three (3) non-students were sent the link to view and attempt to respond to the questionnaire. The researcher made adjustments on the questionnaire after the pilot results. Forty-six (46) students doing agriculture through distance learning were sent emails on 17 August 2014 via email to their university student emails. The introductory page had information pertaining to the survey to be conducted, the importance of the study, and information on their rights to partake in the study. This page had a unique uniform resource locator (URL) to each student at the bottom of the page; the respondent had to click on it to be able to access the survey. The page also provided instructions on the length of the survey, as well as how to access the questions in the survey.

Data was collected by administering the questionnaires to the students studying agriculture through distance learning at a university in South Africa using census method. This method specifically targeted all first-year students as respondents to the questionnaire. According to Salkind (2009), the theory of sampling is, if the researcher can select a sample that is as close as possible to being representative of a population, then any observations the researcher can make regarding that sample should also hold true for the rest of the population. Responses obtained from 42 questionnaires answered by 28 male students and 14 female students represented the rest of the population of students studying agriculture.

Semi-structured questionnaires

The researcher developed a semi-structured questionnaire and administered it to Agriculture educators. The educators filled in the questionnaire at the Middelburg Department of Education circuit offices on 25 August 2014. The Agriculture educators had held a cluster meeting on that day. The cluster is made up of educators from Middelburg 1, 2 and 3 circuits. Ten (10) questionnaires were given to all the 10 educators who had attended the cluster meeting to fill in and only nine (9) educators participated and responded in the research survey. Out of the nine responses received only seven (7) had usable responses.

3.6 DATA ANALYSIS

The data analysis process usually starts with descriptive statistics (Salkind, 2009). Descriptive statistics is a collective name for a number of statistical methods that are used to organise and summarise data in a meaningful way (Maree, 2010).

Online questionnaire responses

Information was collected from responses of the online questionnaires from respondents, captured into the researcher's personal computer as raw data in Microsoft Excel, and analysed using a statistical package for the Social Sciences (SPSS) version 20, with the assistance of a statistician. Descriptive statistics including frequencies, percentages, means, standard deviations, skewness, and kurtosis were used to analyse and describe the data.

Semi-structured questionnaire responses

Responses from the educators were analysed using deductive approach, since the qualitative research forms a smaller component of a larger quantity of the study. The data collected was grouped by obtaining themes, sub themes, patterns and trends, and analysed by extracting recurring statements. The recurring statements were coded into different categories such that a framework of the data collected was made and analysed on how frequently they recur. The qualitative data analysis was analysed using a qualitative data analysis software program Atlas TI . Data was organised and represented in the form of graphs to be able to draw conclusions.

3.7 ETHICAL CONSIDERATIONS

An ethics application was made to the Research Ethics Review Committee of the College of Agriculture and Environmental Science, UNISA, since human subjects were to be used for the survey. They granted approval of the survey and use of human subjects for the study on 04-04-2014 (2014/CAES/065) and attached as Addendum A. Voluntary informed consent was sought from all participants of this research. All data collected will remain confidential and participants will remain anonymous. Participants were informed that they had the right to withdraw from the research without explanation.

3.8 SUMMARY

In this chapter, a framework of how the study was conducted has been outlined, where the mixed methodology approach has been stated. Instrumentation of the research has been identified. An online questionnaire was used to determine the factors that influence the choice of agriculture as a career choice and factors that influenced student's choice of distance education. A semi-structured questionnaire was used to determine how the three (3) agriculture curricula taught at FET level prepares the learners for tertiary education. The population partaking in the study has been specified, and the data collection procedures and data analysis procedures have been described. The next chapter focuses on findings (data presentation, analysis, interpretation), from the research and discussions.

CHAPTER 4: FINDINGS

4.1 INTRODUCTION

In this chapter, the results and findings of the study are presented and discussed. The findings are based on the results of the semi structured questionnaires administered to agricultural sciences educators of the Middelburg 2 circuit, Mpumalanga province, and data collected from the online survey with agriculture distance learning students. The purpose of this study was to identify the factors influencing the choice of agriculture as a study discipline, by undergraduates from a distance university's agriculture department in South Africa. There were five objectives of the study, firstly, to determine what influenced the students to enrol in an agriculture field of study. The second objective was to describe the extent to which the factors influenced the selection of the programme method of study. Thirdly, to determine what influenced the students to enrol for distance education in agriculture. The fourth objective was to conduct an analysis of the impact of the three agriculture curriculums under CAPS, and lastly, to devise a relevant strategy of attracting more students enrolling for the subject as a field of study.

The population of the study consisted of 46 undergraduate agriculture students who had enrolled in an open distance-learning programme at a university in South Africa in the year 2014, mainly the first year students, and 10 agriculture educators from the Middelburg 2 circuit in the Mpumalanga province. The results discussed relate to the demographic profile of students studying agriculture through distance learning, which individuals influenced their career choice, what experiences mostly influenced their choice, why they chose open distance learning, and what could be done to encourage more students to take agriculture as a field of study after completing high school education in South Africa. The results are based on the empirical study done and will be presented in the following sections.

4.2 FINDINGS FROM QUALITATIVE DATA

An open-ended questionnaire was administered to agriculture educators of schools in the Middelburg 2 circuit in the Nkangala region, Mpumalanga province in South Africa. Of the 10 educators, nine educators who agreed to participate in the study were given questionnaires to complete. Out of the nine questionnaire responses received, seven questionnaires had usable responses resulting in a response rate of 70%.

4.2.1 Central themes

A thematic approach was used by categorising the data into five themes and subthemes. The themes and subthemes are presented in Table 4.1 below.

Table 4.1: Themes and sub-themes

Theme	Sub-themes
Demographics	Socio-demographic profile School profile Teacher profile Offering of career guidance and counselling Form of administering guidance and counselling
Curriculum aspects	Reasons for agricultural as elective Agriculture requirements Type of curriculum taught Preference of curriculum Type of practical sessions
Challenges	Academic Infrastructure and resources Administration

Impact of tuition and tertiary education	Alignment of tuition and tertiary education Motivation for enrolment into tertiary level Factors influencing learner uptake of subject at tertiary level
Recommendations for improvement of subject	Financial Academic Human resources Infrastructure and resource

The central qualitative question was:

What factors influence the choice of agriculture as a study discipline by undergraduates of a distance university's agriculture department in South Africa?

The propositions are:

- (i) Socio-demographic characteristics influence the students to enrol in an agriculture field of study.
- (ii) Academic, infrastructure, resources, and administration are the major challenges faced by agriculture educators.

The results of the analysis are presented in the following sections.

4.2.2 Demographics

The characteristics of the respondent was determined by the socio-demographic profile, school profile, teacher profile, offering of career guidance and counselling, and form of administering guidance and counselling. The subthemes are shown in Figure 4.1.

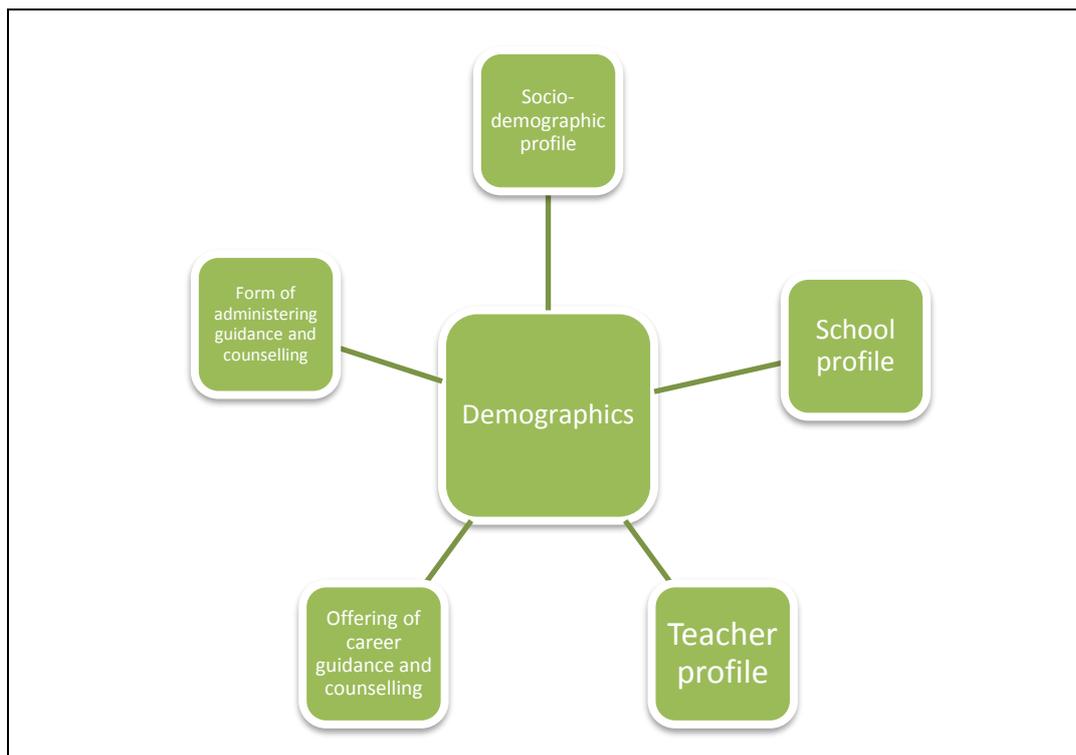


Figure 4.1: Sub-themes for demographics

Of the responses of educators who participated in the study, both sexes participated in the study, six males and one female educator. The respondents were from rural areas, semi-urban areas, and urban areas. All of them had undergone university education where they were holders of degrees. Two of the respondents had a Bachelor of Education degree, two had a Bachelor of Science in Agriculture Management, and the others had a senior degree in Education, Bachelor of Technology in Agriculture Management, and Master of Commerce in Economics degree. Two of respondents had at most five years' experience, whilst the rest had more than ten years' experience. Out of the seven educators who participated in the survey, three of the educators had an agriculture related qualification and the other four respondents had non-agriculture related qualifications.

A report by Didiza (2005) attests to the poor coherence and coordination of the school programme of Agricultural Education and Training. He further stated that most teachers teaching agriculture in the schools were not qualified in agricultural sciences and the challenge of well-trained educators in both agriculture practice and agriculture theory remains high at school level. Kidane (2014) also attests to this in his study on the shortcomings of the implementation of the agriculture education curriculum in schools,

that there is a shortage of well-trained and qualified agricultural science teachers. This affects the learners in the schools as it means they are also disadvantaged in terms of accessing AET.

The educators were teaching the following subjects namely Agricultural Science, Physical Sciences, Natural Sciences, Life Orientation, Mathematics, Mathematical Literacy, Geography, Creative arts, and Life Sciences. Agricultural Sciences, Physical Science, Mathematics, and Geography were being taught at grades 10, 11, and 12, and Life Orientation was being taught at grades 9, 10, 11, and 12. Natural Sciences were being taught at grade 8, Life Sciences at grade 10, Creative arts at grades 8 and 9, and Mathematical Literacy at grades 10 and 11. Five of the respondents were teaching Agricultural Sciences from grades 10 to 12, whilst two were teaching Agricultural Sciences from grade 10 to 11. Thus, all the respondents were teaching grades 10 to 11 in Agricultural Sciences. The five educators teaching grade 12 had 3, 13, 15, 19, and 25 learners respectively. The results indicate that agriculture related programmes (Agricultural Sciences, Agricultural Management Practices, and Agricultural Technology) were only taught at FET level from grades 10 to 12. This is also stated in the CAPS document by Department of Education (2011) that agriculture as a subject is only done from grade 10 to 12. At GET phase, agriculture is not exposed to learners as a subject but it is blended with natural sciences. Reflecting on the number of grade 12 learners taught by the agriculture educators in the schools indicates that agriculture as a subject is an optional subject that is done by a minority of students in the schools.

There is a need to introduce agricultural science as a separate learning area at GET phase. This will give learners a chance to be introduced to agriculture at earlier stages. It will also give the learners a chance as they develop to decide whether they want to follow a career in agriculture or not, instead of discovering late about the subject, making it difficult for them to venture into a field they do not know well and are not sufficiently exposed to (Department of Agriculture,2009).

One can therefore conclude that agriculture is taught as an optional subject at FET phase, only in schools in South Africa. Learners studying agriculture form a minority of the total enrolment of grade 12 learners. Statistics from a report by the Department of Education (2015) indicates that there was a total of 801 688 grade 12 candidates

registered for the 2015 National Senior Certificate (NSC) Examinations, only 107 326 candidates were registered for Agricultural Sciences, even though it showed a slight increase from the previous year with 79 835 registered. From the statistics on subject enrolments, Afrikaans as a subject had the lowest registrations of candidates (88546) followed by Agricultural Sciences.

Five of the educators indicated that they were offering guidance and counselling. Two of them indicated that they administered them at career centres and career days. Another two indicated they did this through exposure to career exhibitions, mostly at grade 12 levels, but no psychometric tests and aptitude tests were administered. One of the respondents indicated that aptitude tests are completed.

From the results, it is evident that there is not much career guidance and counselling done in South African schools to assist learners to choose a career path in agriculture; most of them are in the form of career guidance through career centres, career exhibitions, and career days. Only one educator indicated that learners were given aptitude tests. Only learners from middle-class families who attended well-resourced schools are able to seek services of a private psychologist to assess a group of learners at a fee. However, most learners from low socio-economic backgrounds attend poorly resourced schools and have no access to modern, up-to-date psychological assessment aimed at career counselling; instead, this is left to the life orientation educators (Maree, 2013).

Rosenberg *et al.* (2009) argue that, during career expos, organisations tend to promote what they do, with students not being exposed to the job and career opportunities in the organisation. During these career expos, with the large volume of high school learners we have in South African schools and the many exhibiting organisations, learners may have little time at each exhibit and may therefore have little time to interact with the relevant representatives of the organisations on display.

One can therefore conclude that learners in South African schools, especially those from the low socio-economic backgrounds who attend poorly resourced schools, do not receive adequate agriculture career guidance and counselling in the schools. Career guidance in the schools was left to life orientation educators or left to career expos and career days only at grade 12. Findings from a study by Dabula and Makura

(2013) also indicate that most learners in his study from poor disadvantaged communities of the Eastern Cape of South Africa felt lost, confused, and lacked confidence in making career choices due to poor provision or lack of career guidance and development programmes in their respective schools. Career guidance, being a vital process in assisting learners to choose the correct choice of subjects that will suit their personality and career needs, is absent in learning institutions and makes it difficult for South African students to venture into a field they know well. Dabula and Makura (2013) cited Wright and Maree (2007) in his study that lack of career development programmes is one of the issues concerning the difficulties in transitioning from high school to an institution of higher learning. Proper career guidance and counselling in the schools towards an agricultural career, as early as grade 10 level, would help learners to select subjects that, in the future, will help them gain access to an agricultural career at university level, and will give students the confidence to decide what they want to be in the future. Good guidance could also help free the country from social ills such as crime, poverty, and unemployment.

4.2.3 Curriculum aspects

In terms of the curriculum aspects, the theme was divided into the following sub-themes:

- Reasons for selecting agriculture as an elective
- Requirements for taking agriculture as subject
- Type of curriculum taught
- Factors influencing preference of curriculum
- Type of Agriculture practical sessions

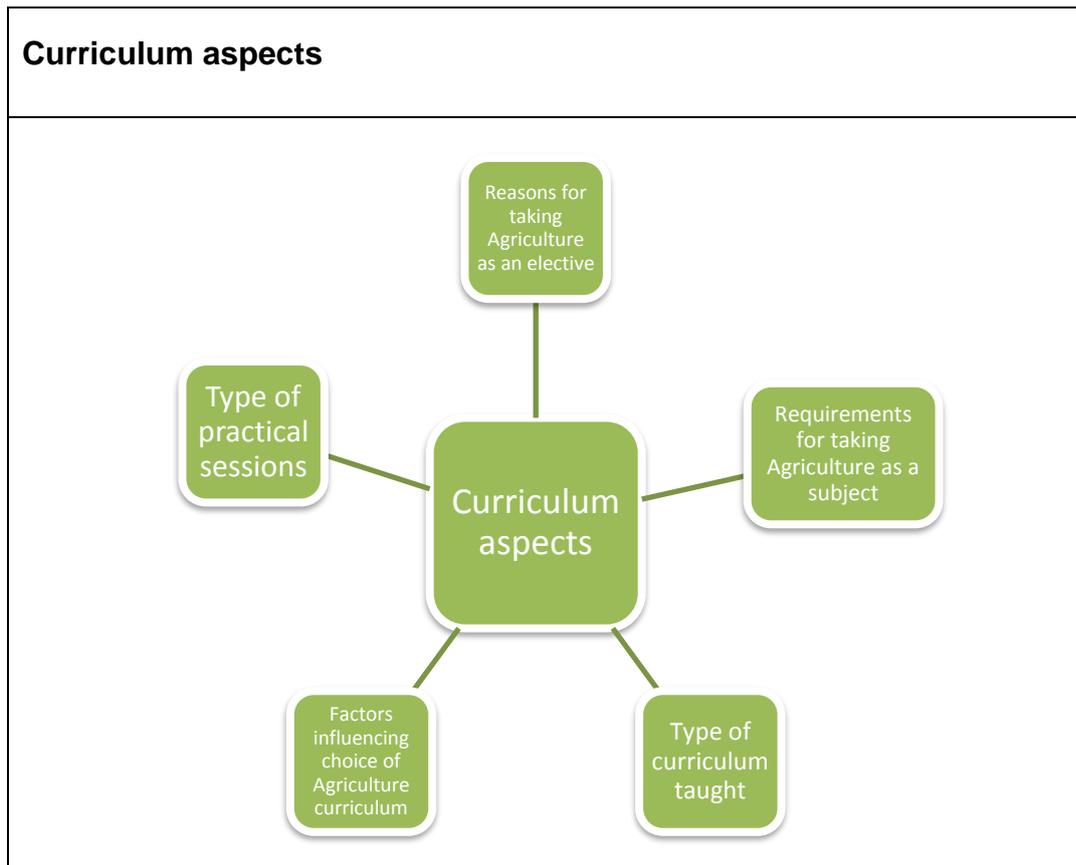


Figure 4.2: Sub-themes for curriculum aspects

Figure 4.2 gives the diagrammatic presentation of the sub-themes for curriculum aspects. The discussion on the sub-themes is given in the following sections, where the type of curriculum was indicated by all respondents.

4.2.3.1 Reasons for selecting agriculture as an elective subject

In terms of the curriculum aspects, six of the educators who participated indicated that agricultural subject was an optional subject (Table 4.2).

Table 4.2: Reasons for taking agriculture as an elective subject

Code	Frequency
Optional, limited to science students only	4
Optional, limited to mathematics and science students only	1
Optional, students believe that agriculture is only for those people who like hard labour, it is not office based	1
Total participants	6

Four of the educators who responded indicated that it was limited to science students only, whilst another one indicated that it was “*optional, limited to both science and mathematics students only*”. One respondent indicated even if it was limited only to science students, little attention was given to agricultural sciences. It was further stressed that the science students happen to be the minority of the students in all the grades. One respondent was quoted as saying “*students believe that agriculture is only for those people who like hard labour, it is not office based*”.

Students’ attitude towards agriculture as a subject plays a very important role towards selecting the subject as a future career option. Most of the youth in South Africa are not exposed to agriculture on a daily basis, like having vegetable gardens in their backyards at their various homes hence, the belief that it is meant for people who like hard work.

The results on the curriculum aspect, for reasons for agriculture as an elective indicate that the agriculture subject was limited to learners who chose both science and mathematics, and learners who chose science. These form a minority of grade 12 learners, hence the low enrolment of agriculture students at grade 12.

4.2.3.2 Requirements for doing agriculture at school

In terms of the requirements to do agriculture in the school, four of the respondents indicated that students should be doing mathematics and science. This further support the fact that the educators indicated that it was optional and done by science students.

Table 4.3: Requirements for doing agriculture at school

Code	Frequency
Learners must be doing mathematics and science	4
Learners must be doing agriculture with any sciences, like physical sciences and life sciences	1
Mathematics and any science subject i.e. physical science or life science	1
No special requirements, any learner can do agricultural sciences at school	1
Total participants	7

The other aspects mentioned were that learners must do agriculture with any sciences, like Physical Sciences and Life Sciences. Another mentioned Mathematics and any science subject, like Physical Sciences or Life Sciences. However, one respondent indicated that there were no special requirements, as any learner can do agricultural sciences at school.

In terms of the requirements to do agriculture in the schools, a majority of educators indicated that students should be doing Mathematics and Physical Science and or any other science subject. This could be attributed to the fact that the entrance requirements to tertiary institutions, if a student wishes to enrol for BSc agriculture programme of study, include Mathematics, Physical Sciences, and other science subjects like Life Sciences and Geography. Mathematics and Physical Science are a prerequisite for enrolling for a BSc programme in any institution of higher learning. Stumpf (2012) also states that Mathematical Literacy was not sufficient for learners studying engineering, technology, or agriculture. Agriculture as a subject can also be

studied by students who are not doing Mathematics and Science, but that could decrease students' chances of qualifying to study for a BSc agriculture programme at an institution of higher learning. For example at UNISA, to study for a BSc degree, a student should have obtained a minimum pass, of 50% in the language of teaching and learning, 50% in Mathematics, and 50% in Physical Sciences at National Senior Certificate level. To study a Diploma in the college of Agriculture and Environmental Sciences, entrance requirements include a minimum pass at NSC level of 50% in the language of teaching and learning, 50% in Mathematics, and 40% in Physical Science or Life Science or Agricultural Science.

4.2.3.3 Type of Agriculture curriculum taught in selected schools

All educators indicated that agricultural science was the type of agriculture curriculum being taught at the schools in Middelburg 2 circuit. This is attributed to the fact that most of the schools lack the necessary resources and infrastructure for teaching agricultural management practices and agricultural technology. Only the 43 special agricultural secondary schools in South Africa in the different provinces offer agricultural management practices and agricultural technology as a formal subject (Madakadze *et al.*, 2014).

Table 4.4: Type of curriculum taught in selected schools

Code	Frequency
Agricultural Science	7
Agricultural Management Practices	0
Agricultural Technology	0
Total participants	7

No respondent indicated agriculture management practises or agriculture technology.

4.2.3.4 Factors influencing preference of Agriculture curriculum

In terms of preference of curriculum, there were seven concepts that were raised as shown in the table below.

Table 4.5: Preference of agriculture curriculum

Code	Frequency
Resources available to the school are limited to teaching agricultural science	5
No special requirements, any learner can do agricultural sciences at school	2
Requires less capitalisation needed	2
Requires less projects of even live animals	2
Because it links well with the sciences subjects	1
Lack of proper infrastructure to do other types of curricula	1
Lack of the necessary infrastructure and equipment to implement the other types of agricultural curricula	1
Totals	14

Five of the Educators indicated that the resources available to the school were limited to teaching agricultural sciences. Some of the respondents indicated that there were no special requirements, e.g. animal houses, a proper vegetable garden etc. that were necessary for a learner to do agricultural sciences at school, and that resources available to the school are limited, requires less projects of even live animals, as well as needing less capitalisation. One of the educators mentioned that it was because it links well with the science subjects. The educators indicated that lack of proper infrastructure to do other types of curricula and lack of the necessary infrastructure and equipment to implement the other types of agricultural curricula were the reasons why agricultural science is preferred. Findings from a study by Dabula and Makura

(2013) identified inadequate teaching aids and materials as one of the short comings in the implementation of the Agricultural Education curriculum in the schools. The participants of the study also indicated the unavailability of necessary infrastructure, and lack of support was another challenge of successful implementation of the different agriculture curricula in schools.

4.2.3.5 Types of Agricultural practicals

The respondents indicated the types of practical sessions learners conduct as part of the CAPS curricula.

Table 4.6: Types of agriculture practicals

Code	Frequency
Crop farming	3
Field cultivation	1
Horticulture	1
Improvise since there is no equipment	1
Investigation of soil horizons	1
Killing and dressing a chicken, digestive system of a chicken	1
No equipment to carry out practical sessions at the school	1
Planting vegetables	1
Practical sessions on animals	1
Soil profile	1
Totals	12

The practical sessions mentioned were crop farming, field cultivation, horticulture, investigation of soil horizon, killing and dressing a chicken, digestive system of a chicken, planting vegetables, practical sessions on animals and soil profile. The educators also mentioned the issue that they improvise practical sessions since they usually have no equipment to carry them out. The results indicate that most of the practical sessions that are carried out in these schools in Middelburg 2 circuit offered in agricultural sciences are practical sessions that do not need much capitalisation. Practical sessions such as soil analysis, soil pH, investigating plant and animal cells, animal production, to name few, are not done since these require specialised science laboratories and animal houses, which are not present in the schools. This is also evident in the findings on challenges faced by the agriculture educators teaching the subject.

4.2.4 Challenges faced by agricultural educators

The respondents were asked to indicate challenges they were facing as agricultural educators teaching the subject. The challenges were divided into three sub-themes:

- Academic
- Infrastructure and resources
- Administration

The diagrammatic presentation of the aspects is shown in Figure 4.3.

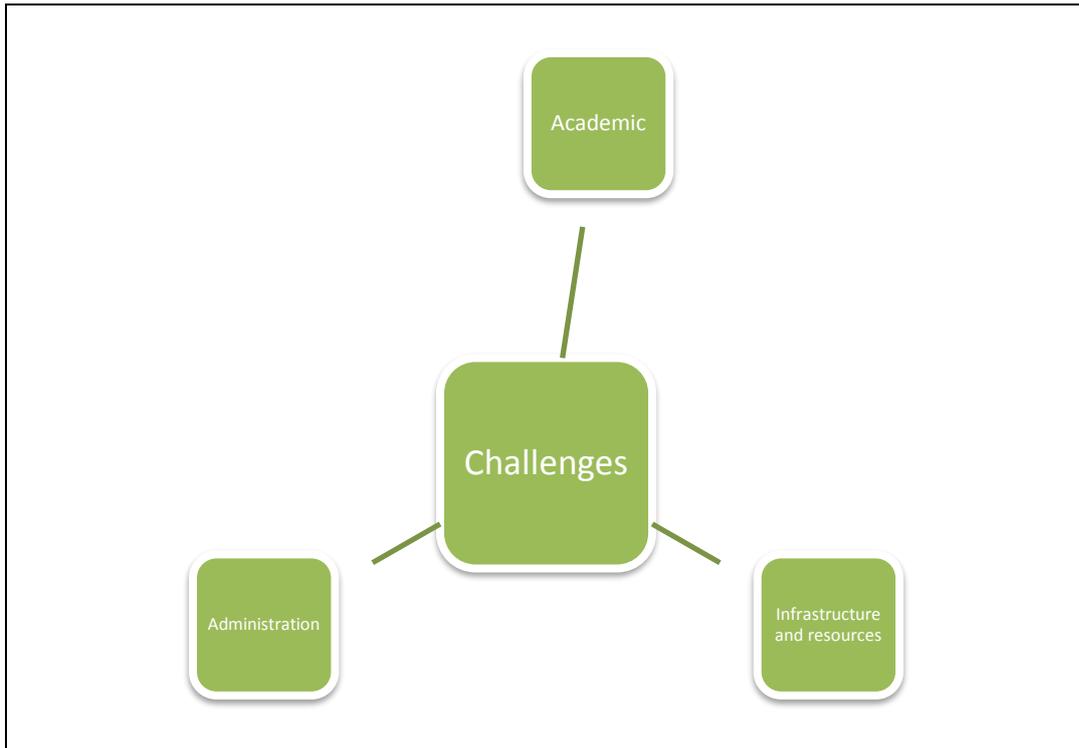


Figure 4.3: Sub-themes for challenges faced

The challenges mostly faced were of an academic nature, followed by those of lack in infrastructure and resources.

4.2.4.1 Academic challenges

The main challenge the educators were facing was that the learners have a negative attitude for the subject.

Table 4.7: Academic challenges

Code	Frequency
Learners have a negative attitude for the subject	6
Agriculture concepts are far-fetched for learners	2
Learners lack the basic skills in agriculture	2
Do not want to do planting practical sessions	1
Learners know nothing about animal husbandry	1
Students lack interest in the subject	1
Totals	13

The participating educators elaborated that the students lack interest in the subject, and they do not want to do planting practical sessions. They mentioned that agricultural concepts are far-fetched for the learners and that the learners lack basic skills in agriculture. One of the educators indicated that learners know nothing about animal husbandry.

A report by the Department of Agriculture (2003) shows that one of the challenges facing agricultural education and training is agriculture's negative image as a career choice in the eyes of the youth in South Africa. It is seen as work of the poor and the elderly and as not being profitable. A report from Department Of Agriculture (2008) recommended that learners be encouraged to apply their learnt agriculture skills in their communities. This could also change learners' negative attitude towards the subject and lack of interest, as indicated by a majority of respondents.

Observations from a study by Ikehi (2013) show that agriculture was not seen as a reputable science course of study among the youth because of the tedious nature of its applied practical aspects and poor wage or capital returns in the agriculture sector and poor societal value of farmers in the country. Lack of interest in the subject and the negative attitude towards the subject by the students at FET phase could have

negative effects on the enrolment of students into the field of agriculture at tertiary level.

4.2.4.2 Infrastructure and resources challenges

In terms of infrastructure and resources, the major challenge was lack of science laboratories in the secondary schools.

Table 4.8: Infrastructure and resources challenges

Code	Frequency
No science laboratories for agricultural sciences in secondary schools for practical sessions	4
Difficulty in mastering scientific concepts in the subject	1
Lack of equipment to carry out some agricultural sciences practical sessions	1
Lack of land to do vegetable production	1
Most learners doing agriculture in the general system	1
Totals	8

The educators also indicated that difficulty in mastering scientific concepts in the subject (e.g. Basic chemistry in grade 11 is problematic to most learners), lack of equipment to carry out some agricultural science practical sessions, lack of land to do vegetable production, and most learners doing agriculture in the general system. Since agriculture is a science-oriented subject, it requires learners to have some base in scientific concepts. Most learners in the general stream are not doing any science subject; hence, they may find mastering some of the agricultural concepts difficult. This could have a negative impact on learners, as they may perceive agriculture as a difficult subject thus losing interest in the subject. These learners in the general stream would not be admitted into a university even if they wished to pursue a career in agriculture, since admission requirements into universities include mathematics and physical sciences.

4.2.4.3 Administration challenge

Only one administrative challenge was mentioned by the participating educators as indicated in Table 4.9 below.

Table 4.9: Administrative challenge

Code	Frequency
Administrators offer very little support for the subject	3
Totals	3

Respondents mentioned that administrators offer very little support for the subject, especially the school administration. The school administration is expected to facilitate the provision of the relevant infrastructure and equipment needed in the agriculture department in the schools by liaising with the relevant stakeholders. This will in turn improve participation by students and the success rate of the subject.

4.2.5 Impact of tuition on tertiary education

Three sub-themes emerged from impact of tuition on tertiary education. They are given below:

- Alignment of tuition and tertiary education
- Motivation for enrolment into tertiary level
- Factors influencing learner uptake of subject at tertiary level

Figure 4.4 shows a diagrammatic presentation of the themes.

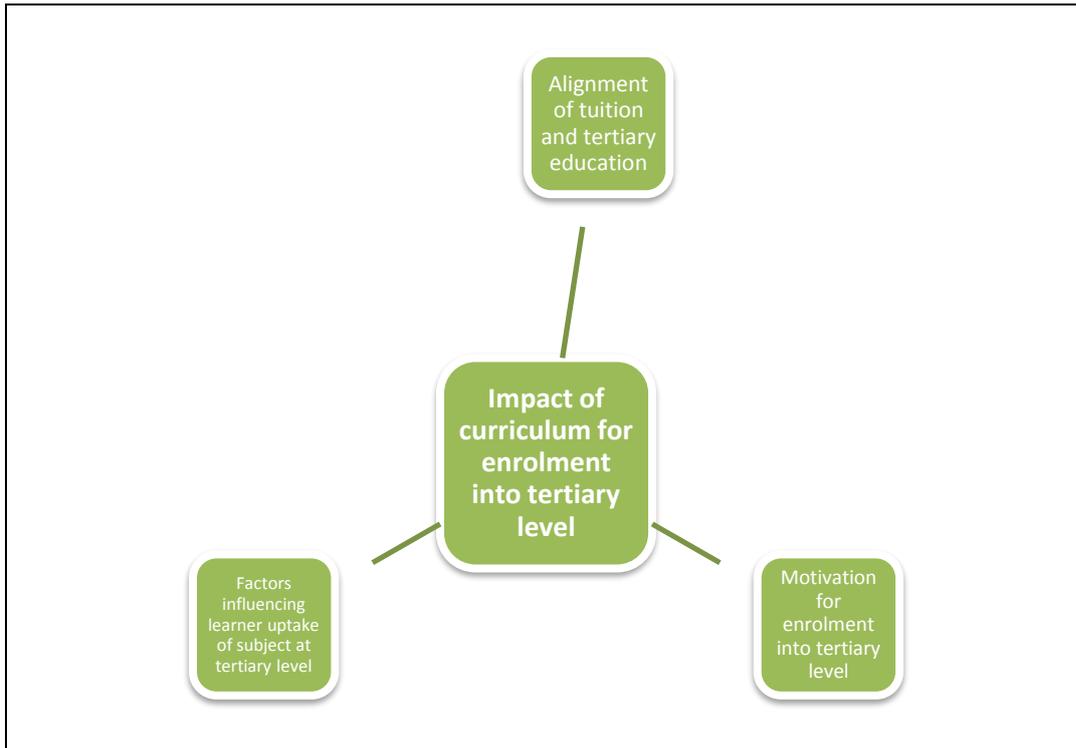


Figure 4.4: Sub-themes for impact of tuition and tertiary education

The main concepts mentioned were for the factors influencing learner uptake of the subject at tertiary level.

4.2.5.1 Alignment of tuition and tertiary education

Four of the educators indicated that high school tuition affects the learners by giving them the basic scientific terminology and concepts involved in agriculture. It does not give the learners the practical skill agriculture since all schools in Middelburg Circuit are offering agricultural sciences curriculum, which does not have much agriculture practicals. It does not motivate the learners enough to consider enrolling for the subject at tertiary level.

Table 4.10: Impact of alignment of tuition and tertiary education

Code	Frequency
By giving them the basic terminology and concepts involved in agriculture	4
Engage learners to have education with production skills in order to appreciate value of subject content in daily lives	2
Capitalise the schools in order to empower learners with mechanism and input resources	1
Capitalise the schools in order to empower learners with more practical sessions in agriculture	1
More practical sessions than theory	1
Most learners are doing agriculture in secondary school for practical sessions	1
Totals	10

The educators also indicated that most of the learners doing agriculture are not doing Physical Sciences and Mathematics, thus limiting their chances of enrolling at a university to further pursue agriculture, as these subject form part of the entry requirements. One respondent was quoted as saying “*there is a need to engage learners to have education with production skills so that they appreciate the value of the subject content in their day-to-day lives*”. A report from the Department of Agriculture (2008) recommended that practical portions of the AET curricula be given particular attention to ensure that students who achieve NSC with agriculture subjects are empowered to start and successfully manage their own agricultural enterprises in a sustainable manner. Success may in time, create wealth as the enterprise can be expanded; hence, lead to job creation. Capitalisation was also mentioned. They stressed the need to capitalise the schools in order to empower learners with mechanisms, input resources and more practical sessions in agriculture. This was

further emphasised by one respondent who indicated that the agriculture taught in the schools should be more practical than theoretical and that most learners are doing agriculture in secondary school for practical sessions.

4.2.5.2 Impact of tuition on motivation for enrolment into tertiary level

In terms of motivation, five of the educators indicated that the agriculture they do in schools does not motivate the learners.

Table 4.11: Impact of tuition on motivation for enrolment at tertiary level

Code	Frequency
Does not motivate learner	5
Learners lack vision of subject	2
Environment not motivating	1
Need to see importance of agriculture in daily live	1
Yes to some extent	1
Totals	10

One of the educators elaborated that it does not create interest in the learner to continue doing agriculture, even after completing grade 12, and another one was quoted as saying that *“no, learners lack the vision of the subject, hence they are not motivated”*.

One of the respondents indicated that the environment is not motivating at all and the other indicated that it is more science than practical. He elaborated by saying that, if they would be doing more practical sessions, they would see the importance of agriculture in their daily lives. However, one was quoted as saying it motivates them to some extent.

4.2.5.3 Impact of tuition and tertiary education on factors influencing learner uptake of subject at tertiary level

One of the factors mentioned by six of the respondents was that learners lack proper guidance.

Table 4.12: Factors influencing learner uptake of Agriculture at tertiary level

Code	Frequency
Learners lack proper guidance	6
Black students need more exposure	2
It is not properly conducted to inform the learners about the various fields of study on such levels	2
In most degrees, agriculture is not a prerequisite; instead they want Maths and Physical Sciences	1
Lack of practicality in the agricultural curricula	1
Learners lack proper guidance and counselling	1
The entrance requirements for admission to an agriculture programme of study are too high for the students to register	1
Totals	14

Educators indicated that learners lack proper guidance regarding the choosing of subjects in the higher levels. It is not properly conducted to inform the learners about the various fields of study at such levels, and that the entrance requirements for admission to an agriculture programme of study are too high for the students to register. In most degrees, agriculture is not a prerequisite; instead, they want maths and physical sciences. Dabula and Makura (2013) from their study deduce that career guidance has a positive effect on one's desire to enter higher education. The assumption therefore is that if more learners receive proper guidance while in high school, they will be in a position to make informed career choices and that has positive

implications for tertiary education access. A report by the Department of Agriculture (2008) states that the agricultural schools that catered for almost exclusively white pupils has since been infiltrated by black pupils and are now predominantly black, thus more black students are exposed to agriculture. Having more black students enrolling for an agriculture programme of study could mean more skilled agriculturists and researchers who may come up with more advanced farming techniques and sustainable methods of farming hence meeting future food needs of the country. It was also mentioned that there is lack of practicality in the agriculture curricula making it less important in the subjects they do.

4.2.6 Recommendations for improvement of subject

Educators were asked to make any recommendations on how they can improve agriculture as a subject in order to motivate learners to take the subject at a tertiary level. The recommendations were mentioned in the following areas:

- Financial
- Academic
- Human resources
- Infrastructure and resource

More concepts were mentioned in terms of academic recommendations.

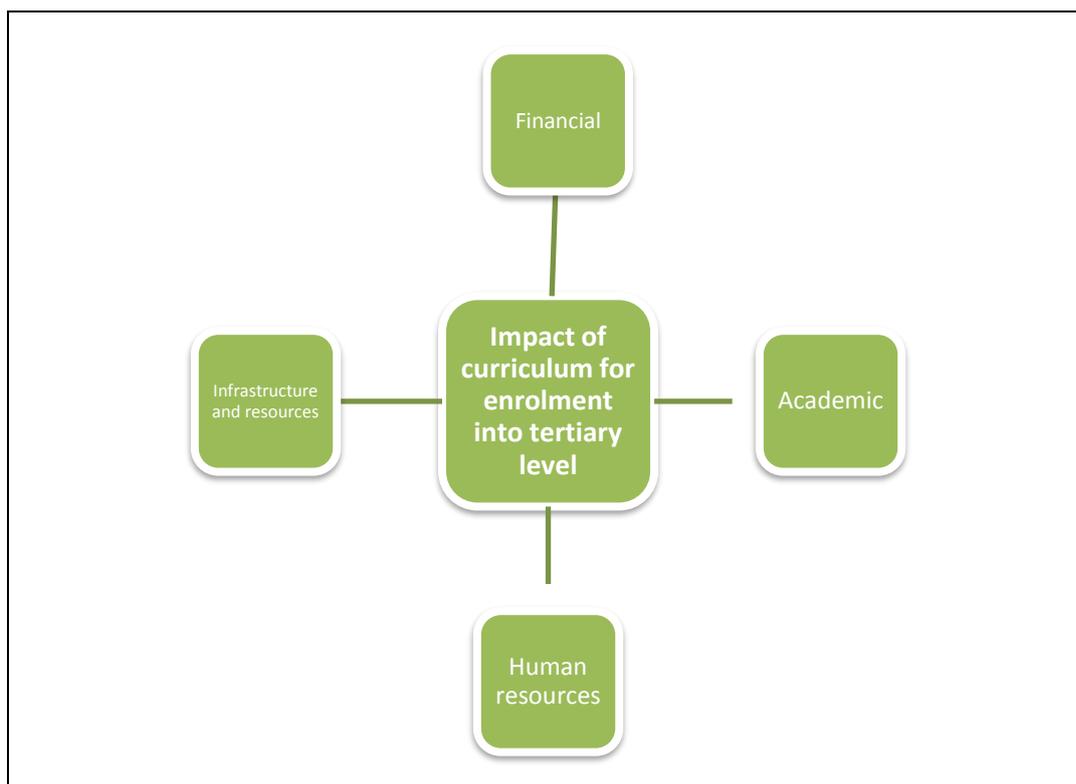


Figure 4.5: Sub-themes for recommendations for improvement of subject

The presentations on the recommendations are given in the following sections.

4.2.6.1 Financial recommendations for improvement of subject

Four of the participating educators indicated that there was a need for free bursaries for students studying agriculture.

Table 4.13: Financial recommendations for improvement of subject

Code	Frequency
Bursary for students studying agriculture	4
Sponsorship for tertiary level tuition	1
Totals	5

This was further supported by one educator who mentioned that there should be sponsorship for tertiary level tuition.

4.2.6.2 Academic recommendations for improvement of subject

In terms of academic recommendations, seven concepts were mentioned.

Table 4.14: Recommendations for improvement of the subject

Code	Frequency
Give more support to educators in the form of content workshops	2
Educators and curriculum implementers to motivate learners about importance of agriculture	1
Department to allow curriculum implementers to conduct career guidance	1
Educating learners about agriculture at primary level	1
Subject should be a stand alone	1
Subject to be incorporated in curriculum at primary level	1
The subject should be taught at GET phase	1
Totals	8

Two of the educators recommended that they give more support to educators in the form of content workshops. One of the respondents stressed that educators and curriculum implementers should motivate learners about the importance of agriculture as a subject at school level. Stumpf (2012) also attest that key factors for successful vocational education relies on high quality educators, by ensuring that they have adequate knowledge and orientation of the workplace and its demands.

This was supported by one of the educators who said that the Department of Basic Education must give the Curriculum Implementers (CIs) the opportunity to conduct career guidance at the various schools and by giving learners good information about the subject at primary school level. One educator said that it should just be a stand-

alone subject at GET phase like all the other subjects or the agriculture subject should be started by learners at primary school and not be partially incorporated in natural sciences.

4.2.6.3 Human resources recommendations for improvement of subject

The human resources had two recommendations.

Table 4.15: Human resources recommendations for improvement of subject

Code	Frequency
Department to capacitate the agriculture subject	2
Need for service training and field attachments for educators	2
Totals	4

Respondents indicated that the Department of Basic Education must capacitate the agriculture subject and the need to offer educators in-service trainings and field attachments for the educators to be more competent when executing their duties regarding the subject.

4.2.6.4 Infrastructure and resources recommendations for improvement of subject

Two respondents indicated that more agriculture laboratories should be built in the schools to provide learners with more practical experiments in agricultural sciences.

Table 4.16: Infrastructure and resources recommendations for improvement of subject

Code	Frequency
Build more agriculture laboratories in the schools to provide learners with more practical experiments	2
Build proper infrastructure	1
Buy the relevant equipment for practical sessions	1
Totals	4

Participants also indicated the need to build proper infrastructure and buy relevant equipment for conducting practical sessions.

4.3 FINDINGS FROM QUANTITATIVE DATA

An online survey was administered to undergraduate agriculture students studying agriculture through open distance learning, mainly to the first-year students. As mentioned earlier, the population of the study consisted of 46 undergraduate agriculture students who had enrolled at a university in South Africa studying through an open distance-learning programme.

Responses collected were 44 out of the 46 emails sent, two (2) of the responses were spoilt making a total of 42 useable responses collected resulting in a response rate of 91.3%. The results of the survey are presented in this section. A 5% level of significance was used to test any hypothesis.

4.3.1 Demographic profile of the respondents

Table 4.17: Characteristics of the students that participated in the sample (F = number of respondents)

VARIABLE	CATEGORY	F	%
Ethnicity	Black	35	83.3%
	White	7	16.7%
	Total	42	100.0%
Gender	Male	28	66.7%
	Female	14	33.3%
	Total	42	100.0%
Age in years	20 - 25 years	10	23.8%
	26 – 30 years	17	40.5%
	31 – 35 years	6	14.3%
	Above 35 years	9	21.4%
	Total	42	100.0%
Community of origin	Small ranch	4	9.5%
	Rural area, not a farm or ranch	26	61.9%

		Small town	5	11.9%
		Small city or suburb	3	7.1%
		Urban city	4	9.5%
Total			42	100%
Classification of level in college		1 st year	20	47.6%
		2 nd year	10	23.8%
		3 rd year	12	28.6%
	Total			42
Classification of study method		Full time	1	2.4%
		Part time	3	7.1%
		Distance learning	38	90.5%
	Total			42
Type of school attended		Public school	37	88.1%
		Private School	5	11.9%
	Total			42

Location of school	Urban	19	45.2%
	Semi-urban	18	42.9%
	Rural	5	11.9%
	Total	42	100.0%
Type of agriculture curriculum offered	Agriculture sciences	25	59.52%
	Agriculture management	13	30.95%
	Agriculture technology	1	2.38%
	Other	3	7.14%
	Total	42	100.0%

The sample consisted mainly of black students, which is 83.3%. This may be attributed by the fact that in the past agriculture programmes were studied mostly by white students and presently more black students are now enrolling for agriculture as a field study.

In terms of gender, the ratio of males to female was in the ratio 2:1, that is 28 (66.7%) were males and 14 (33.3%) were females. These programmes used to be dominated by males with a few women doing sciences and at present females seem to be penetrating the field. This is evident in the statistics of enrolment by gender from the International Education Association of South Africa (IEASA); there are still more males than females enrolled for agriculture as a field of study.

A large proportion of the respondents were aged 26 – 30 years, that is, 40.5% ($n = 17$) whilst 23.8% ($n = 10$) are aged 20 – 25 years. Thus, the majority of the students were younger than 35 years. This can be contributed to the fact that more students in this age group have completed school and are at the point of enrolling at tertiary institutions to study for their different careers.

The respondents were asked to state their communities of origin, classification of level in college, classification of study method, type of school attended, location of the school, and the type of agriculture curriculum studied at school to relate whether these factors could possibly have had an influence on the students choosing agriculture as a field of study.

A large portion of the respondents grew up in a rural areas, not on a farm, that is 61.9% ($n = 26$), whilst only 7.1% ($n = 3$) indicated the city suburbs as their community of origin. One would have thought growing up on a farm would have a major influence on the students choosing agriculture as a field of study.

The sample consisted of mainly first-year students, that is 47.6% ($n = 20$). This is attributed to the fact that the study focused on undergraduate students preferably first-year students, as they would have been fresh from school and in a better position to remember the factors that influenced them to enrol in agriculture as a field of study.

The most popular study methods indicated by students was studying through distance learning, that is 90.5% ($n = 38$). This is because the sample of the study is studying at a distance education university.

A large population of the sample indicated attending public schools, that is 88.1% ($n = 37$). This could be attributed to the fact that a majority of schools in the country are public schools and the high volume of learners found in public schools. A majority of the respondents attended schools in rural areas, that is 45.2% ($n = 19$) and the minority attending in urban schools with 11.9% ($n = 5$).

In terms of the Agriculture curricula, a majority of the respondents indicated studying the following agricultural subjects in high school: Agricultural Sciences 59.53% ($n = 25$), Agricultural Management 30.93% ($n = 13$), and only 2.38% ($n = 1$) studied

Agricultural Technology. There were 2.38% ($n = 3$) that indicated other, which could mean that they did not study any of the three agriculture curricula stated above.

4.3.2 FACTORS THAT INFLUENCED CHOICE OF AGRICULTURAL SCIENCE AS A CAREER CHOICE

Four groups of possible influences were used to identify what could have possibly influenced the respondents to take agriculture as a choice of study at university level. These groups of factors are: 1) Family and friends 2) Exposure to Agriculture 3) Professionals influence, and 4) Job considerations. Frequencies, proportions, means, and standard deviations were used to determine the level of influence. In this case, very influential and moderately influential were used to determine the level of influence. A scale was also used to measure the level of influence /agreement for each of the factors using the mean on the tables.

Scale to be used:	1.0– 1.4	Very Influential / Strongly Agree
	1.5 – 2.4	Moderately Influential / Agree
	2.5 – 3.4	Undecided / Neutral
	3.5 – 4.4	Slightly Influential / Disagree
	4.5 – 5.0	Non Influential / Strongly Disagree

4.3.2.1 Level of influence from family and friends

The respondents were asked to indicate who influenced them most when it comes to family and friends. The information is shown in Table 4.18.

Table 4.18: Influence by family and friends

Statement	% influential	Mean	Standard deviation
Parents and guardians	71.4%	2.12	1.596
Sister/brother	69.4%	2.64	1.511
Personal role model	63.4%	2.29	1.487
College friend	35.7%	3.60	1.415
High school friend	17.1%	3.95	1.224

The results revealed that parents and guardians, sisters and brothers, and personal role models had majority of the respondents indicating that they were influential as evidenced by means of 2.12, 2.64, and 2.29 respectively. One can conclude that family plays a role in influencing students' choice of agricultural science as a career choice at university level. A study by Osborne (2000) also revealed that the most influential people on agriculture students' careers included agriculture teachers, parents, other teachers, and guidance counsellors. This is also evidenced by the results in Table 4.20, where agriculture professionals showed a strong influence on students' career choice. Close associates like parents, guardians, sisters, and brothers can be accepted as factors that influenced students' choice.

4.3.2.2 Exposure to agriculture

The respondents were asked to indicate which agricultural experience could have influenced them the most, when it comes to exposure to agriculture. This dimension had seven aspects. The information is shown in Table 4.19.

Table 4.19: Exposure to agriculture

Statement	% influential	Mean	Standard deviation
Prior experience in agriculture	81.0%	1.83	1.146
Other agriculture experiences	81.0%	2.00	1.126
Agriculture courses in high school	59.5%	2.60	1.578
Personal visit to the college of agriculture	57.1%	2.69	1.814
Television programmes on agriculture	54.8%	2.71	1.657
Journals and magazines on agriculture	54.8%	2.74	1.499
Relatives in agriculture	42.9%	3.24	1.495

From the results above, it shows that prior experience in agriculture and other agriculture experience have majority of the respondents indicating that they are influential. This is evidenced by means of 1.83 and 2.00 respectively. One can conclude that prior experience in agriculture and other agriculture experiences can be accepted as factors that influenced students' choice of agriculture as a career choice at university level. Dyer *et al.* (2002) also indicated that prior experience in agriculture and enrolment in high school agriculture programmes were the strongest predictors of students' retention in colleges of agriculture.

4.3.2.3 Professional's influence

The respondents were asked to indicate who influenced them most when it comes to professional influence. This dimension had three (3) aspects as stated below. The information is shown in Table 4.20.

Table 4.20: Professional's influence

Statement	% influential	Mean	Standard deviation
Agriculture professionals	85.7%	1.86	0.977
High school agriculture teacher	52.4%	2.67	1.692
High school career guidance and counsellor	21.4%	4.00	1.498

From the results above, it shows a majority of the respondents were strongly influenced by agriculture professionals with a mean of 1.86. One can conclude that agriculture professionals working in the agriculture industry can be accepted as a factor that influenced students' choice of agriculture as a career choice at university level. The results also show that high school career guidance and counsellors had the least influence on students choice, this could be attributed to the fact, from a report by the Department of Agriculture (2009), that career guidance is very limited or totally absent in some schools and communities in South Africa. Olatunji and Oporum (2012) blame lack of information on agriculture on the students' choice of a career path in agriculture. Maree (2013) also agrees that most learners from low socio-economic backgrounds attend poorly resourced schools and have no access to modern, up to date psychological assessment aimed at career counselling. Instead, this is left to the Life Orientation educators.

4.3.2.4 Job considerations

The respondents were asked to indicate what influenced them most when it comes to job considerations. This dimension had six aspects as shown on the table below. The information is shown in Table 4.21.

Table 4.21: Job considerations

Statement	% influential	Mean	Standard deviation
Enjoy working with animals	92.9%	1.52	0.773
Future employment opportunities	83.3%	1.74	1.037
Enjoy working with plants	81.0%	1.98	0.950
Potential income gained after college	73.8%	2.19	1.174
Working outdoors	69.0%	2.12	1.310
Prestige of career	47.6%	2.74	1.449

From the results above, it shows that a majority of respondents indicated being influenced mostly by working with animals, future employment opportunities, working with plants, potential income gained after college, and working outdoors. This is evidenced by the means 1.52, 1.74, 1.98, 2.19, and 2.12 respectively. Job consideration plays an important role in the students' choice of agriculture as a career.

A study by Dlamini (1999) reveals that availability of employment in the profession, the known positive contribution of agriculture to national development, and prospects of a good salary were other factors that made students choose agriculture as a field of study. Rayfield (2013) was of the opinion that working with plants and working with animals was being highly considered when choosing a major in agriculture, which relates to the findings above.

One can therefore conclude and accept that under job considerations, working with plants and animals, future employment opportunities, potential income gained after college and working outdoors were very influential in influencing students' choice of agricultural science as a career choice at university level.

4.3.3 Factors that influenced why one chooses open distance learning

A number of factors that could influence the students to study through distance learning were examined. This dimension had eight aspects. The participating students were asked to indicate the factors that influenced them choosing open distance learning. Table 4.22 shows a list of the factors that were studied to determine the level of agreement that they are influential. In this case, strongly agree and agree were collapsed to determine the level of acknowledgement that they were influential.

Table 4.22: Level of agreement on aspects that influence study through open and distance learning

Statement	% in Agreement	Mean	Standard Deviation
Convenient as there are other personal commitments	97.6%	1.50	0.552
Flexibility of studying at own pace	78.6%	2.12	1.173
Ample time to spend with family and work	66.7%	2.29	1.066
Access to learning anywhere, anytime, no limitations and restriction of time and location of study	61.9%	2.33	1.074
Saves time and costs incurred by travelling and accommodation	57.1%	2.69	1.115
Study fees are cheaper	52.4%	2.79	1.586
Wide variety of courses to choose from	42.9%	2.76	1.100
Failure to gain admission in a full-time institution	28.6%	3.24	1.340

From the results, above it shows that a majority of respondents agreed to convenience, as there are other personal commitments, flexibility of studying at own pace, ample time to spend with family and work, and access to learning anywhere, anytime, no limitations and restrictions, as factors that influenced them to choose open distance learning. This is evidenced by the means 1.50 (97.6%), 2.12 (78.6%), 2.29 (66.7%), and 2.33 (61.9%) respectively. One can therefore conclude the above named factors influenced the respondents' choice of studying through open distance learning, and can therefore be accepted as factors influencing students' choice to study through open distance learning.

4.3.4 Suggestions to improve choice of agricultural sciences as a field of study at university level

A number of suggestions on how to improve the choice of agricultural sciences by students as a field of study at university level were examined. This dimension had six (6) aspects. Table 4.23 has a list of suggestions that were examined to determine the level of agreement to each of the suggestions. In this case, strongly agree and agree were collapsed to determine the level of acknowledgement that the suggestions would help improve students' choice of agriculture at university level.

The respondents were asked to indicate their level of agreement on the suggestions to improve choice of agricultural sciences as a field of study at university level. The information is shown in Table 4.23.

Table 4.23: Level of agreement on suggestions to improve choice of agricultural sciences as a field of study at University level

Statement	% in agreement	Mean	Standard deviation
More Agriculture practical sessions should be done by learners at school to create interest	97.6%	1.33	0.526
Agriculture educators should market the subject to the learners in the schools	95.2%	1.69	0.563
Agriculture scholarships should be made available to all agriculture learners at tertiary level	92.9%	1.48	0.634
Agriculture should be taught at GET phase	71.4%	2.07	0.947
Agriculture as a subject should be made a compulsory subject at senior phase	33.3%	3.17	1.342

The results above indicate that a majority of the respondents agree with the following suggestions, more agriculture practical sessions should be done by agriculture learners to create interest. This is evident in a study by Dlamini (1993) which states that students' career choices in the faculty of agriculture were influenced by practically oriented courses studied in agriculture, which allowed for opportunities of self-employment upon graduation. Other factors were that agriculture educators should market the subject to learners in schools, availability of agriculture scholarships to all agriculture students at tertiary level, and the agriculture subjects being taught at GET phase. This was evidenced by the percentages in agreement of 97.6%, 95.2%, 92.9%, and 71.4% respectively.

Ikehi (2013) also recommended that government should make efforts to establish an agriculture scholarship fund as this would encourage youth into the agriculture sector, boost agricultural production and enhance the economy of the country.

One of the strategies in a report by AET on access barriers (2009) was to improve the image of agriculture as a career and livelihood by developing a high impact education programme promoting the image of agriculture, particularly among the youth and the children. Hence, agriculture educators would be in a better position to promote the image of agriculture. The reports also placed emphasis on the integration of training, focusing on scarce and critical skills in the agriculture sector.

Teaching agricultural science as a subject at GET phase could create interest in the subject from an early age, hence improving the possibilities of many students furthering their studies in an agriculture field of study.

4.3.5 Descriptive statistics and normality tests of variables

Composite variables were calculated per each section and subsections using averages. The sections and subsections were:

- Factors that influence choice of agricultural science as a career choice
 - Family and friends
 - Exposure to agriculture
 - Professional's influence
 - Job considerations
- Factors that influenced one to choose distance learning
- Suggestions to improve the choice of agricultural sciences as a field at university level

The composite variables were used to determine whether differences existed due to socio-demographic factors, namely ethnicity, gender, age, classification of level in college, classification of study method, type of school attended, location of school, and type of agriculture curriculum offered by the school. The descriptive statistics and the test for normality are presented in the following sections. The findings were used to determine the views of students on factors influencing the choice of agriculture as a study discipline.

4.3.5.1 Factors that influence choice of agricultural science as a career choice

This section asked respondents about factors that influence choosing agricultural science as a career choice. There were four subsections, namely family and friends, exposure to agriculture, professional's influence, and job considerations.

Family and friends

There were five (5) aspects measuring the dimension family and friends. Table 4.24 gives the summary statistics of the composite variable.

Table 4.24: Summary statistics of the factors influencing the choice of study: Family and friends

Summary Statistics	Value
Mean	2.9131
Median	2.6000
Mode	2.0000
Standard deviation	1.0094
Skewness	0.741
Kurtosis	-0.343
Maximum	5.00
Minimum	1.20
Range	3.80
Coefficient of variation	34.65%

The composite variable on family and friends had a mean value of 2.9131 with a standard deviation of 1.0094 giving a coefficient of variation of 34.65%. Therefore, the ratio of the standard deviation to the mean as a percentage was 35:1. The maximum and minimum values are 5.00 and 1.20 respectively, giving a range of 3.80. The histogram and box plots are shown in Figure 4.6

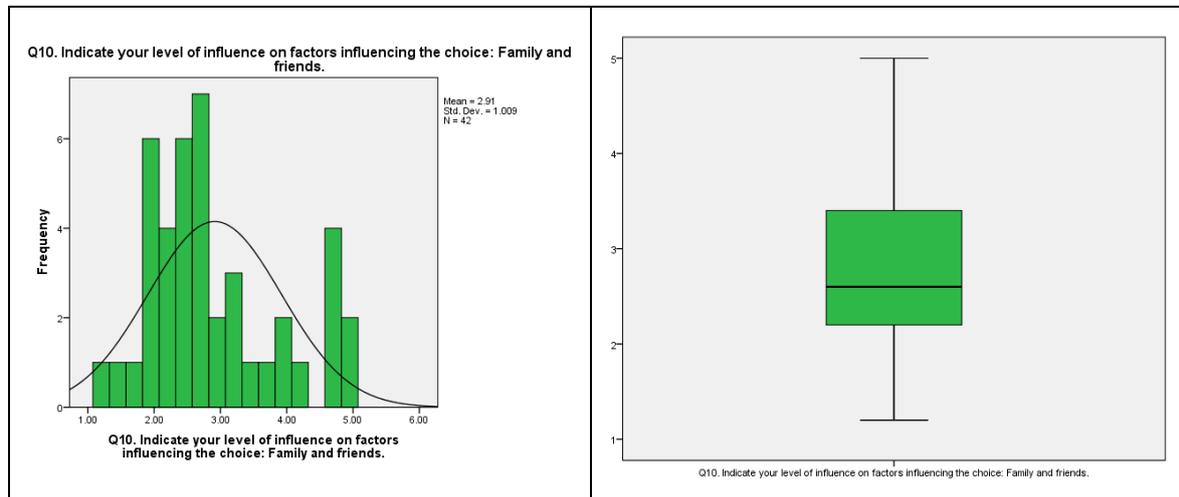


Figure 4.6: Histogram and box plot showing distribution of ratings on the factors influencing the choice of study: Family and Friends

The histogram shows that data is positively skewed. The histogram also has a slightly longer tail to the right. Looking at the box plot and histogram, most values were between 1.0 and 2.5 and one can conclude that the majority of the respondents indicated that this factor was influential. To test normal distribution of data the Shapiro Wilk test was done, the test gave a p -value of 0.004. Since the p -value was less than 0.05, it showed that the data was not normally distributed and was therefore highly significant.

Exposure to agriculture

Exposure to agriculture had seven (7) items measuring the dimension. The composite variable gave the mean, median, and mode of 2.54, 2.5, and 3.14 respectively. The values were close to 3.0, signifying that the respondents were undecided. The information is shown in Table 4.25.

Table 4.25: Summary statistics of the factors influencing the choice of study: Exposure to agriculture

Summary Statistics	Value
Mean	2.5442
Median	2.5000
Mode	3.1400
Standard deviation	0.8479
Skewness	0.094
Kurtosis	-0.949
Maximum	4.14
Minimum	1.14
Range	3.00
Coefficient of variation	33.33%

The standard deviation was 0.8479 giving a coefficient of variation of 33.33%. The data was almost symmetrical, as evidenced by the histogram and boxplot in Figure 4.7.

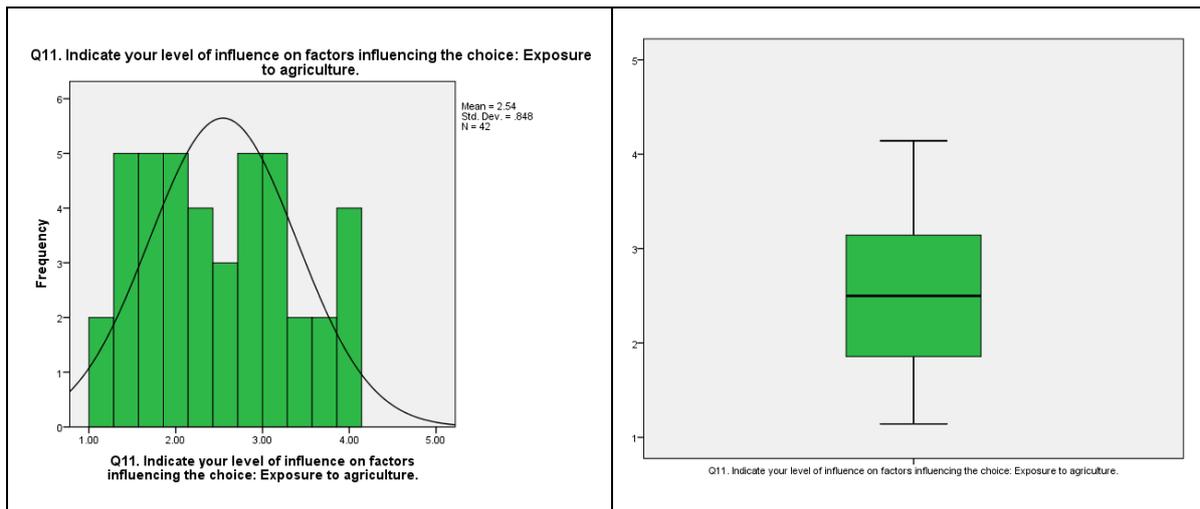


Figure 4.7: Histogram and box plot showing distribution of ratings on factors influencing the choice of study: Exposure to agriculture

The histogram shows that the data is almost symmetrical and the box plot is centrally distributed. Looking at the histogram and box plot, one can conclude that more than 50% respondents had above 2.5. The highest peak was close to 3.14. The Shapiro Wilk test was performed and it gave a p -value of 0.220, confirming that the data was normally distributed since the p -value is more than 0.05, thus the null hypothesis of normality was not rejected.

Professional's influence

In terms of professional influence, there were only three (3) items measuring the dimension. The mean was 2.84 and a standard deviation was 1.033 giving a coefficient of variation of 36.39. The values of the measures of centrality are close to three, indicating that the respondents were undecided overall. The information summary statistics are shown in Table 4.26.

Table 4.26: Summary statistics for factors influencing the choice of study: Professional's influence

Summary Statistics	Value
Mean	2.8413
Median	2.6667
Mode	2.67
Standard deviation	1.0339
Skewness	-0.189
Kurtosis	-0.459
Maximum	5.00
Minimum	1.00
Range	4.00
Coefficient of variation	36.39%

The minimum and maximum values were 1.00 and 5.00 giving a range of 4.0. Figure 4.8 shows the histogram and box plot of the data.

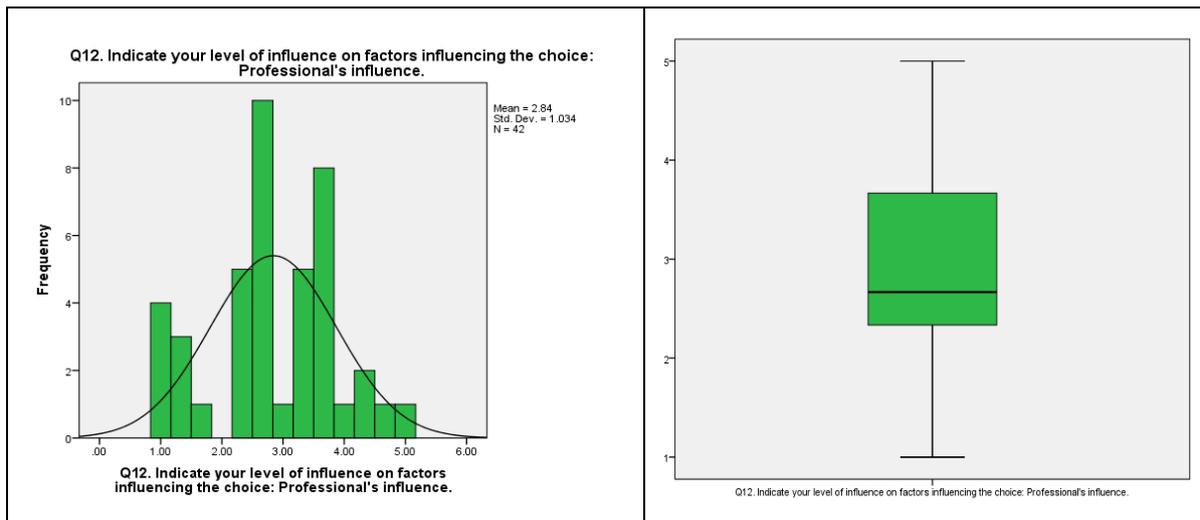


Figure 4.8: Histogram and box plot showing distribution of ratings on professionals influence

The histogram shows that the data is almost symmetrical. However, the boxplot shows that there is some slight positive skewness. The Shapiro Wilk test was performed and it gave a p -value of 0.061 confirming that the data was normally distributed.

Job considerations

The summary statistics for the composite variable on job considerations are given in Table 4.27.

Table 4.27: Summary statistics of the factors influencing the choice of study: Job considerations

Summary Statistics	Value
Mean	2.0476
Median	2.0000
Mode	1.33
Standard deviation	0.5634
Skewness	0.433
Kurtosis	-0.690

Maximum	3.33
Minimum	1.17
Range	2.17
Coefficient of variation	27.52%

The ratings ranged from 3.33 to 1.17 giving a range of 2.17. The mean was 2.0476 with a standard deviation of 0.5634 giving a coefficient variation of 27.52%. Therefore, the ratio of the standard deviation to the mean as a percentage was 28:1. The histogram and box plot of the data is given in Figure 4.9

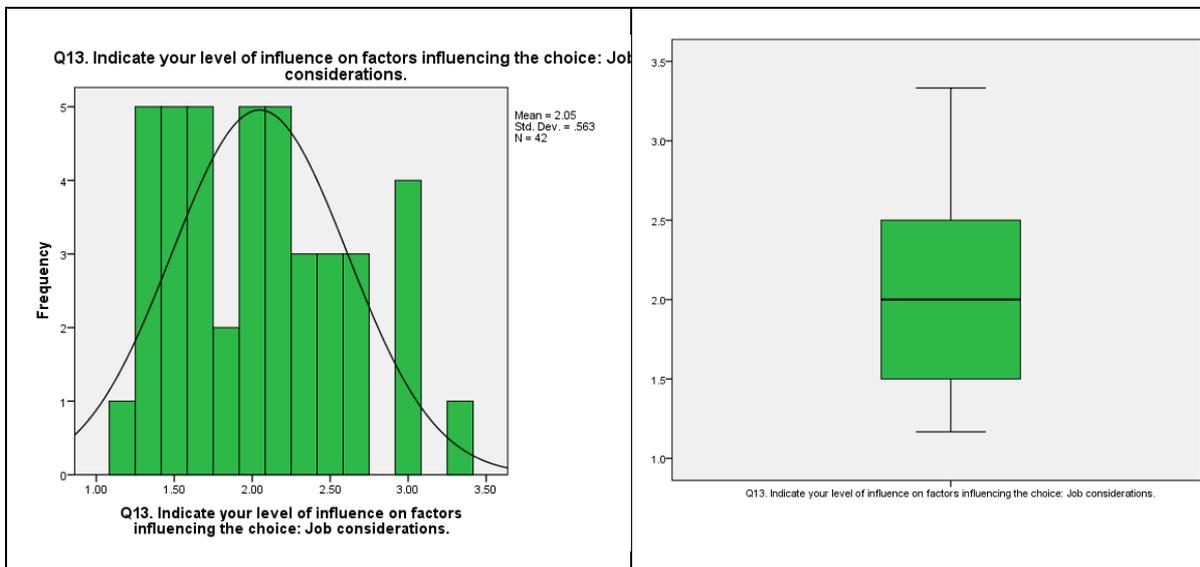


Figure 4.9: Histogram and box plot showing distribution of ratings on factors influencing the choice: Job considerations

The histogram shows that data is almost symmetrical. The box plot has a slightly positive skewness and does not have any outliers. Looking at the histogram and box plot, more than 50% of the respondents gave a rating of not more than 2.04 the highest peak close to 1.33. Therefore, a majority of them were influenced by this factor. The Shapiro Wilk test was performed to test for normality; it gave a p -value of 0.062 indicating that the data was normally distributed since the p -value was more than 0.05.

4.3.5.2 Factors that influence one to choose distance learning

The section was the overall composite variable for the factors that influences one to choose distance learning. There were eight aspects and six of them had levels of agreement above 50%. Table 4.28 gives the summary statistics of the composite variable.

Table 4.28: Summary statistics on why one chooses to study through open distance learning with an open distance University

Summary Statistics	Value
Mean	2.4643
Median	2.3750
Mode	2.38
Standard deviation	0.5660
Skewness	-0.152
Kurtosis	0.870
Maximum	3.88
Minimum	1.00
Range	2.88
Coefficient of variation	22.97%

The minimum and maximum values were 3.88 and 1.00 respectively, giving a range of 2.88. The mean and standard deviation were 2.4643 and 0.5662 respectively; giving a coefficient of variation was 22.97%. Therefore, the ratio of the standard deviation to the mean as a percentage was 23:1

The histogram and box plot of the data is given in Figure 4.10

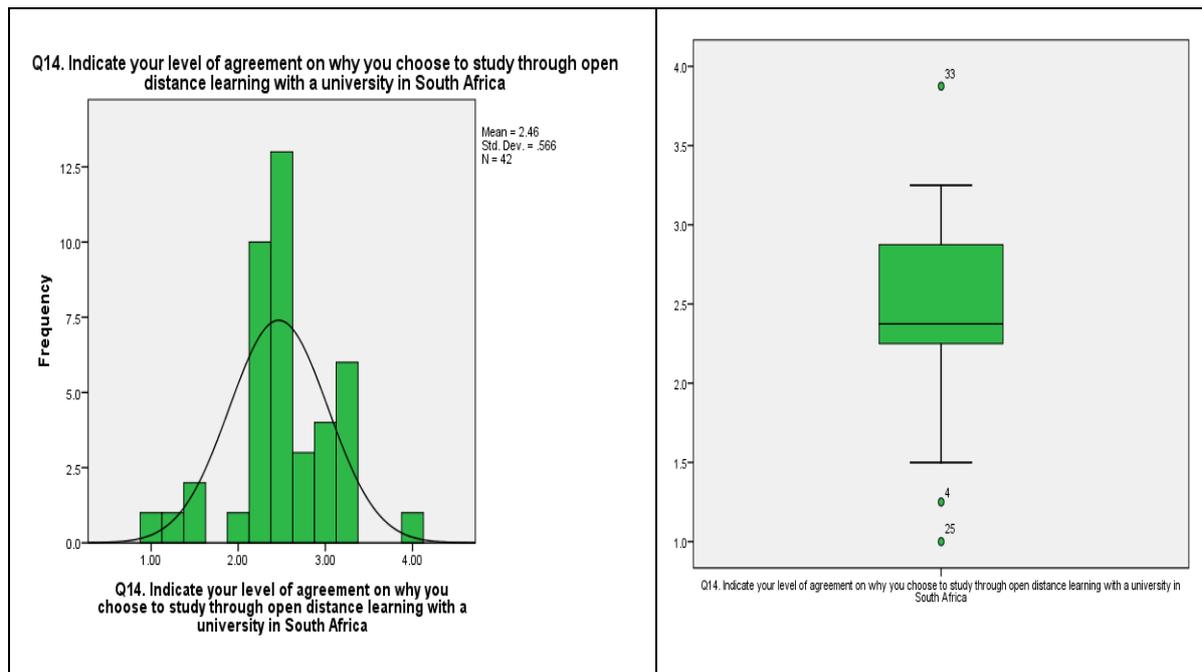


Figure 4.10: Histogram and box plot showing distribution of ratings on why one chooses to study through open and distance learning through a university in South Africa

The histogram shows that data is almost symmetrical. However, the box plot has outliers on both sides of the distribution. About 50% of the respondents gave a rating of not more than 2.5. Therefore, the majority of the people were in agreement with the factors that led them to study through distance learning as shown by results on Table 4.22. A test of normality was done. The Shapiro Wilk test gave a p -value of 0.055 indicating that the data was normally distributed since the p -value was more than 0.05.

4.3.5.3 Suggestions to improve the choice of agricultural science as a field of study at university level

The respondents were asked to rate aspects on suggestions to improve the choice of agricultural science as a field of study at university. Only one aspect had an agreement level below 50%. The information is indicated in Table 4.29.

Table 4.29: Summary statistics on suggestions to help improve the uptake of agriculture as field of study

Summary Statistics	Value
Mean	1.9476
Median	2.0000
Mode	1.6000
Standard deviation	0.4759
Skewness	0.076
Kurtosis	-0.261
Maximum	3.00
Minimum	1.00
Range	2.00
Coefficient of variation	24.44%

The range was 2.00 resulting from maximum and minimum values of 3.00 and 1.00 respectively. The mean was 1.9476 with a standard deviation of 0.4758. The average shows that most of the participants were in agreement with the aspects that were given on suggestions to help improve the uptake of agriculture as a field of study as indicated in Table 4.23. The coefficient variation was 24.44% giving the ratio of the standard deviation to the mean as a percentage of 24:1. The histogram and box plot of the data is given in Figure 4.11.

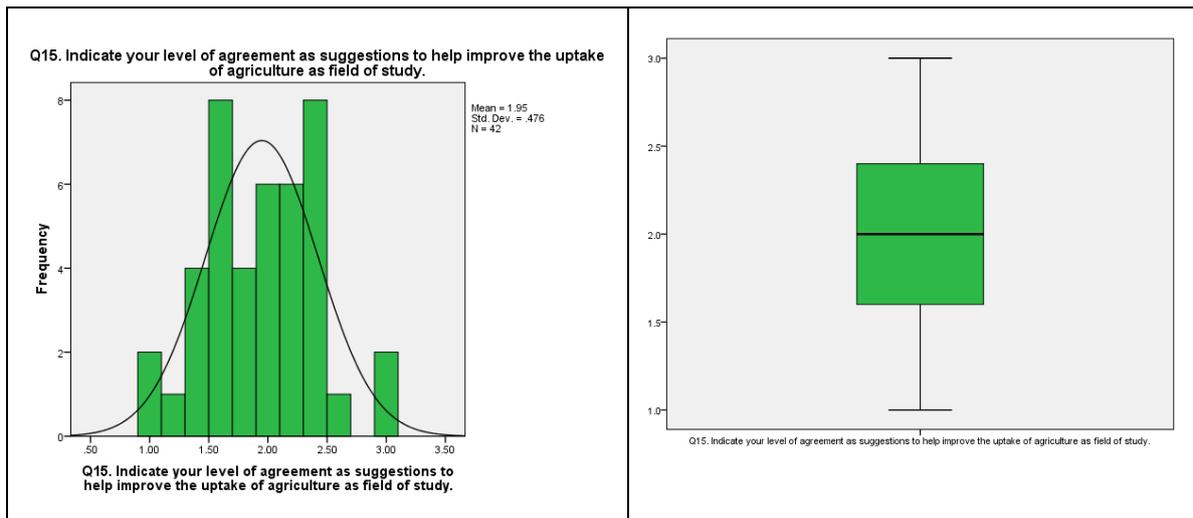


Figure 4.11: Histogram and box plot showing distribution of ratings on suggestions to help improve the uptake of agriculture as field of study

The histogram shows that data was almost symmetrical and this is evidenced by the box plot, which does not have any outliers. A test of normality was done. The Shapiro Wilk test gave a p -value of 0.214 indicating that the data was normally distributed since the p -value is more than 0.05.

4.3.6 Independent t -tests showing difference of means for two groups

All the composite variables showed that the data was normally distributed except for the factor of family and friends. In this case, the central limit theorem was applied to the data. According to Keller and Gaciu (2015), the central limit theorem states “the sampling distribution of the mean of a random sample drawn from any population is approximately normal for a sufficiently large sample size. The larger the sample size, the more closely the sampling distribution of \bar{X} will resemble a normal distribution”. Since the sample size was 42, which is more than 30, parametric tests were used. The t -tests were used to compare differences between two independent groups. The aim was to determine whether there was a difference in ratings by ethnicity, gender, classification of study method, type of school attended, and type of college attended. The t -tests have two assumptions; with independent observations, and the data follows a normal distribution. In this case, both assumptions were satisfied.

The null hypothesis to be tested is:

H₀: The means are equal ($\mu_1 = \mu_2$)

H₁: The means differ ($\mu_1 \neq \mu_2$)

The 5% level of significance was used. The null hypothesis, which states that the means are the same, was rejected if the *p*-value was less than 0.05. Otherwise, it was not rejected. Only those significant tests will be presented in detail.

4.3.6.1 Independent *t*-test to determine difference by ethnicity

Only two ethnicity groups responded to the survey, namely blacks and whites. All aspects had *p*-values more than 0.05, except the aspects ‘professional’s influence’ and ‘suggestions to help improve the uptake of agriculture as a field of study’ as shown in Table 4.30.

Table 4.30: Independent *t*-tests of the difference of mean ratings by ethnicity

Factor	Group	Mean	<i>t</i> -value	<i>p</i> -value	Decision
Professional's influence	Black	2.619	−3.521	0.001**	Null hypothesis is rejected
	White	3.952			
Suggestions to help improve the uptake of agriculture as field of study	Black	1.834	−4.047	0.000**	Null hypothesis is rejected
	White	2.514			
* <i>p</i> <0.05 and ** <i>p</i> <0.01					

In terms of the aspect ‘professional’s influence, the average for blacks was 2.619 whilst for the whites were 3.952. Therefore, the black students indicated that it was more influential than it was for the white students. The confidence interval error bars are given in Figure 4.12.

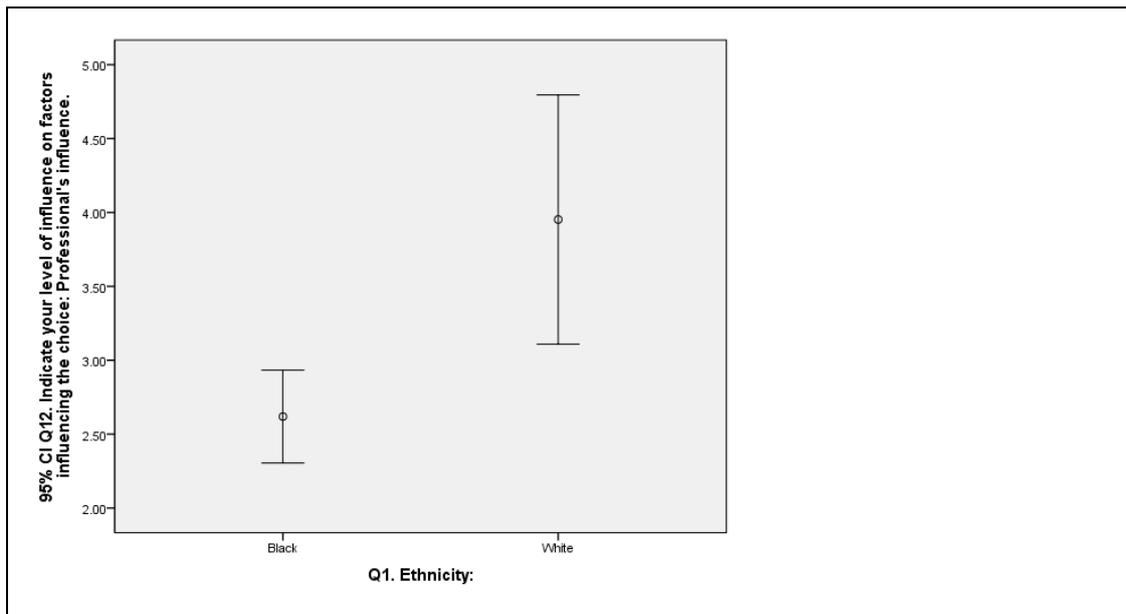
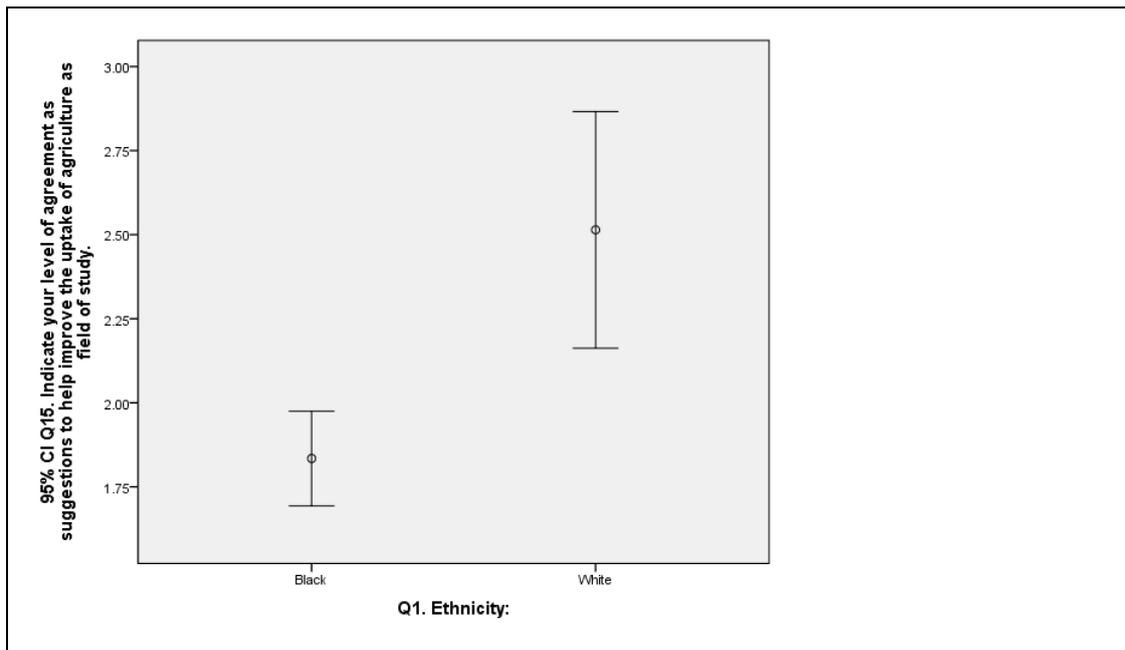


Figure 4.12: Confidence interval error bar of ratings on Professional's influence by ethnicity

The ***t*-value = -3.521** with a ***p*-value = 0.001**. Since the *p*-value was less than 0.05, the null hypothesis of equal means was rejected and this is evidenced by the confidence interval of the error bars not overlapping, which was highly significant. The white students did not find it influential that professional influence impacts on the choice of agricultural as a career.

The null hypothesis of equal means was rejected in the aspect 'suggestions to help improve the uptake of agriculture as a field of study'. The average for blacks was 1.834 whilst whites were 2.514. Therefore, the blacks were more in agreement than the whites who were neutral on the issue. The confidence interval error bars are shown in Figure 4.13.



4.13: Confidence interval error bar of ratings on suggestions to help improve the uptake of agriculture as field of study by ethnicity

The t -value = -4.047 with a p -value = 0.000 . Since the p -value was less than 0.05, the null hypothesis of equal means was rejected and this is evidenced by the confidence interval of the error bars not overlapping. More blacks agreed to the suggestions than whites did. The suggestion could be that more black students participated in the study than white students.

4.3.6.2 Independent t -test to determine difference by gender

In terms of gender, all aspects had p -values greater than 0.05. Therefore, there were no differences by gender regarding all aspects on factors influencing choice of agriculture as a career.

4.3.6.3 Independent t -test to determine difference by classification of study method

Classification of study by method did not affect the factors influencing choice of agriculture as a career. All p -values were greater than 0.05, thus the null hypothesis of equal means was not rejected. The opinion of distance learners and full time or part time students were the same.

4.3.6.4 Independent t-test to determine difference by type of school attended

The data had two types of schools: public schools and private schools. All aspects had p -values more than 0.05, except the aspect 'family and friends' as shown in Table 4.31.

Table 4.31: Independent t-tests of the difference of mean ratings by type of school attended

Factor	Group	Mean	t-value	p-value	Decision
Family and friends	Public school	3.026	2.041	0.048	Null hypothesis is rejected
	Private school	2.080			
* $p < 0.05$ and ** $p < 0.01$					

The aspect, 'family and friends' had a **t-value = 2.041** with a **p-value = 0.048** leading to the rejection of the null hypothesis. The mean for public school was 3.036 whilst for private was 2.080. Thus, those from private schools tend to agree that family and friends influenced their decision. The confidence interval error bars are given in Figure 4.14.

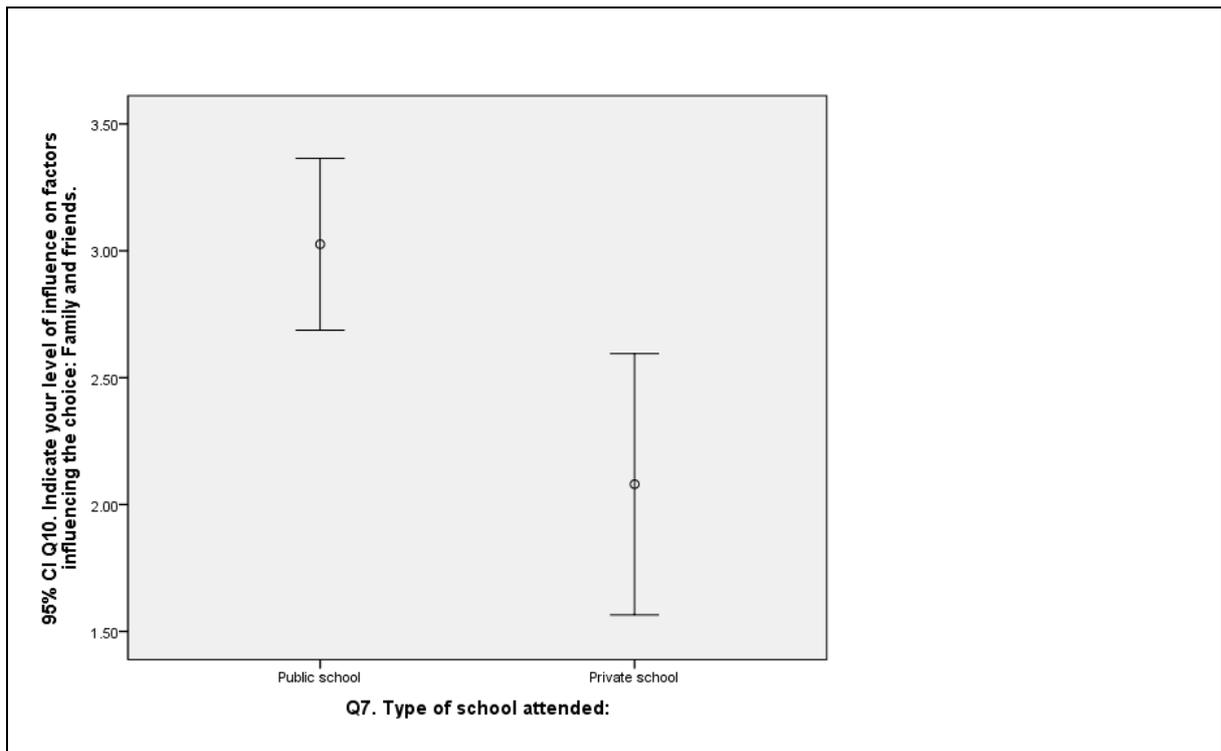


Figure 4.14: Confidence interval error bar of ratings on the factors influencing the choice: Family and friends by type of school attended

The confidence interval of the error bars are not overlapping. Private schools' rankings were significantly lower than public schools, indicating that they acknowledged that family and friends are influential in choice of career as an agriculturist.

4.4.6.5 Independent *t*-test to determine difference by type of agriculture curricula offered

The type of agriculture curricula offered to students at FET level was grouped into two groups: Agricultural Science and Agriculture Management. All aspects had *p*-values more than 0.05, except the aspect 'job considerations as shown in Table 4.32

Table 4.32: Independent t-tests of the difference of mean ratings by classification of study method

Factor	Group	Mean	t-value	p-value	Decision
Job considerations	Agricultural sciences	2.167	2.392	0.022	Null hypothesis is rejected
	Agriculture management	1.744			
* $p < 0.05$ and ** $p < 0.01$					

The null hypothesis of equal means was rejected since the p -value was 0.022. The averages for both groups were below 2.5. Therefore, both groups indicated that it was influential but the emphasis was more on Agriculture Management students. The confidence interval error bars are given in Figure 4.15.

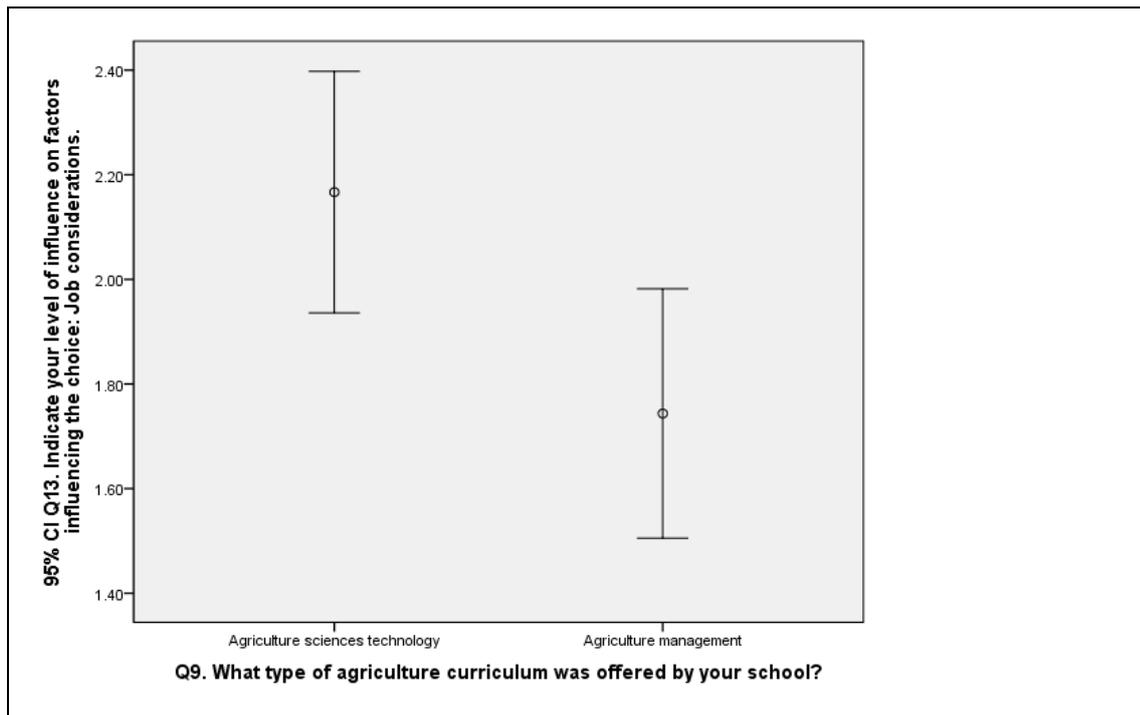


Figure 4.15: Confidence interval error bar of ratings on factors influencing the choice: Job considerations by classification of study method

The bars are overlapping and agriculture management students' rankings were lower than that of agricultural science, indicating there was no significant difference between agriculture management students who considered the aspect more influential than the agriculture science students did in their career choice.

4.3.7 Analysis of variance for significant differences between socio-demographic variables with more than two groups

Analysis of variance (ANOVA) was used to determine whether differences exist where there were more than two categories. Assumptions of ANOVA are that the observations are independent, come from a normal population, and that the groups have equal variances. The assumption of independence and normality were satisfied so that one can apply the analysis of variance.

The ANOVA test was used to determine where the dimensions differed by the respondents age, community of origin, classification of level in college, and classification of the location of the school. Where differences exist, post hoc analysis using Turkey B was done to determine whether differences really existed, where the assumption of homogeneity of variance was tested, and where the assumption was met. Where sample sizes were greater than five, the Games-Howell test was done for

unequal variances and unequal sample sizes. Error bars were drawn to determine where the differences lie.

What was left was to determine the homogeneity of the variances, that is, whether the groups have equal variances. The assumption of homogeneity of variance was tested and where the assumption was met, the Turkey B test was used for the post hoc analysis and where it was violated, the post hoc analysis was done using the Games-Howell test to determine whether differences really existed. The Games-Howell test (GH test) is designed for unequal variances and unequal sample sizes (De Muth, 2014). According to De Muth (2014), the Games-Howell test is a pair-wise procedure based on the q -distribution and is an extension of the Turkey-Kramer test, and is recommended when sample sizes are greater than five. This test will be used to test for the differences in means when the assumption of homogeneity of variance is violated.

The null hypothesis to be tested was:

H_0 : The means are equal

H_1 : At least one of the pairs of means were different

The test was done at 5% level of significance. The rejection of the null hypothesis resulted in at least one pair of means being different and post hoc analysis was done to determine where the differences lie.

4.3.7.1 ANOVA test to determine differences in means by age

The age of respondents were grouped into three groups namely, 20 – 25 years, 26 – 30 years, and above 30 years. All p -values were greater than 0.05, thus the null hypothesis of equal means was not rejected. Therefore, age did not affect factors influencing agriculture as a career.

4.3.7.2 ANOVA test to determine differences in means by community of origin

The community of origin was divided into three groups: small ranch, rural area, not a farm or ranch, and town/city. All aspects had p -values more than 0.05, except the

aspects 'professional's influence' and 'suggestions to help improve the uptake of agriculture as a field of study' as shown in Table 4.33.

Table 4.33: ANOVA tests to determine difference in mean of the factors by community of origin

Factor	Group	Mean	F-square Value	p-value	Decision
Professional's influence	Small ranch	3.833	3.586	0.037*	Null hypothesis is rejected
	Rural area, not a farm or ranch	2.564			
	Town/city	3.111			
Suggestions to help improve the uptake of agriculture as field of study	Small ranch	2.500	5.381	0.009**	Null hypothesis is rejected
	Rural area, not a farm or ranch	1.800			
	Town/city	2.083			
* $p < 0.05$ and ** $p < 0.01$					

The aspect 'professional's influence' had the test of homogeneity giving a p -value of 0.923. Thus, the test of homogeneity was satisfied since the p -value was greater than 0.05. The test of equal means gave an **F-value = 3.586** with a p -value = 0.037, which was less than 0.05. Therefore, the null hypothesis of equal means was rejected. The post hoc analysis resulted in two groups as shown below.

Table 4.34: Post hoc analysis on factors influencing the choice: Professional's influence by community of origin

Tukey HSD^{a,b}			
Q4.Community of origin:	N	Subset for alpha = 0.05	
		1	2
Rural area, not a farm or ranch	26	2.5641	
Town/city	12	3.1111	3.1111
Small ranch	4		3.8333
Sig.		.503	.307

The lowest mean was 2.5641 from rural area, not a farm or ranch, and the highest mean was 3.833 from the small ranch. The town/city was in both groups. The major difference was between the rural area and the small ranch as shown in Figure 4.16.

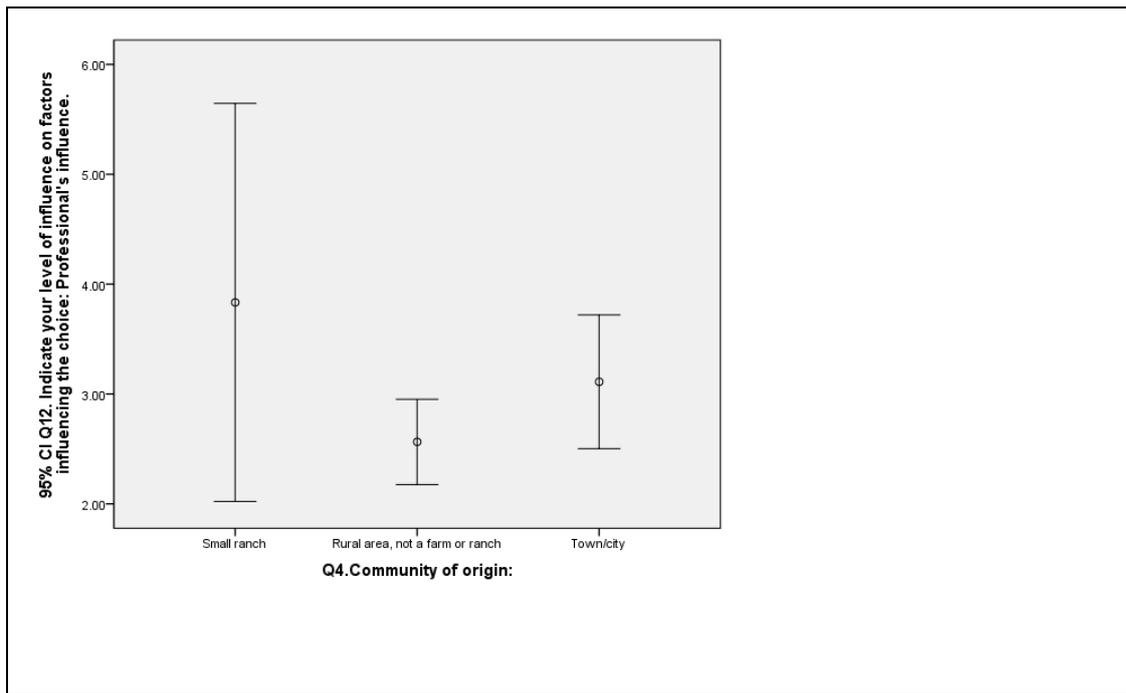


Figure 4.16: Confidence interval error bar of ratings on factors influencing the choice: Professional's influence by community of origin

Those in rural areas had the smallest mean than the rest of the groups. Those in rural areas were not sure, whilst those in small ranches indicated that the aspect 'professional's influence' was not influential.

In terms of the aspect 'suggestions to help improve the uptake of agriculture as a field of study', the test of homogeneity gave a p -value 0.537. The test of homogeneity of equal variances was not rejected. In terms of equality of means, the **F-value = 5.381** with a **p-value = 0.009**. The test was highly significant. The null hypothesis of equal means was rejected. The post hoc analysis resulted in two groups as shown below.

Table 4.35: Post hoc analysis on suggestions to help improve the uptake of agriculture as field of study by community of origin

Tukey HSD^{a,b}			
		Subset for alpha = 0.05	
Q4.Community of origin: N		1	2
Rural area, not a farm or ranch	26	1.8000	
Town/city	12	2.0833	2.0833
Small ranch	4		2.5000
Sig.		.394	.142

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 8.069.

Those from rural areas agreed more than those from small ranches did on the suggestions to help improve the uptake of agriculture as shown by results on Table 4.35. Refer to Table 4.23 for the suggestions to help improve choice of agricultural science as a field of study. This is also evidenced by the confidence interval of the error bars in Figure 4.17.

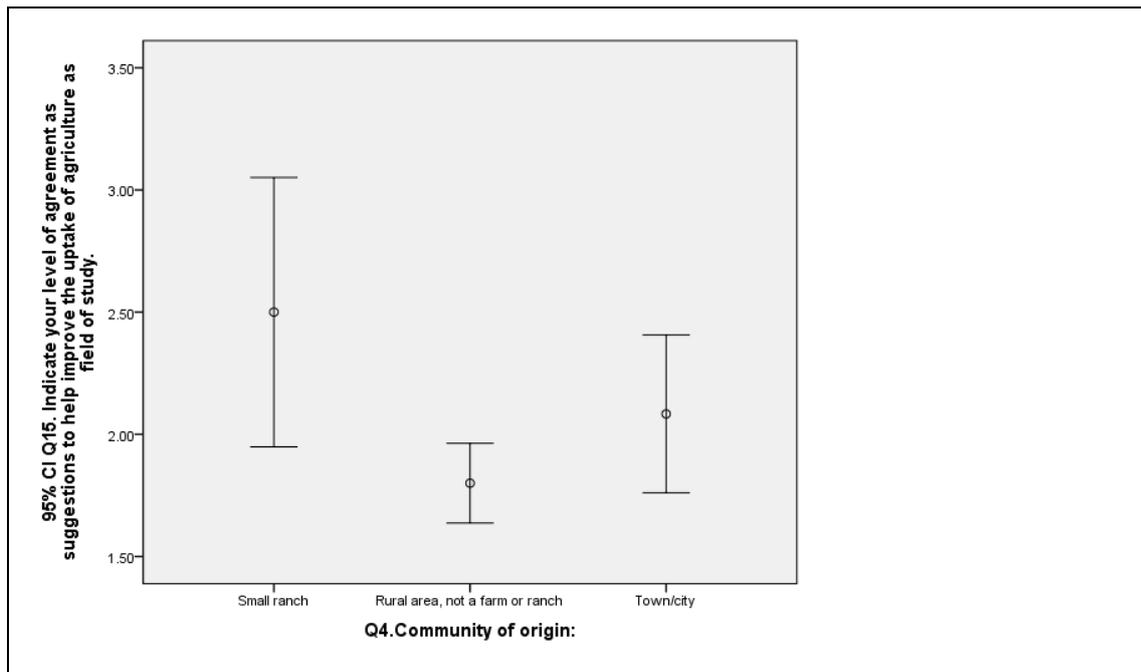


Figure 4.17: Confidence interval error bar of ratings on suggestions to help improve the uptake of agriculture as a field of study by community of origin

The participants from the rural area agreed more than those from small ranches did.

4.3.7.3 ANOVA test to determine differences in means by classification of level in college

The classification of level in college was divided into first-year, second-year, and third-year. The homogeneity tests of equal variances gave p -values greater than 0.05, signifying equal variances among the three groups in all aspects except for the factor 'family and friends'. In this case, the Games-Howell post hoc analysis test will be used. In terms of equality of means, all aspects had p -values more than 0.05, except the aspects 'family and friends influence' and 'job considerations', as shown in Table 4.36.

Table 4.36: ANOVA tests to determine difference in mean of the factors by classification of level in college

Factor	Group	Mean	F-square Value	p-value	Decision
Family and friends	1st year	2.815	4.244	0.022*	Null hypothesis is rejected
	2nd year	2.380			
	3rd year	3.521			
Job considerations	1st year	1.983	3.682	0.034	Null hypothesis is rejected
	2nd year	1.783			
	3rd year	2.375			
* $p < 0.05$ and ** $p < 0.01$					

For the aspect 'family and friends', the p -value was 0.022, which was less than 0.05. Therefore, the null hypothesis of equal means was rejected. The confidence interval error bar is given in Figure 4.18.

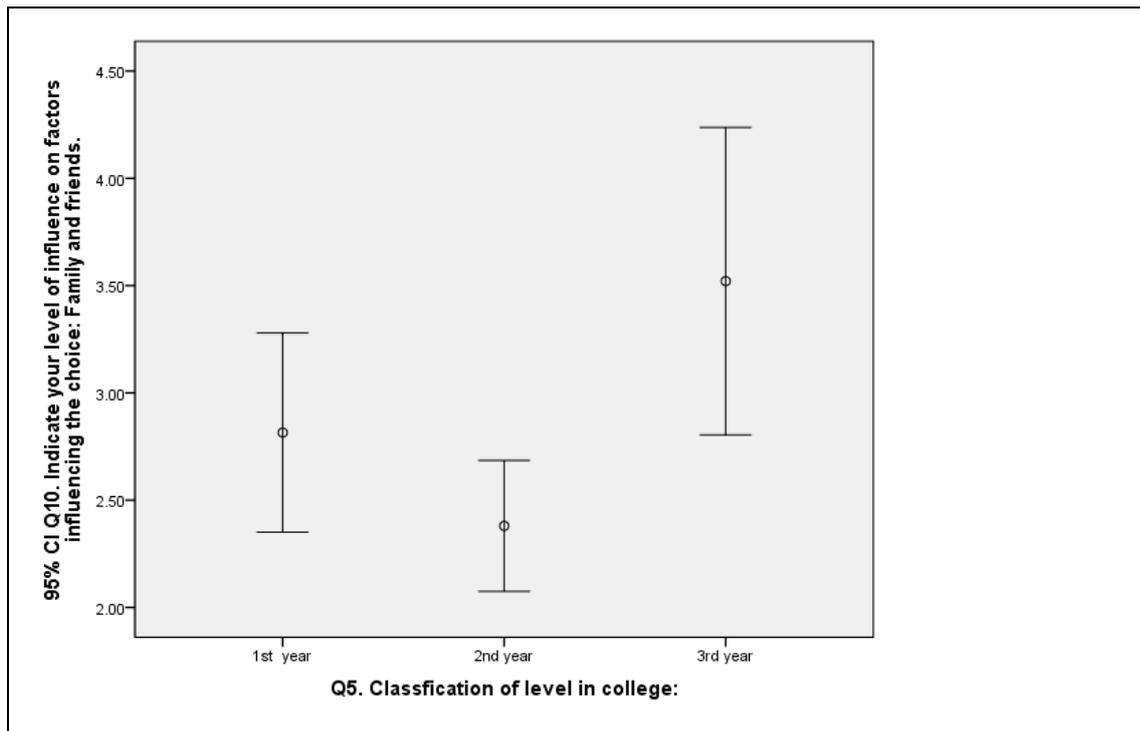


Figure 4.18: Confidence interval error bar of ratings on factors influencing the choice: family and friends by classification of level in college

There is no overlap, between those in 2nd year and those in 3rd year level. Therefore, there is a significant difference. The Games-Howell test gave a p -value of 0.015 leading to the rejection of equal means between 2nd year and 3rd year students. Those in their 1st year overlapped with both groups and thus were not significantly different from 2nd years and 3rd years. The Games-Howell gave p -values of 0.232 and 0.197 respectively. The 2nd year level respondents found family and friends as influential in career choice, whilst 3rd year students indicated that they were not influential as evidenced by a mean of 3.521, which is close to 4.0.

In terms of the aspect 'job considerations', the F -value = 3.682 with a p -value of 0.034, leading to the rejection of the null hypothesis of equal means. The post hoc analysis gave the following groups.

Table 4.37: Post hoc analysis on factors influencing the choice: Job considerations by classification of level in college

Tukey HSD ^{a,b}			
Q5. Classification of level in college:	N	Subset for alpha = 0.05	
		1	2
2nd year	10	1.7833	
1st year	20	1.9833	1.9833
3rd year	12		2.3750
Sig.		.608	.160

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 12.857.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Those in 2nd year were significantly different from those in 3rd year. This is evidenced by the error bars in Figure 4.19, indicating not much overlap between the groups.

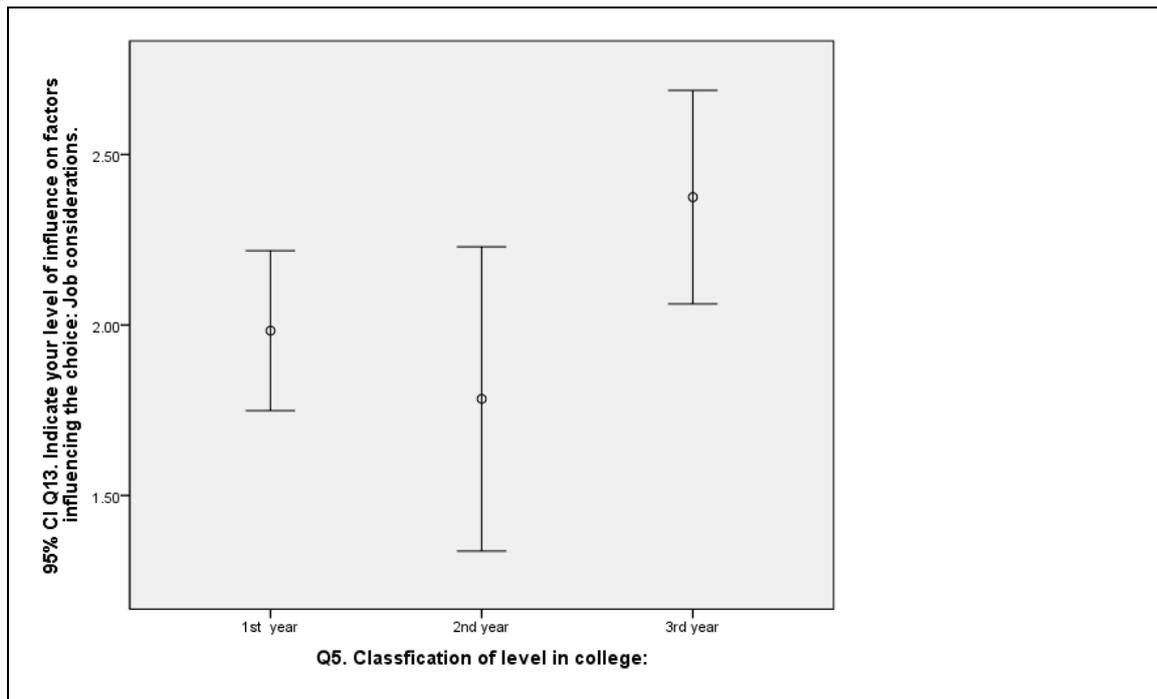


Figure 4.19: Confidence interval error bar of ratings on factors influencing the choice: Job considerations by classification of level in college

Looking at the means, all groups indicated that it was influential but the degree of influence was more emphasised with second-year respondents.

4.3.7.4 ANOVA test to determine differences in means by location of school

The location of schools was divided into three groups. The groups are urban, semi-urban, and rural. The homogeneity tests of equal variances gave p -values greater than 0.05, signifying equal variances among the three groups for each aspect. Therefore, the assumptions of applying an ANOVA test were met. All p -values were greater than 0.05 for all aspects except the aspect 'suggestions to help improve the uptake of agriculture as a field of study' as shown in Table 4.38.

Table 4.38: ANOVA tests to determine difference in mean of the factors by location of school

Factor	Group	Mean	F-square Value	p-value	Decision
Suggestions to help improve the uptake of agriculture as field of study	Urban	1.705	7.517	0.002**	Null hypothesis is rejected
	Semi urban	2.067			
	Rural	2.440			
* $p < 0.05$ and ** $p < 0.01$					

For the aspect ‘suggestions to help improve the uptake of agriculture as a field of study’, the p -value was 0.002, which is less than 0.05. It was highly significant. Therefore, the null hypothesis of equal means was rejected. The confidence interval error bar is given in Figure 4.20.

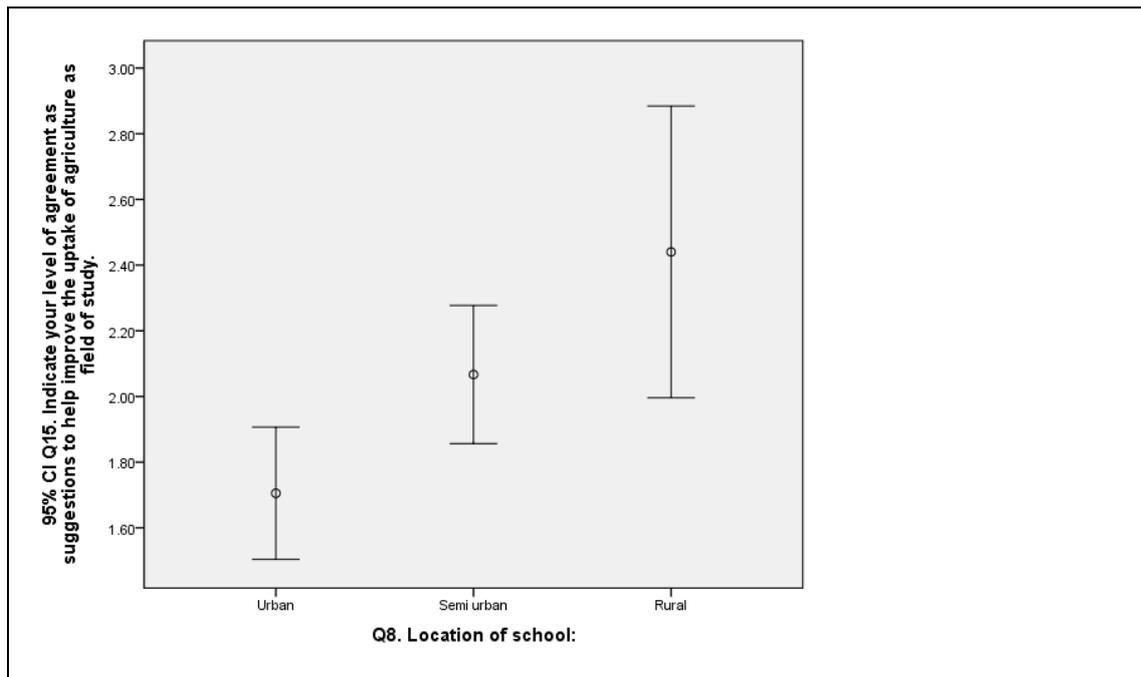


Figure 4.20: Confidence interval error bar of ratings on suggestions to help improve the uptake of agriculture as field of study by location of school

There is no overlap between those in urban schools and rural areas. Therefore, there is a significant difference. Those in schools in urban areas agreed more than those in rural areas did. This is also evidenced by the post hoc analysis in Table 4.39.

Table 4.39: Post hoc analysis on suggestions to help improve the uptake of agriculture as field of study by location of school

Tukey HSD^{a,b}			
Q8. Location of school:	N	Subset for alpha = 0.05	
		1	2
Urban	19	1.7053	
Semi urban	18	2.0667	2.0667
Rural	5		2.4400
Sig.		.146	.129

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 9.734.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

All the groups had means lower than 2.5 and thus agreed. However, those in urban had the lowest mean of 1.7053 indicating that there were more in agreement than any other group to the suggestions to help improve the uptake of agriculture as a field of study.

4.4 SUMMARY

This chapter discussed the findings of the study. Data from the mixed methods approach from the respondents was analysed. The qualitative data was used to obtain themes and sub-themes, and the patterns and trends in the data were observed. The quantitative data analysis was done using SPSS. Composite variables were obtained for the instrument. The study revealed that two major composite variables namely family and friends, and job considerations were highly significant in students' choice of agriculture at tertiary level. The study also revealed challenges faced by agricultural science educators amongst which were learners' negative attitude towards the subject, lack of or inadequate infrastructure, and lack of proper guidance and counselling regarding choosing subjects as factors that could hinder effective teaching and learning of agriculture in South African schools.

The next chapter presents the conclusions and recommendations.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This final chapter presents the summary regarding the literature and findings, conclusion, and recommendations of strategies to help improve the uptake of agriculture as a field of study, and recommendations for further studies.

The factors that have been identified as influencing the choice of agriculture as a field of study by students were obtained by means of an online questionnaire. The impact of agriculture curricula studied by students at school level was obtained by means of semi-structured questionnaires administered on agriculture educators in Middelburg 2 circuit.

The aim of the research was to identify the factors that influenced the choice of agriculture as a study discipline by undergraduates of a distance university's agriculture department in South Africa.

5.2 SUMMARY

5.2.1 Summary of Literature Review

The literature review revealed low enrolments in the field of agriculture at university level in Southern Africa and globally, thus producing less graduates in the field of agriculture. A number of factors were found to influence the choice of a field of study including family and friends, professionals and role models, prior exposure or experience to agriculture, job considerations, and college of agriculture recruitment activities. However, the literature review limited the factors affecting tertiary agriculture enrolment to career guidance and counselling, parents or guardians, agriculture teachers, and learners' attitude towards agriculture. The literature also revealed that learners from low socio-economic backgrounds attended poorly resourced schools, with no access to modern, up to date psychological assessment aimed at career guidance and counselling towards a career in the field of agriculture, hence learners do not receive proper guidance on subject choice when intending to further their studies in the field of agriculture. Students were allowed to do Mathematical Literacy

and Agricultural Science, whereas the entrance requirement to an agriculture field of study requires the student to have done Mathematics at Matric level.

5.2.2 Summary of findings

This section consists of a brief synopsis of each question as explored by the research project. The research study used mixed methodology, both quantitative and qualitative methods. It had structured online questionnaires administered to 46 undergraduate agriculture students who had enrolled at a university in South Africa studying through an open distance-learning programme. Semi-structured questionnaire were administered on 10 agriculture educators from Middelburg 2 circuit.

5.2.2.1 Major findings pertaining factors influencing students choice of agriculture

The factors that influenced students' choice of agriculture as a study discipline at university level included family and friends, and job considerations upon completion of tertiary education. These findings are supported by those of earlier research projects such as Hadebe (2010) and Esters (2005), as quoted in section 2.4. The respondents indicated having been influenced by a high school friend, college friend or siblings (sister/ brother). Findings from a study by Sikhwari (2015) also concur with these findings. One can therefore deduce that parents, guardians and role models do play an important role in influencing students' choice of agriculture as a study discipline at university level.

Findings from the study reveal that the students were influenced by future employment opportunities, entrepreneurial potential gained after college, and working outdoors in choosing agriculture as a career choice at tertiary level. These results are supported by findings from studies by Rayfield (2013) and Dlamini (1999) as quoted in section 2.4.

The results revealed factors that influenced learners to study through distance learning included convenience, as there are other personal commitments, flexibility of studying at own pace, ample time to spend with family and work, and access to learning anywhere, anytime, and no limitations and restrictions of time and location of study.

5.2.2.2 Major findings pertaining events/experiences that most influenced students' choice of a career in Agriculture?

Results from the study indicated that students' choice of agriculture were influenced by prior experience in agriculture and other agriculture experiences like working with plants, working with animals and working outdoors. This view was supported by findings from a study by Dyer *et al.* (2002) as quoted in section 2.3. About 92% of students indicated enjoying working with animals and 81% of respondents indicated enjoying working with plants. Students were mostly influenced by working with plants and animals, which could be that they got experience of working with plants and animals from home or a farm.

5.2.2.3 Findings regarding the relevance of the Agriculture curricula that students learn at school, How well does it prepare them for tertiary education, and if it motivates them to take up a career in agriculture

The impact of the agricultural science curricula taught in the schools in preparation for tertiary education, only gives learners basic terminology and concepts involved in agriculture. The curricula taught at school do not motivate learners enough to consider enrolling for an agriculture programme of study upon completion of grade 12. Findings from the study revealed low enrolments of agriculture as a subject at FET level. Agriculture subject is done as an optional subject in the schools and most schools do agricultural sciences curricula due to lack of infrastructure to do the other agriculture curriculum. The schools offering agriculture also perform very limited practical sessions than what is required by the curricula due to the lack of equipment and science laboratories to carry out practical sessions

Challenges faced by Agricultural Science educators includes learners' negative attitude towards the subject. The students are not interested in the subject, and do not want to do practical sessions like planting. Findings from a study by Kidane (2014) and Garwe (2015) provide support for this view. School administrators and the Department of Education offer very little support for the subject. This was attributed to the fact that they may not have expertise of the subject hence, it would be best to incorporate the Department of Agriculture regarding teaching of the subjects in the

schools. Negative perceptions towards the agricultural professions in society needs to be overcome by improving the benefits of agriculture such that it is seen as a fulfilling career path hence removing the negative perception among students.

Lack of proper guidance and counselling regarding choosing of subjects at higher levels was not properly conducted, to inform the learners about the various fields of study at university. These findings were supported by a report by the Department of Agriculture (2009) as quoted in section 2.3. Learners are not conscientious about the various fields of study and the entrance requirements for admission to an agriculture programme of study. The findings of Olatunji and Oporum (2012) and Sikhwari (2015) also provide support on this view. In most agriculture programmes of study, the agriculture subject is not a prerequisite for admission; instead, they want mathematics and physical sciences. Upon completion of grade 12, students apply for admission at universities, only to find that the entrance requirements for admission to an agriculture programme of study are too high for students to register. The low enrolments at tertiary level were attributed to lack of career guidance and counselling at FET level.

5.2.2.4 Major findings regarding ways of encouraging more students to take up agriculture as a field of study after completing school in South Africa

Suggestions from the findings by educators and students on how to improve agriculture enrolments includes provision of bursaries to students studying agriculture at university level and those wishing to enrol for an agriculture programme of study at tertiary level. This was also a recommendation made in the study by Ikehi (2013) as quoted in section 2.5. The Department of Basic Education should capacitate the agriculture subject and the schools offering the subject by building proper infrastructure, science laboratories, and buying relevant equipment for practical sessions at school level. They should provide adequate training for agriculture educators and capacitate schools with science laboratories and adequate equipment to carry out practical sessions. The Department of Basic Education and Training should endeavour to strengthen Mathematics and Science education programmes at primary and secondary school level, as these are the subjects that make students eligible to pursue an agriculture related programme at tertiary level and upon school

matriculation. Agriculture subject being taught at the GET phase. This view was supported by a recommendation made in a report by the Department of Agriculture (2009) as cited in the literature review. This will help learners be conscientious about the agriculture subject from an early age.

5.3 CONCLUSION

It can be concluded that choosing agriculture as a study discipline at university level is influenced mainly by family, friends and job considerations upon completion of tertiary education. Events and experiences that influenced the students' choice included working outdoors, and enjoying working with plants and animals. Moreover, studying through open distance learning was influenced by the convenience and flexibility of studying at own pace and time, learners have ample time to spend with families and work.

It can also be concluded that the impact of agriculture agricultural science curricula taught in schools in preparation for tertiary education, only gives learners basic terminology and concepts involved in agriculture. Very limited agriculture practical sessions are done in the school due to lack of infrastructure and resources hence it does not motivate learners enough to consider enrolling for an agriculture programme of study upon completion of grade 12.

Suggestions to help improve the uptake of agriculture as a field of study include provision of bursaries to students studying agriculture at university level and those wishing to enrol for an agriculture programme of study at tertiary level. The Department of Basic Education should capacitate the agriculture subject and the schools offering the subject by building proper infrastructure, science laboratories, and buying relevant equipment for practical sessions at school level. Agriculture subject should be taught at the GET phase and curriculum implementers be given the opportunity to conduct career guidance at various schools by giving learners good information on the subject at an early age.

5.4 RECOMMENDATIONS

In order to encourage more students to enrol for an agriculture programme of study at tertiary level, the following recommendations based on the findings of the study were made.

5.4.1 Recommendations regarding the Department of Basic Education

- i) Agriculture as a science subject be taught at GET level to create interest among the learners from an early age. From the literature, Agriculture is not taught as a subject at GET level but incorporated into the Natural Sciences subject.
- ii) The Department should capacitate the agriculture subject, build proper infrastructure, science labs, animal houses etc. and buy the relevant equipment for students to be able to carry out practical sessions, hence creating interest in the learners. The findings from educators clearly revealed that there are no science labs and animal houses to carry out the relevant agriculture practical sessions that learners are required to perform.
- iii) The Department should have specially trained career guidance and counsellors in each of the schools who would help assist learners with the choice of subjects for their different career paths, from as early as grade 10. This is evident in the results and the literature that career guidance in the form of career expos is only administered to students at grade 12 and career guidance is only left to Life Orientation educators to perform.
- iv) The Department of Education and the Department of Agriculture should work together in ensuring that the subject is carried out effectively in the schools to ensure that the schools feed competent people into the agriculture universities and subsequently, the agriculture industry.
- v) Bursaries for students studying agriculture should be made available for their tertiary education, since agricultural science educators are also among the scarce skills in the country.

5.4.2 Recommendations regarding the Department of Agriculture

The Department of Agriculture, in conjunction with the Department of Education, should encourage the youth and learners to partake in agricultural projects like Masibuyele Emasimini programme (Department of Agriculture Rural development, 2015), vegetable production, and livestock production in their schools and communities, and planting vegetable patches at their homes. Partaking in these projects will help the youth to embrace and appreciate the subject as part of their daily lives, hence painting a positive image of the subject. The youth will also gain agricultural skills and will use the skills gained as a means of livelihood by generating income from their agricultural projects upon completion of school.

5.4.3 Recommendations regarding university agricultural programmes

The universities in the country offering agriculture programmes of study should introduce an Agricultural Education programme, to have more competent and qualified agriculture educators to teach agriculture subjects in South African schools. Universities offering agriculture do not have a specific agriculture programme for future teachers of the subject; they only offer agriculture degrees. Teachers need to study education methodology to be able to work as a teacher. Hence, very few agriculture educators have the relevant qualifications. This is also evident in the findings as only three (3) educators out of seven (7) who responded had an agriculture-related qualification.

5.4.4 Recommendations regarding future studies

Further research on the impact of the agriculture curricula taught at school level should be carried out at a broader scale to find solutions to proper implementation of the CAPS agriculture curriculum in the schools, hence better enrolments at universities.

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APPENDICES

APPENDIX A: ETHICAL APPROVAL



Ref. Nr.: 2014/CAES/065

To:
Student: NF Dlamini
Supervisor: Dr S Shava
Department of Agriculture and Animal Health
College of Agriculture and Environmental Sciences

Student nr: 45076537

Dear Dr Shava and Ms Dlamini

Request for Ethical approval for the following research project:

Factors influencing the choice of Agriculture as a study discipline by undergraduates: A case study of a distance education university's Agriculture department in South Africa

The application for ethical clearance in respect of the above mentioned research has been reviewed by the Research Ethics Review Committee of the College of Agriculture and Environmental Sciences, Unisa. Ethics clearance for the above mentioned project (Ref. Nr.: 2014/CAES/065) is given for the duration of the study.

The applicant is reminded to abide by the stipulation in the department's letter that the results of the study be shared with them. The application also needs to go to SENRIC for approval to use UNISA students as participants.

Please be advised that should any part of the research methodology change in any way as outlined in the Ethics application (Ref. Nr.: 2014/CAES/065), it is the responsibility of the researcher to inform the CAES Ethics committee. In this instance a memo should be submitted to the Ethics Committee in which the changes are identified and fully explained.

The Ethics Committee wishes you all the best with this research undertaking.

Kind regards,

Prof E Kempen,
CAES Ethics Review Committee Chair

Prof MJ Linington
Executive Dean: College of Agriculture and Environmental Sciences

Please NOTE SHDRIC NEEDS TO APPROVE STAFF PARTICIPATION MJC



University of South Africa
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www.unisa.ac.za

APPENDIX B: PERMISSION LETTER



education
DEPARTMENT: EDUCATION
MPUMALANGA PROVINCE

Best Education
www.besteducation.co.za

Private Bag X 1824
Middelburg, 1050
Beca Building
39 SADC Street
MIDDELBURG
Mpumalanga Province
Republic of South Africa

MIDDELBURG CIRCUIT 2

Litiko le Tomfandvo Department of Education Nanyango waFundo Department van Onderwys Ntsoano le Dyaniso

28/02/2014

TO : MS NF DLAMINI
FROM : THE CIRCUIT MANAGER
MIDDELBURG CIRCUIT 2
DATE : 28/02/2014
SUBJECT : PERMISSION TO CONDUCT AN INTERVIEW

1. The above matter has reference
2. With reference to your letter dated 27/02/2014, I wish to inform you that permission is hereby granted to interview all the identified Agricultural Science teachers.
3. For your personal development and the improvement of education, we request that the department be informed about your findings.
4. This office wishes you all the best in your studies

Hope you find this in order.

Kind Regards



Mrs Skhosana MK
(Circuit Manager Middelburg 2)

APPENDIX C: STUDENT QUESTIONNAIRE

FACTORS INFLUENCING CHOICE OF AGRICULTURE AS A STUDY DISCIPLINE BY UNDERGRADUATES: A CASE STUDY OF A DISTANCE EDUCATION UNIVERSITY'S AGRICULTURE DEPARTMENT IN SOUTH AFRICA

SECTION A

DEMOGRAPHIC AND ACADEMIC CHARACTERISTICS

Instruction: Please fill information on your personal data.

1. Ethnicity

- Black
- White
- Coloured
- India
- Other

2. Gender

- male
- Female

3. Age in years

- Below 10
- 10 - 25 years
- 26 - 35 years
- 36 - 45 years
- Above 45

4. Community of Origin

- Small town
- Rural area, not farmstead
- Small town
- Small city or suburb
- Urban city

5. Classification of level in college

- 1st year
- 2nd year
- 3rd year

6. Classification of study method

- Fulltime
 - Parttime
 - Distancelearning
-

7. Type of school attended

- Public
 - Private
-

8. Location of school

- Rural
 - Semi urban
 - Urban
-

9. What type of agriculture Curriculum was offered by your school?

- Agricultural sciences
- Agricultural management
- Agricultural Technology

SECTION B: FACTORS THAT INFLUENCED CHOICE OF AGRICULTURE SCIENCE AS A CAREER CHOICE

INSTRUCTION: Please indicate your level of influence with the following statements on factors that influenced the choice of agriculture as a field of study.

FACTORS INFLUENCING THE CHOICE OF AGRICULTURE AS A CAREER CHOICE

10. FAMILY AND FRIENDS

		Very Influential	Moderately Influential	Undecided	Slightly Influential	Not Influential
Parent(s) and	Grandpa	<input type="checkbox"/>				
College	Friend	<input type="checkbox"/>				
High school	friend	<input type="checkbox"/>				
Sister/	Brother	<input type="checkbox"/>				
Personal role model		<input type="checkbox"/>				

11. EXPOSURE TO AGRICULTURE

	Very Influential	Moderately Influential	Undecided	Slightly Influential	Not Influential
Prior experience in agriculture	<input type="checkbox"/>				
Other agricultural experiences	<input type="checkbox"/>				
Relatives in agriculture	<input type="checkbox"/>				
Agriculture courses in high school	<input type="checkbox"/>				
Personal visit to the college of agriculture	<input type="checkbox"/>				
Journals and magazines on agriculture	<input type="checkbox"/>				
Television programs	<input type="checkbox"/>				

12. PROFESSIONAL'S INFLUENCE

	Very Influential	Moderately Influential	Undecided	Slightly Influential	Not Influential
Agriculture Professionals'	<input type="checkbox"/>				
High school agriculture teacher	<input type="checkbox"/>				
High school career guidance and counselor	<input type="checkbox"/>				

13. JOB CONSIDERATIONS

	Very influential	Moderately influential	Undecided	Slightly influential	Not influential
Future employment opportunities	<input type="checkbox"/>				
Potential income gained after college	<input type="checkbox"/>				
Prestige of career	<input type="checkbox"/>				
Working outdoors	<input type="checkbox"/>				
Enjoy working with plants	<input type="checkbox"/>				
Enjoy working with animals	<input type="checkbox"/>				

DISTANCE LEARNING: Factors that influenced you to choose distance learning

INSTRUCTION: Please indicate the level of agreement with the following statements on reasons why you chose to study through open distance learning.

14. Why choose to study through an open distance learning university

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Convenient as there are other personal commitments	<input type="checkbox"/>				
Ample time to spend with family and work	<input type="checkbox"/>				
Study fees are cheaper	<input type="checkbox"/>				
Failure to gain admission in a full-time institution	<input type="checkbox"/>				
Flexibility of studying at own pace	<input type="checkbox"/>				
Access to learning anywhere anytime, no limitations and restriction of time and location of study	<input type="checkbox"/>				
Saves time and costs incurred in travelling and accommodation	<input type="checkbox"/>				
Wide variety of courses to choose from	<input type="checkbox"/>				

SECTION C: SUGGESTIONS TO IMPROVE THE CHOICE OF AGRICULTURAL SCIENCES AS A FIELD OF STUDY AT UNIVERSITY LEVEL.

INSTRUCTION: Please indicate your level of agreement with the following statements on suggestions to help improve the choice of agriculture as a career choice.

15. Suggestions to help improve the uptake of agriculture as a field of study

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Agriculture should be taught at GET phase	<input type="checkbox"/>				
More Agriculture practicals should be done by learners at school to create interest	<input type="checkbox"/>				
Agriculture educators should market the subject to the learners in the schools	<input type="checkbox"/>				
Agriculture scholarships should be made available to all agriculture learners at tertiary level	<input type="checkbox"/>				
Agriculture subject should be made a compulsory subject at senior phase	<input type="checkbox"/>				

APPENDIX D: EDUCATORS QUESTIONNAIRE

INSTRUCTIONS: the respondent is kindly asked to give responses to the questions asked in this questionnaire by filling in the spaces provided.

1. Where is your school located? (Choose one)

- a) Semi Urban area
- b) Urban
- c) Rural Area
- d) Other _____(state)

2. What is your highest qualification?

- a) Honours
- b) Degree
- c) Diploma
- d) Other _____(state)

3. Name of Qualification _____

4. How many years teaching experience do you have?

- a) 0 – 5 years
- b) 6 – 10 years
- c) Above 10 years

5. What subjects do you teach?

i) What grades? _____

ii) How many agriculture learners do you have at grade 12?

6. Do learners receive career guidance and counselling before they make a choice of subjects in your school? Yes () No ()

If yes in what form is it administered? E.g. Psychometric tests, aptitude tests etc please be specific _____

7. a) Is agriculture subject an optional or compulsory subject in your school?

b) If optional, why do you think it is an optional subject in your school?

8. What are the requirements for learners to do agriculture in your school?

9. i) As an agriculture educator, what type of agriculture curricula is taught at your school (choose one) please tick

Agricultural science ()

Agricultural management ()

Agricultural technology ()

ii) For the chosen curricula above, why do those curricula over the others?

iii) For the chosen type of curricula taught at your school, what type of practicals are learners made to do as part of the caps curriculum?

9. What are the challenges you face as agriculture educators teaching the subject? _____

10. i) How do you think the agriculture curricula taught in the school prepares learners for tertiary education?

i) ii) Does it motivate them enough to enrol for an agriculture programme at tertiary level?

11. Currently there are a few learners who enrol for an agriculture programme at college level, or university level, what do you think may be the factors influencing the learner's uptake of the subject at tertiary level?

12. What do you think the department of education can do to improve the subject? Such that more learners do the subject at the school level, eventually taking it up at tertiary level?

This brings us to the end of our research. Thank you very much for participating in the research and thank you very much for your time.