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Full Length Research Paper

Effectiveness of field practical training for competence acquisition among students of Botswana College of Agriculture

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Field practical training is a requirement for all students who enrol in any program in the Botswana College of Agriculture, as it has been discovered that, experiential learning complements theoretical classroom teaching. The effectiveness of Field Practical Training (FPT) for competence acquisition among students was examined through a descriptive survey. A simple random sampling technique was used to select 71 students out of those that participated in FPT in 2008 and data on their personal characteristics and their perceived competence of agricultural tasks before and after FPT were collected with a structured questionnaire and analysed using frequency counts percentages and t-test statistics. Results showed that a majority of the respondents were males, between the ages of 20 to 24 years and were pre-service students. The level of competence among students changed from not competent to competent in 31 out of the 47 tasks. Students also reported that they were competent before undergoing the FPT programme in 12 tasks and the rating was retained as well after FPT. On the other hand, students reported that they were not competent before and even after undergoing the FPT programme in four of the agricultural practical skills examined. The results of paired t-test showing comparison before and after FPT among students showed that, significant differences were found among 32 tasks with students having higher competence mean score after the FPT training than the score before the training. The study recommends that, established farms should be used for the programme and students should be posted to farms that will enhance their skill development for the area of the academic programme specialisation.

Key words: Field practical training, agricultural tasks, experiential learning, skill acquisition, Botswana.

INTRODUCTION

Experiential learning is an old concept of learning and according to Kolb and Kolb (2005), theory must be reinforced with practice and practices need sound theory to guide their conduct. Lewis and Williams (1994) observed that, in higher learning situations, experiential learning is conducted in the form of field based experiences or by crediting of prior learning. Incorporating field experiences into institutional programs is what many institutions, including BCA, are drifting towards in order to enhance the quality of their programs. The University of Swaziland (UNISWA) has a field attachment or internship program in agriculture that was designed to offer students some practical experience in the actual work environment (Moichubedi, 2003). Other institutions like the California Polytechnic, also endeavour

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to promote the "learning by doing" practice, where students combine theoretical knowledge and hands on skills during program implementation. This also helps to promote experiential learning program quality.

Field Practical Training (FPT) that is offered to diploma and bachelors degree students in BCA is a form of experiential learning exercise. Students going on FPT are attached to a commercial farm for a minimum of six-weeks (FPB 300) and for another six weeks in a District or Regional Agricultural Offices. While at the FPT they are placed under the supervision of a farm manager or an Agricultural Officer in the case of government offices; the supervisors are known as Training Officers in Industry (TOIs). During the FPT, students are expected to meet the performance requirements of BCA, a condition that applies to all college courses. However, in the case of FPT courses, students must also meet the work quality standards of the TOIs (BCA, 2008). These courses are a requirement for all diploma or bachelors degree students who enrol in any program in the Faculty of Agriculture (BCA, 2008).

Navarro (2004) is of the opinion that, students should learn about and experience their environment to be prepared for competing in the dynamic workplace typical of agricultural farm. This is very important as Bruening and Frick (2004) found that, companies of today want graduates with cross-cultural experiences; agricultural farms being inclusive. Acker (1999) said that, students' education should include development of broad thinking skills to initiate problem-solving skills; and further asserted that, students need to examine agriculture from a systems perspective, including social, biological and physical systems. Foundations for experiential learning also include full participation in specific experiences, reflecting on the experiences and taking active roles in experimenting with those experiences (Andreasen, 1999; Joplin, 1981; Kolb, 1984).

Williams et al. (2002) identified the importance of experimental learning, as such opportunities could introduce students to experiments that could help shape and develop knowledge, skills and attitudes on the other hand, Brucing and Frick (2004) said that, after the experiential learning opportunities given to students, they strongly believe that other students should take advantage of outside classroom activities.

Bruening and Shao (2005) supported the motion that, experiential education is beneficial, as this could offer opportunities for experiential learning, interaction with professionals, and develop meaningful relationships among others. Weng (1998) said that, in order to meet the diverse needs and create new employment opportunities, new courses need to be developed and the content of the existing courses modified. In addition, schools should improve conditions for developing student practical skills by building student practical skills by building more practical laboratories both inside and outside schools. Weng (1998) added that, the relationship between agricultural schools and industries should be strengthened for the purpose of practical training and internship programmes. According to Ogunbameru (1986), Farm Practical Year (FPY) programme is a process of gaining knowledge and practical skill though observation and by doing which is called internship.

In Nigeria, it is mandatory and indeed a policy of the National Universities Commission (NUC) that, agricultural undergraduates in the fourth year of the five-year degree be exposed to farm practical year. Henze (1984) concluded that students were usually trained theoretically and narrowly in the field of agriculture because most subjects studied in the schools were academic and usually have little relevance to the students workplace and reality. Consequently, the traditional classroom lecture-based delivery systems provide limited opportunity to acquire the necessary skills and experience to explore careers (Nikolova-Eddins et al., (1997). This situation needs to be connected and field practical training programmes (FPT) seem to be the way forward. It is a known fact that, demonstration conducted by students with the assistance of a field supervisor will add practical value to the academic training received by the students. Thus, what students hear during the teaching – learning process may be doubted, what they see, may possibly be doubted but what they do cannot be doubted (Skillbeck, 1984). The Revised National Policy on Education (RNPE) of 1994 highlighted the importance of quality tertiary education that produces graduates with requisite expertise in a broad range of disciplines.

The role of tertiary education according to the policy is to produce highly competent human resources for national economic development in numbers required by both the public sector, private sector, and all other players in the diverse economy.

In tandem with the RNPE, the University of Botswana (UB)'s teaching and learning policy committed the UB to ensuring "relevance of learning and teaching so that students are prepared for life, work and citizenship" (UB, 2008). The policy further listed relevance of curriculum to the economy at large, preparation of graduates to fit the employment sector, and satisfaction of employers with performance of the graduates of the university as some of the pertinent aspects to be addressed to ensure quality programs from the University. The questions that arise from the aforementioned statement are: Does the FPT programme at BCA provide students with the opportunities to learn about the farming occupation of their choice through work related practical experience? Can the BCA students apply agricultural theories to practice under farmer's conditions? Are BCA students able to develop the ability to work under actual farm and farmers' conditions? Is the field practical training conducted in farms and agricultural industries by BCA students capable of developing students' practical skills in agriculture? The purpose of this research is to determine the extent of students' farming competency acquisition, as a result of undertaking BCA FPT programme.

MATERIALS AND METHODS

This was a descriptive survey that described the effectiveness of FPT on BCA students acquisitions of farming competencies. Structured questionnaires were used to collect data from the BCA who participated in the FPT training programme in June 2008. List of participating students was obtained from the BCA FPT Coordinator. This helped to control frame error in the research because the actual lists were obtained. A random sample of 71 students participated in the study. The instruments for data collection were developed with the help of literature review coupled with the list of competencies developed by each of BCA's academic Departments. The instruments were divided into two domains to satisfy the objectives of the study; namely: personal characteristics of the students such as gender, age, work experience, occupation, and level of training and where training was obtained, while the second generated data on students' competencies, that they had before and after participating in the FPT. The levels of competency were measured by asking students to indicate their perceived levels competence in performing specific agricultural production tasks.

The listed tasks were related to the list of competencies that students supposedly acquired from the College courses. Competence in performing the tasks were measured using a Likert-type rating scale with the following categories: 4 = very competent; 3 = competent; 2 = slightly competent and 1 = not competent. The students were also asked to indicate the extent to which they thought they had learnt farm operations skills from the FPT programme. Prior to the data collection process, the survey questionnaire was submitted to four BCA academic staff, one from each BCA department, for content validity. The suggestions of the staff members were incorporated into the final version of the questionnaire. Data analysis was done using version 15 of Statistical Package for Social Sciences (SPSS). Descriptive statistics were used to present the data and to describe respondents' demographic characteristics. T-test was used to determine differences in competence levels on agricultural production skills of students before and after the FPT exercise.

RESULTS

Table 1 shows the demographic information about the respondents, while Table 2 shows students' perceived levels of competence in agricultural tasks before and after FPT.

Table 1. Demographic characteristics of respondents.

Variables	Frequency	Percentages
Gender		
Male	40	56.30
Female	31	43.30
Total	71	100
Age		
20-24	50	70.50
25-30	11	15.50
31-35	5	7.00
36-41	5	7.00
Total	71	100
Service		
In-service	12	18.00
Pre-service	59	72.00
Total	71	100
Programme		
BSc CSP	5	7.00
BSc ED	13	18.50
BSc AS	12	18.00
BSc AG	10	14..10
BSc SW	9	12.30
Diploma	22	30.10
Total	71	100
Family/relative own commercial farm		
Yes	10	14.10
No	61	85.90
Total	71	100

DISCUSSION

In Table 1, the demographic information examined included gender, age, service status, programme being pursued at BCA, ownership of commercial farms by relatives. The total number of respondents was 71. Out of the 71 students, 56.3% were males while 43.7% were females. A large proportion of the respondents (70.5%) were between the ages of 20 to 24 years of age. Also 72.0% of the respondents were pre-service students indicating that, a majority of them have never worked before coming to enrol in their BSc Agriculture programme at BCA. Regarding the programme being pursued by the respondents, 30.1% were pursuing their diploma programme in Agriculture. Also, in terms of ownership of commercial farm by parents or relatives of respondents, 85.9% reported that, their family/relatives did not own commercial farm. The varying sizes of sample for each of the agricultural task as shown in Table 2 reveals that, the number of students that actually participated in the tasks is low. This may be because many farms where students were posted for the FPT do not carry out the tasks on which students were expected to acquire competencies. It may also be due to the fact that, students were not posted on the basis of their academic programme specialisations.

In terms of competence, perceived levels of competence were measured by asking students to state their levels of competencies in 47 agricultural tasks at the beginning and end of FPT. To interpret their competency levels, a mean above 2.5 was used to denote 'competent' and a mean below 2.5 was used to denote 'not competent'. From the list of 47 agricultural tasks on which the competence levels of students were examined,

Table 2. Paired t-test showing competencies acquired by BCA students before and after FPT.

FTP activities		M	N	SD	Competency level	t	df	p*
Evaluating of soil profiles in farming areas	Before	2.33	24	0.96	Not competent	-4.37	23	0.000
	After	2.91	24	0.97	Competent			
Sampling farming soils using appropriate soil sampling techniques	Before	2.22	22	1.15	Not competent	-2.98	21	0.007
	After	2.77	22	0.81	Competent			
Evaluating farming land for soil and water Conservation needs	Before	1.69	23	0.97	Not competent	-3.45	22	0.002
	After	2.57	23	1.08	Competent			
Recommending suitable soil and water conservation measures for specific farm	Before	2.00	24	1.14	Not competent	-2.30	23	0.031
	After	2.50	24	1.14	Competent			
Calculating amounts of fertilisers to apply to specific crops	Before	2.53	32	1.19	Competent	-2.49	31	0.018
	After	3.03	32	0.96	Competent			
Performing basic plant diseases diagnosis	Before	2.27	33	0.87	Not competent	-3.98	32	0.000
	After	2.84	33	0.79	Competent			
Determining plant nutrition problems	Before	2.21	28	0.95	Not competent	-3.73	27	0.001
	After	2.92	28	0.94	Competent			
Recommending appropriate correction procedures for plant nutrition problems	Before	2.09	31	0.87	Not competent	-2.83	30	0.008
	After	2.70	31	0.90	Competent			
Planning and implement land preparation procedures for crops	Before	2.63	36	0.96	Competent	-4.16	35	0.000
	After	3.22	36	0.79	Competent			
Selecting appropriate planting methods for various crop seeds	Before	2.63	33	0.89	Competent	-3.66	32	0.001
	After	3.27	33	0.76	Competent			
Calibrating planters and seeders for various crop seeds	Before	1.77	22	0.97	Not competent	-2.66	21	0.015
	After	2.52	22	1.06	Competent			
Planning and carry out harvesting appropriately for various crops	Before	2.63	30	0.76	Competent	-3.31	29	0.002
	After	3.20	30	0.80	Competent			

Table 2. Contd.

Identifying pest infestation symptoms	Before	2.66	33	0.98	Competent	-2.51	32	0.017
	After	3.06	33	0.89	Competent			
Recommending appropriate pest control procedures for various pests	Before	2.60	33	0.89	Competent	-2.62	32	0.013
	After	3.00	33	0.86	Competent			
Collecting and preserving crop disease specimen	Before	1.90	20	1.02	Not competent	-1.15	19	0.26
	After	2.55	20	0.87	Competent			
Carrying out appropriate husbandry measures for the nursery	Before	2.27	18	1.12	Not competent	-1.52	17	0.13
	After	2.72	18	1.22	Competent			
Successfully engaging in bee keeping	Before	1.86	15	0.99	Not competent	-1.78	14	0.09
	After	2.50	15	1.08	Competent			
Making linear measurements	Before	1.80	15	0.77	Not competent	-4.58	14	0.00
	After	2.60	15	0.98	Competent			
Comparing heights of various points	Before	2.11	17	1.16	Not competent	-2.21	16	0.41
	After	2.58	17	1.06	Competent			
Making simple contour maps	Before	2.27	11	1.19	Not competent	-2.63	10	0.025
	After	2.81	11	1.25	Competent			
Interpreting maps and aerial photographs	Before	2.09	11	1.22	Not competent	-2.63	10	0.25
	After	2.63	11	1.20	Competent			
Using levels and theodolites	Before	2.33	9	1.58	Not competent	-1.31	8	0.225
	After	2.77	9	1.20	Competent			
Using compass, level and theodolites	Before	2.20	10	1.39	Not competent	-2.86	9	0.019
	After	3.10	10	0.99	Competent			
Enforcing safety behaviour in the workshop	Before	2.15	20	0.93	Not competent	-4.25	19	0.000
	After	3.10	20	0.96	Competent			
Operating and maintaining a tractor	Before	1.83	18	0.92	Not competent	-3.38	17	0.003
	After	2.66	18	1.08	Competent			

Table 2. Contd.

Diagnosing common tractor problems	Before	1.94	19	1.07	Not competent	-2.27	18	0.036
	After	2.57	19	1.16	Competent			
Planning mechanisation strategies for a farm for efficient operation	Before	2.07	14	0.99	Not competent	-3.68	13	0.003
	After	2.78	14	0.97	Competent			
Operating and adjust common agricultural implements	Before	2.15	20	1.13	Not competent	-1.83	19	0.083
	After	2.66	20	0.99	Competent			
Recommending appropriate soil erosion control measures	Before	2.58	25	0.96	Competent	-2.10	24	0.046
	After	2.60	25	0.90	Competent			
Recommending appropriate water harvesting techniques	Before	2.52	21	1.02	Competent	-1.75	20	0.095
	After	2.85	21	1.01	Competent			
Asses irrigation scheme performance	Before	2.50	24	1.14	Competent	-4.52	23	0.000
	After	3.37	24	0.82	Competent			
Recommending appropriate control measures for wind and water erosion	Before	2.27	22	0.98	Not competent	-3.81	21	0.001
	After	2.95	22	0.95	Competent			
Designing and constructing animal housing facilities	Before	2.26	15	1.03	Not competent	-1.97	14	0.068
	After	2.73	15	0.88	Competent			
Designing and construct crop storage facilities	Before	1.80	10	0.78	Not competent	-1.50	9	0.168
	After	2.20	10	1.22	Not competent			
Cleaning and fumigating poultry houses	Before	2.71	17	0.87	Competent	-5.37	16	0.000
	After	3.52	17	0.62	Competent			
Processing of broilers	Before	2.70	15	1.05	Competent	-4.18	14	0.001
	After	3.40	15	0.82	Competent			
Cleaning and disinfecting milking facilities	Before	2.27	11	1.19	Not competent	-3.02	10	0.013
	After	3.27	11	0.90	Competent			
Cleaning and disinfecting piggery units	Before	2.00	5	1.00	Not competent	-1.50	4	0.21
	After	2.60	5	0.89	Competent			

Table 2. Contd.

Keeping and maintaining office records	Before	2.19	21	0.98	Not competent	-6.53	20	0.000
	After	3.28	21	0.98	Competent			
Livestock disease diagnosis	Before	2.61	19	1.00	Competent	-4.02	18	0.001
	After	3.10	19	0.93	Competent			
Taking temperature of animals	Before	2.33	3	0.57	Not competent	-3.37	13	0.005
	After	3.66	3	0.57	Competent			
Taking pulse rate of animals	Before	1.50	2	0.00	Not competent	-2.87	14	0.012
	After	2.50	2	0.70	Competent			
Examining mucus membranes of animals	Before	2.20	16	1.00	Not competent	-2.52	15	0.023
	After	2.81	16	1.22	Competent			
Assessing hydration status of animals	Before	1.85	14	0.94	Not competent	-1.74	13	0.104
	After	2.14	14	1.16	Not competent			
Mounting cattle to diagnose FMD	Before	1.76	13	0.92	Not competent	-.822	12	0.427
	After	2.00	13	1.00	Not competent			
Conducting in pregnancy diagnosis	Before	2.21	14	1.05	Not competent	-1.17	13	0.263
	After	2.50	14	1.16	Competent			
Assisting in dystocia cases	Before	2.00	13	1.08	Not competent	-.80	12	0.436
	After	2.30	13	1.25	Not competent			

*M – mean; N number of cases; SD – standard deviation; t –t test ratio; df- degree of freedom, p – probability.

students reported that their level of competence changed from not competent to competent in 31 out of the 47 tasks. These were predominantly in the areas of soil and crop production and animal science while most activities related to farm engineering are not popular in the competent rating by the students. Oloruntoba (2008) reported similar findings among students from the University of Agriculture Abeokuta, Nigeria; that the farm practical year programme improved their competence in many agricultural tasks. This confirms the expectations that the practical training programme, reinforces the theory from the class and thus, helps in preparing better graduates for future employment world.

Students also reported that they were competent before undergoing the FPT programme in 12 out of the This indicates that, the FPT programme was not solely responsible for their change in competency levels. The changes recorded here could probably be attributed to the practical training received at school or to some other sources, such as from parents who might have demonstrated the skills to their children on their

farms.

On the other hand, students reported that they were not competent before and even after undergoing the FPT programme in four of the agricultural practical skills examined. The implication of this is that, the FPT programme did not help them to improve on their levels of competency in the four agricultural practical skills. The trainers should take note of these skills and use the teaching strategies or methods that will assist the students to develop some competency levels on these nine areas.

From Table 2, the results of paired t-test showing comparison before and after FPT among students in terms of competencies acquired was based on the score of students that participated in each of the tasks, irrespective of the farms they were posted for the FPT were pooled and subjected to t-test analysis. The results showed that from the 47 agricultural practical skills examined, significant differences were found among 32. Students had higher competence mean score after the FPT training than the score before the training. It could be inferred that, FPT has therefore increased the competence of students in the practical agricultural skills examined. This agrees with the findings of Mohd et al. (2009) who stated that, engineering students perception after Industrial Training Placement in Malaysia showed beneficial effect and has significantly improved their 'personal attitude', 'communication', 'work attitude'. The experience gained has given them the opportunity to become better students and could, in the future, provide them with better employment prospects. Also, Oloruntoba (2008) reported that students' perceptions of farm practical year programme at the University of Agriculture, Abeokuta, Nigeria showed that, the programme provided students with 'hands-on' experience and opportunity; to apply theory learnt in the classroom to a real-life field situation in which students had to adapt and solve problems on a daily basis. Students also felt strongly that, the farm practical would contribute to their professional career and employability on graduation. However, no significant differences existed for 17 agricultural tasks, although in some of these tasks the mean values after FPT were greater than the values before FPT.

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