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ANALYSIS OF RESEARCH METHODOLOGIES USED BY AGRICULTURAL EDUCATION UNDERGRADUATE STUDENTS IN ESWATINI FROM 2008 TO 2017

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ABSTRACT

Agricultural Education in Eswatini is relatively a young discipline that emerged in the early 1970s; thus, still growing in areas such as research methodologies, rigour and focus among other aspects. Unfortunately, information on methodologies used in Agricultural Education is not systematically documented. Therefore, this study identified research methodologies used in Agricultural Education undergraduate research projects completed from 2008 to 2017 in the Department of Agricultural Education and Extension (AEE) at the University of Eswatini (UNESWA). This study was a descriptive survey employing desk review in data collection. Validity of the instrument was ensured through the use of two peers / experts from the Department of AEE, Faculty of Agriculture at UNESWA. Data analysis was performed using frequencies and percentages. Findings of the study revealed that Agricultural Education research was positivistic, quantitative, basic and descriptive in nature. Agricultural Education studies were mainly analysed using descriptive statistics. Thus, the study concluded that generally, undergraduate research in Agricultural Education was mainly descriptive. Therefore, there is a need for Agricultural Education students to conduct research studies that are explanatory, analytical and evaluative.

Keywords: *Agricultural Education, research methodologies, undergraduates, thesis, University of Eswatini*

INTRODUCTION

Agricultural Education is a young discipline that begun from America in the early 1900s (Williams, 1991). Late in the 1970s to the early 1980s, agricultural educators started believing in both knowledge and facts coming from empirical investigation. The agricultural educators began to consider themselves as researchers. Consequently, Agriculture Education was viewed as a problem-solving initiative. Agricultural Education through research became a way of verifying existing knowledge, creating new knowledge, and for disseminating and applying that knowledge. However, the research work was not cumulative; that is, it lacked depth and sound theoretical framework (Cambell & Martin, 2012).

Mannebach, McKenna and Pfau (1984) when analysing research methodology reported in Agricultural Education suggested that researchers must continually examine their research and scholarly activities as they point at what is being done and the direction where the discipline is going. Shinn, Briers and Baker (2008, p122) noted that "*there is a need to re-examine Agricultural Education in a future that has already happened*." This assertion was based on advice by Drucker (1997) that it is possible and fruitful to identify major events that have already happened to predict effects in the future. Generally, Agricultural Education researchers have sought to understand the theoretical and conceptual underpinnings of the discipline (Edgar, Edgar & Rutherford, 2008). Edgar et al. (2008) further revealed that one of the

attempts in Agricultural Education was on understanding the strategies used to focus the discipline (Barrick, 1989). Thus, a need arose to analyse the methodologies used by researchers in the discipline (Dyer, Haase-Witter & Washburn, 2003). Furthermore, Edgar et al. (2008) reported that there were calls to examine the essence of research in Agricultural Education. Correspondingly, a need also arose for Agricultural Education to understand where the discipline has been in order to focus future research (Edgar et al., 2008). Knight (1984), and Radhakrishna and Xu (1997) on the analysis of research conducted in Agricultural Education provided a note of caution and evidence on the need for more variety in research methodologies and designs in the discipline.

Existing literature indicates that the type of research conducted in Agricultural Education is mainly positivistic (Wardlow, 1989). Wardlow noted that other research paradigms such as interpretivist and the critical science were not common in the discipline; not to mention the pragmatism paradigm. The research conducted in Agricultural Education was dominantly quantitative, followed by qualitative and then mixed methods approach (Dyer, Haase-Witter & Washburn, 2003; Edgar, Briers & Rutherford, 2008; Edgar, Edgar, Briers & Rutherford, 2008). Dyer et al. (2003) also noted that positivism corresponds to quantitative approach and social constructionism corresponds to the qualitative approach. Similarly, the pragmatism paradigm corresponds to the mixed methods approach (Johnson & Onwuegbuzie, 2004). Dyer et al. (2003) further revealed that the type of research conducted in Agricultural Education in U.S.A. was applied research. Furthermore, Dyer et al. (2003) and Edgar, et al. (2008) reported that descriptive survey was the most popular research design, followed by correlational design. In Eswatini, previous studies revealed that basically, research was also quantitative employing survey research design (Dube & Zwane, 2002; Gwebu, 2010; Mazibuko, 1997; Shabangu, 1991)

Gwebu (2010) and Zwane (2001) reported that the Agricultural Education undergraduate students at the University of Eswatini were using questionnaires for data collections. Agriculture teachers were the main sources of data (Dube & Zwane, 2002; Gwebu, 2010; Mazibuko, 1997; Shabangu, 1991). Gwebu also revealed that the Agricultural Education undergraduate students at the University of Eswatini were using probabilistic more than non-probabilistic sampling methods. Probability sampling techniques include simple random, stratified random, cluster random, systematic random and multi stage sampling method while non-probability sampling techniques are purposive, quota, criterion, snowballing, and convenience or accidental sampling method (Polit & Beck, 2012).

Data analysis is another methodology issue in the research. Data analysis is determined by the type of data collected: quantitative and qualitative data. Analysing quantitative data involves the use of statistical analysis. According to Miller (1998), three categories of statistics are found: descriptive, correlation or regression and inferential. Conversely, qualitative data analysis has three overarching types: content analysis, constant comparative method and bracketing (Tesch, 1990). Data analysis in mixed methods is both numerical and textual or pictorial (Ivanakova, Creswell & Plano Clark, 2007). Bowen et al. (1990) found that most articles were analysed quantitatively using descriptive statistics. However, Goodwin and Goodwin (1985) noted that the articles were analysed using basic statistics instead of inter-mediate and advanced statistics. Generally, research conducted by undergraduates in Eswatini was analysed using mainly inferential statistics (Gwebu, 2010; Mazibuko, 1997, Shabangu, 1991; Zwane, 2001). Few studies were reported to have used correlational and descriptive statistics (Mazibuko, 1997, Shabangu, 1991). Also, some studied did not use statistics at all as they were qualitative in nature (Mazibuko, 1997, Shabangu, 1991; Zwane, 2001). Thus, Gwebu (2010) recommended that researchers should move to the prediction and control level of the continuum when analysing data.

In Eswatini, Agricultural Education started in 1973 (Gooday, 1974); introduced at the University of Eswatini. Students enrolled for Bachelor of Science in Agricultural Education at this University are required to undertake a research project. Most of these students' research outputs are available in the University's library as unpublished research projects. A number of studies on Agricultural Education had been conducted on undergraduates' research projects at the University of Eswatini. The first study conducted by Shabangu (1991) was on "A synthesis of the student Agricultural Education dissertation of period from 1985 to 1990". Mazibuko (1997) then conducted a study on" Summaries of students' Agricultural Education dissertation completed between 1991 and 1995 at the University of Swaziland". A similar study to the current study was conducted by Dube and Zwane in 2002 on the "Analysis of research methodologies of student dissertation in Agricultural Education of the University of Swaziland completed between 1995 and 2000. Another study conducted by Gwebu (2010) was on Agricultural Education research projects (2001 -2008) in the Faculty of Agricultural Education at the University of Swaziland.

Unfortunately, the literature could not reveal a periodic and comprehensive analysis of methodologies used in Agricultural Education. The last analysis on methodologies used in Agricultural Education was done about two decades ago (Dube & Zwane, 2002). Yet the future of agricultural research depends on the acquisition and application of new knowledge generated from research amongst other variables (Dyer et al., 2003)

Therefore, this paper analysed the research methodologies used by Agricultural Education undergraduate students in

Eswatini from 2008 to 2017. The objectives of the study were to: (i) describe the types of research conducted by Agricultural Education undergraduates at the University of Eswatini; (ii) identify methods used for study participants or respondents; (iii) identify data collection methods used in the undergraduate research projects; (iv) describe the sources of data; and (v) identify the data analysing procedures used by the undergraduates in their research projects.

METHODOLOGY

This was a descriptive study that employed a desk review in data collection. This study was a census (N=386) which focused on methodologies employed in research projects completed by Agricultural Education undergraduates in University of Eswatini over the past decade 2008 to 2017. Three hundred and seventy research projects (97.2%) were accessible. The methodologies examined by the study were: research philosophy, research approach, research design, data sources, sampling procedures, data collection methods, and data analysis. Validity of the instrument was ensured through the use of two experts from the Department of Agricultural Education, Faculty of Agriculture at the University of Eswatini. Data analysis was performed using frequencies and percentages.

FINDINGS AND DISCUSSION

Types of research conducted by Agricultural Education undergraduates

Table 1 reveals that most of the undergraduates' research projects employed positivism philosophy (n=288, 76.8%); quantitative research approach (n=319, 85.1%); and descriptive research (n=288, 77.4%). The type of research conducted was basic (n=307, 81.9%) and descriptive (n=180, 48.0%). Generally, the findings of the study confirm existing knowledge on research in Agricultural Education. Wardlow (1989) reported that the type of research conducted in Agricultural Education was mainly positivistic and lacking in interpretivist and the critical science. Also past research has dominantly been quantitative (Dyer, Haase-Witter & Washburn, 2003; Edgar, Briers & Rutherford, 2008; Edgar, Edgar, Briers & Rutherford, 2008) employing descriptive research design (Dube & Zwane, 2002; Dyer et al., 2003; Edgar, Briers & Rutherford, 2008; Gwebu, 2010; Mazibuko,1997; Shabangu, 1991). Dyer et al. (2003) further revealed that the type of research conducted in Agricultural Education in U.S.A. was applied research yet in Eswatini is basic. This creates a need for Agricultural Education in Eswatini to move from basic to applied research. Also, the findings imply that research in Agricultural Education should be conducted beyond the positivism, quantitative and descriptive stance. Thus, Edgar et al. (2008) observed that a need exists to engage in a more rigorous research methodologies to answer the "why" question as well as the "what is."

Table 1: Types of research conducted by Agricultural Education undergraduates

Type of research	f	%
Philosophy		
Positivism	288	76.8
Constructivism	20	5.3
Pragmatism	18	4.8
Transformative	49	13.1
Approach		
Quantitative	319	85.1
Qualitative	35	9.3
Mixed	21	5.6
Design		
Descriptive	288	77.4
True experimental	0	0
Quasi-experimental	1	0.3
Ex-post facto	8	2.2
Case study	7	1.9
Qualitative	15	4
Correlation	49	13.2
Triangulation	4	1.1
Research type - outcome		
Basic	307	81.9
Applied	68	18.1
Research type -purpose		
Exploratory	35	9.3
Descriptive	180	48
Explanatory	22	5.9
Analytical	138	36.8

Methods used for study participants or respondents

The findings of the study also revealed that most of the respondents or participants for Agricultural Education research were reached through sampling (n=264, 74.8%) instead of a census (n=89, 25.2%) (see Figure 1).

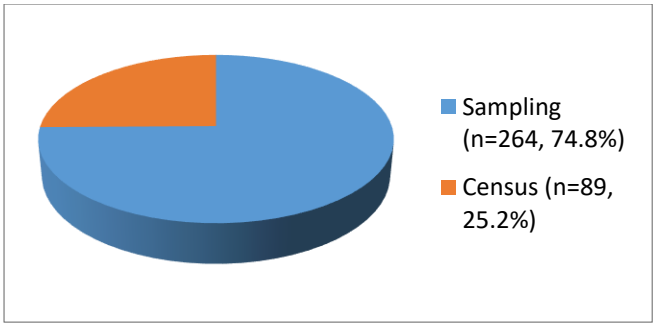

Figure 1: Group studied by Agricultural Education graduates (N=353)

Table 2 depicts that simple random was the most common sampling method (n=144, 51.8%) and was followed by purposive sampling method (n=103, 37.1%). Random sampling method was common because research in Agricultural Education was basically positivistic, quantitative and descriptive in nature. Purposive sampling was also one of the commonly used sampling design even though is a qualitative research design probably because the triangulation of quantitative and qualitative research strategies used.

Table 2: Sampling designs used in Agricultural Education undergraduates' research projects (N=278)

Type of research	f	%
Simple random	144	51.8
Stratified random	29	4.4
Systematic random	15	5.4
Cluster random	5	1.8
Purposive / Judgemental	103	37.1
Quota	1	0.3
Accidental or Convenience	8	2.9
Snowballing	8	2.9

Sources of data used in the undergraduate research projects

Table 3 depicts that learners were the main source of data (n=143, 38.2%) and were followed by the educational professionals (n=133, 35.6%). Interestingly, the main source of data for Agricultural Education research conducted by undergraduate students at the University of Eswatini has been learners. Contrary, research conducted so far indicate that the main source of data were agriculture teachers (Dube & Zwane, 2002; Gwebu, 2010; Mazibuko, 1997; Shabangu, 1991). Sources of data such as parents, private sector, documents and farmers were spared. Therefore, a need exists to double efforts towards reaching the other sources of data in order to have a balanced picture on the state of research in the discipline.

Table 3: Data sources used in Agricultural Education undergraduate research projects (n=374)

Data source	f	%
Educational professionals	139	37.2
Learners	144	38.5
Parents, community members, farmers and retired people	100	26.7
Policy makers, and business people	5	1.3
Agriculture officers and workers from other ministries	19	5.1
Private sector and non-government organization workers	12	3.2
Documents	37	9.9
Facilities	5	1.3

Since literature indicated that agriculture teachers were the most researched group in Agricultural Education; a need arose to find out if the teachers were the most researched groups among the educational professionals. Table 4 presents that indeed teachers were the main source of data among the educational professionals (n=97, 64.9%). The findings of the study confirm that by Dube and Zwane (2002); Gwebu (2010); Mazibuko (997); and Shabangu (1991). Sources of data such as lecturers, administrators, and coordinators were spared. Again, efforts should be put towards reaching the other educational sources of data in order to have a balanced picture on the state of research in the discipline.

Table 4:
Education professionals as data sources used by under graduates in Agricultural Education (N=127)

Data source	f	%
Teachers	97	76.4
Administrators	37	29.1
Educators / lecturers	3	2.4
Inspectorate / coordinators	5	3.9
Instructors	2	1.6
Ministry of Education and Training officials	5	3.9
Curriculum designers / evaluators	1	0.8
Examinations of Eswatini	1	0.8
Library Workers	1	0.8

Data collection methods used in the undergraduate research projects

Figure 2 reveals that generally, questionnaire was the most used data collection instrument (n=306, 81.6%). Generally, the research in Agricultural Education is positivistic, quantitative and descriptive in nature; hence, the most used data collection is the questionnaire. Such findings were also reported by Gwebu (2010).

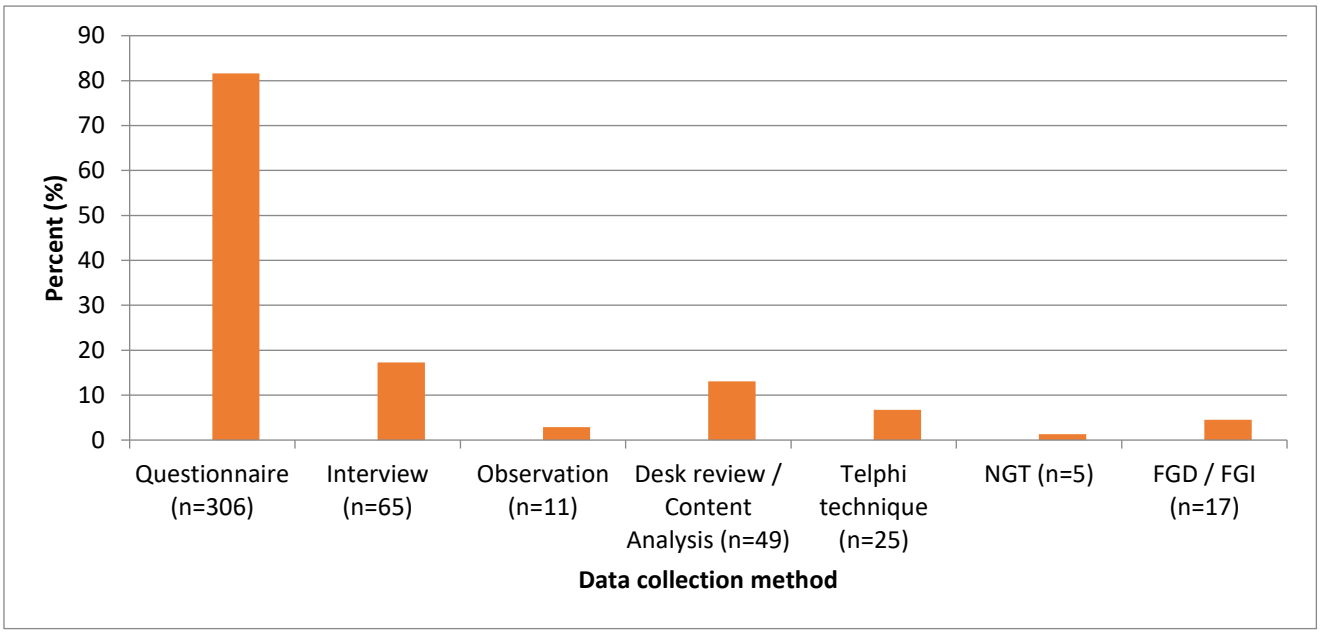

Figure 2. Data collection methods used in Agricultural Education undergraduates' research projects (N=375)

Data analysis procedures used by the undergraduates in their research projects

Table 5 demonstrates that the data were mainly analysed using descriptive statistics (n=356, 94.9%). One hundred and thirty four research projects (35.7%) were also analysed using inferential statistics while 122 research projects (32.5%) were also analysed using correlational statistics. These findings are in harmony with studies conducted in Agricultural Education. Bowen et al. (1990) found that most articles were analysed quantitatively using descriptive statistics. Similarly, research conducted by undergraduates in Eswatini has been analysed using mainly descriptive statistics (Gwebu, 2010; Mazibuko, 1997, Shabangu, 1991; Zwane, 2001). Few studies were reported to have used correlational and descriptive statistics (Mazibuko, 1997, Shabangu, 1991). Thus, Gwebu (2010) recommended that researchers should move to the prediction and control level of the continuum when analysing data.

Table 5: *Data analysis used by masters' degree graduates in Agricultural Education research projects* (N=375)

Data analysis method	**f**	**%**
Descriptive	356	94.9
Predictive	18	4.8
Inferential	134	35.7
Correlation	122	32.5
Constant comparison analysis	3	0.8
Thematic analysis	46	12.3
Narrative analysis	5	1.3
Borichs	1	0.2
Non-parametric	25	6.6

CONCLUSIONS

The study concluded that the research methodologies used in under-graduate research projects were basically positivistic, quantitative, basic and descriptive in nature. Learners and educational professionals especially teachers were the main sources of data. Simple random and purposive samplings were the common sampling designs. The study also concluded that the questionnaire was the most used data collection and descriptive statistics was the most used analysing tool.

RECOMMENDATIONS

The study recommended that the under-graduates in Agricultural Education at University of Eswatini should include: (i) pragmatism and social constructionism philosophy; (ii) qualitative and mixed approach; (iii) applied research; and (iv) analytical, evaluative and explanatory research. Furthermore, effort should be made to tap into diverse sources of data such as parents, documents, school administration, and so on. The choice of a varied sources of data would allow the use of a varied sampling methods and data collection methods. A need arose to go beyond descriptive statistics in data analysis, to predictive and advanced level of statistics.

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