

Methodological Trends in Science Education and Curriculum Studies Research in the University of Port Harcourt; 2005 – 2015

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Abstract— This study analysed the methodological trends in Education science and Curriculum studies Ph.D. dissertations undertaken in the Department of Curriculum Studies and Educational Technology, Faculty of Education of the University of Port Harcourt from 2005 to 2015. It was revealed that 74.1% of the curriculum and education science studies undertaken in the department adopted the experimental research design. The simple random sampling technique was applied in 46.1% of the studies. Achievement tests were used to collect data in 61.3% of the studies while ANOVA, ANCOVA, t – test and the descriptive method were variously applied in the analysis of data. It was concluded that the Department of Curriculum Studies and Educational Technology of the University of Port Harcourt is duly poised to contribute to the technological development of the country through educational intervention projects. The study is then recommended to policy makers in the field of education science and curriculum studies.

Index Terms— Methodological Trends, Science Education .

I. INTRODUCTION

The process of curriculum development [1] is such a dynamic one because it involves the making of changes in teaching and learning activities in order to meet the demands of emergent realities and needs of the society. A proper study and management of these changes that occur in the society as well as the consequent response of curriculum development efforts constitutes cogent avenue of assuring better future and well being of the society. With rapid advancements in technology and the pervasive impact of information and communication technology (ICT) on all aspects of the society, a myriad of changes have been occasioned in curriculum development which manifest as sets of related trends. One obligatory function of research and development efforts in any discipline is the periodic examination of the products of that discipline.

A study of the trends of research studies in a given discipline can therefore be equated to an account of the periodic examination of the products of the given discipline. And so by analysing the research work done in a discipline, thereby revealing the areas of concentration and lack, trends studies eventually provide knowledge of the types of research works needed in a particular discipline or subject area. Trends studies give direction to future research and

development efforts [2]. And concerning the benefits of trends studies, [3] it is observed that

“While national development policies and objectives guide research and development activities, trends studies introduce elements of formative assessment to identify and highlight areas of emphasis as well as areas of lack, so that attention to innovation and development would be properly directed for the achievement of national development objectives”.

It is in this vein that this study hereby seeks to analyse the Doctor of Philosophy (Ph.D.) dissertations in education science and curriculum studies in the Department of Curriculum Studies and Educational Technology, Faculty of Education, University of Port Harcourt within the period 2005 to 2015.

II. TRENDS IN CURRICULUM STUDIES RESEARCH

A typical curriculum studies department of a teacher education institution especially as exemplified with the structure of the University of Port Harcourt consists of the disciplinary options of Social Studies education, Language education and the Education science options made up of:

- a) Computer education
- b) Mathematics education
- c) Biology education
- d) Chemistry education and
- e) Physics education

The positive contributions of experts in these subject areas to societal development are simply obvious. The Nigerian nation relies on these disciplinary curriculum options for the training of the teachers of the primary and secondary school levels of education. One major advantage of the marriage of education science curriculum options with Educational Technology in the Department of Curriculum Studies and Educational Technology is the technological knowledge and skills that trainee teachers acquire alongside expertise in subject matter and pedagogical skills. On graduation, each student is duly equipped with knowledge of subject matter, knowledge of the pedagogical skills to impart same to upcoming generations as well as the knowledge of the technological skills required for effective impartation of the knowledge. This is the TPACK curriculum framework [4]. It is generally referred to as knowledge of the technology, pedagogy and the content of given subject.

A study of the research activities in the different curriculum options would reveal the topical issues that attracted the attention of researchers and possibly influenced decisions in national developmental policies and also

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highlight the methodological trends that were adopted in the research activities. In justifying the doctorate degree dissertations in a given institution as determinant of faculty research efforts in the discipline of interest, [3] it is observed that

“The choice of Ph.D. dissertations as determinant of trends in educational technology research is hinged on the fact that the determination of the topics, research methods, data collection and analysis methods and other factors of the research project is a collaborative effort of faculty and the Ph.D. candidate”.

And so to ascertain the methodological trends in science education and curriculum studies research in the University of Port Harcourt, the study shall identify the research methods that were most commonly applied in Doctor of Philosophy (Ph.D.) science education and curriculum studies research projects undertaken in the University of Port Harcourt within the period spanning from 2005 to 2015.

Objectives of the study

The study shall:

- 1) Ascertain the annual distribution of research designs adopted for the studies
- 2) Identify the most common tool of data collection that were utilised in the studies
- 3) Identify the sample selection tool that researchers preferred
- 4) Ascertain the method of data analysis that were most prevalently utilised by the researchers

In summary, this study shall reveal the descriptive characteristics and the methodological dimensions of PhD dissertations in Science Education and Curriculum Studies in the University of Port Harcourt within the period; 2005 to 2015. The sampling methods adopted and the instruments for data gathering and data analysis shall also be specifically identified.

Research questions

The study shall provide answers to the following research questions.

- 1) What is the nature of the yearly distribution of the research methods that were applied in Curriculum

studies research in the University of Port Harcourt from 2005 to 2015?

- 2) Which research design featured most in curriculum studies research in the University of Port Harcourt from 2005 to 2015?
- 3) Which data collection tool did the researchers apply most often?
- 4) Which is the most preferred data analysis tool that researchers utilised within the period?

III. METHOD

Adopting a document analysis strategy, the researchers classified the methodological dimensions of the dissertations into four broad aspects, viz:

- 1) Research design,
- 2) Sampling technique,
- 3) Instrumentation and
- 4) Data analysis tools.

The researchers aligned the four methodological dimensions with the research questions posed in the study. The requisite data were then gathered and frequency counts of the different aspects of the research methods captured and analysed accordingly.

Sample

The study adopted a census sample, wherein the whole population of 26 dissertations constitute the sample for the study

Table 1: Comprehensive data table

S/N	Years Methods	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	TOTALS/%	
01	Design													
	Descriptive	0	1	0	2	0	2	0	0	1	0	1	7	25.9
02	Quasi Experimental	1	0	1	0	0	3	1	3	0	9	2	20	74.1
	Sampling													
03	Intact class	1	0	0	0	0	1	1	0	0	2	1	6	23.1
	Simple random	1	0	0	2	0	1	0	2	1	4	1	12	46.2
04	Stratified random	0	0	1	0	0	1	0	0	0	0	0	2	7.6
	Purposive	0	0	0	0	0	0	0	1	0	5	0	6	23.1
05	Instrument													
	Questionnaire	0	1	0	2	0	1	0	0	1	2	2	9	29.04
06	Achievement test	1	0	1	0	0	4	2	3	0	8	0	19	61.3
	Interviews	0	0	0	0	0	0	0	0	0	1	0	1	3.2
07	Inventory checklist	0	0	0	0	0	0	0	0	0	2	0	1	3.2
	Observation	0	0	0	0	0	0	0	0	1	0	0	1	3.22
08	Data Analysis													
	Descriptive	0	0	0	0	0	2	1	3	1	9	1	17	32.07
09	t-test	1	1	0	2	0	2	1	2	1	4	0	11	20.7
	ANCOVA	0	0	0	0	0	0	1	2	0	4	2	9	17
10	MANOVA	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANOVA	0	0	1	0	0	1	1	1	0	5	1	10	18.86
11	CHI SQ	0	1	0	0	0	1	1	0	0	0	0	3	5.6
	Z0TEST	0	0	0	1	0	1	0	0	0	1	0	3	5.6
12	Correlation	0	0	0	0	0	0	0	0	0	0	0	0	0
	STUDIES OPTIONS													
13	EDUC. SCI.	0	1	1	1	0	2	0	3	0	4	1	13	50
	LANGUAGE	1	0	0	1	0	2	1	0	1	2	1	9	34.6
	SOC. STUDIES	0	0	0	0	0	1	0	0	0	3	0	4	15.4

Table 2: Table of distribution of research designs

S/N	Method Factors (Research Design)	FREQUENCY (RESEARCH DESIGN)											Total
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
01	Descriptive	0	1	0	2	0	2	0	0	1	0	1	7
02	Experimental	1	0	1	0	0	3	1	3	0	9	2	20

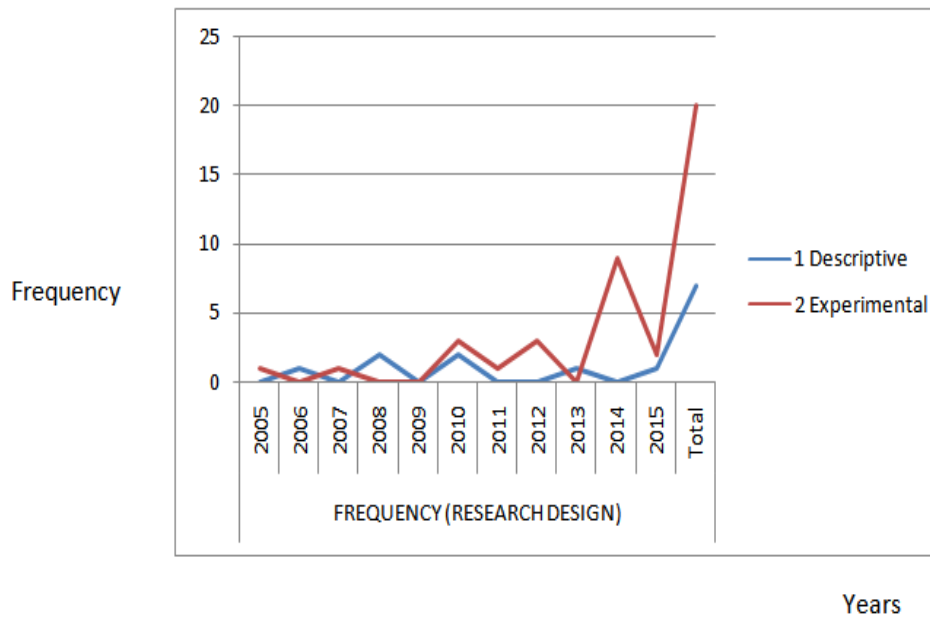


Fig. 1; Graphical Distribution of research designs

Table 3: Table of distribution of sampling

S/N	SAMPLING TECHNIQUES	FREQUENCY (SAMPLING TECHNIQUE)											
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
01	Intact class	1	0	0	0	0	1	1	0	0	2	1	6
02	Simple random	1	0	0	2	0	1	0	2	1	4	1	12
03	Stratified	0	0	1	0	0	1	0	0	0	0	0	2
04	Purposive	0	0	0	0	0	0	0	1	0	5	0	6

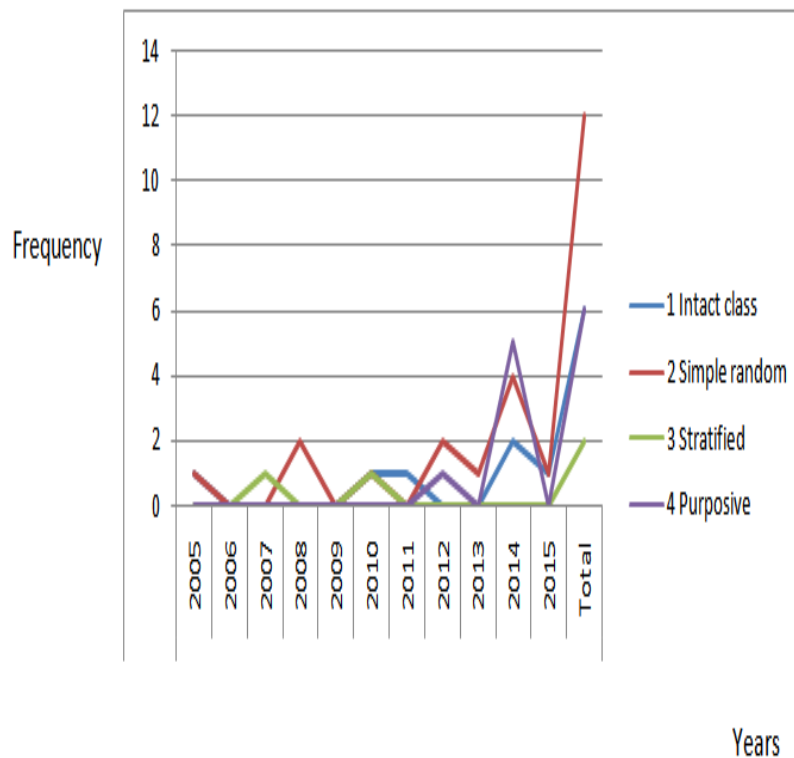


Fig. 2: Graphical Distribution of sampling techniques

Table 4: Table of distribution of research instruments

S/ N	TYPES OF INSTRUMENTS	FREQUENCY (INSTRUMENT)											Total
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
01	Questionnaire	0	1	0	2	0	1	0	0	1	2	2	9
02	Achievement test	1	0	1	0	0	4	2	3	0	8	0	19
03	Interviews	0	0	0	0	0	0	0	0	0	1	0	1
04	Checklist	0	0	0	0	0	0	0	0	0	2	0	1
05	Observation	0	0	0	0	0	0	0	0	1	0	0	1

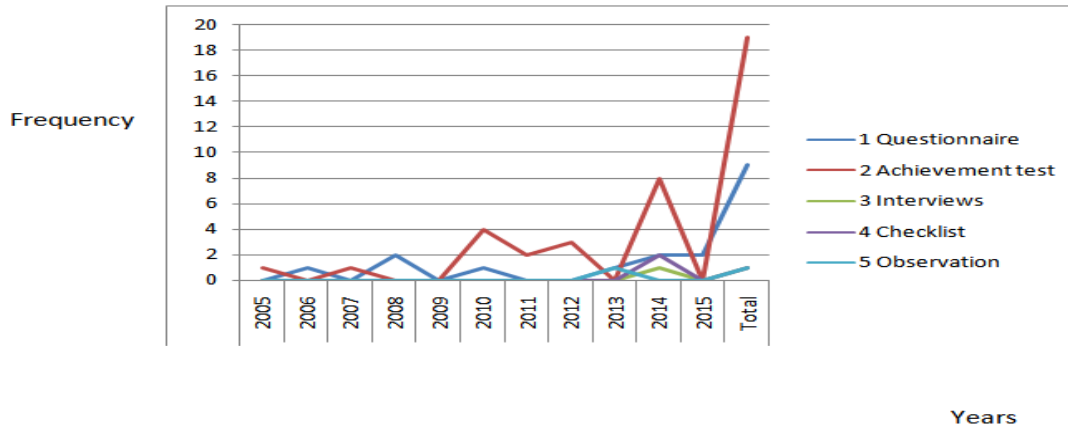


Fig. 3: Graphical distribution of instruments

Table 5: Table of distribution of data analysis tools

S/N	Data analysis tools	FREQUENCY (DATA ANALYSIS TECHNIQUE)											Total
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
01	Descriptive	0	0	0	0	0	2	1	3	1	9	1	17
02	T – test	1	1	0	2	0	2	1	2	1	4	0	11
03	ANCOVA	0	0	0	0	0	0	1	2	0	4	2	9
04	MANOVA	0	0	0	0	0	0	0	0	0	0	0	0
05	ANOVA	0	0	1	0	0	1	1	1	0	5	1	10
06	CHI SQ	0	1	0	0	0	1	1	0	0	0	0	3
07	Z – TEST	0	0	0	1	0	1	0	0	0	1	0	3
08	Correlation	0	0	0	0	0	0	0	0	0	0	0	0

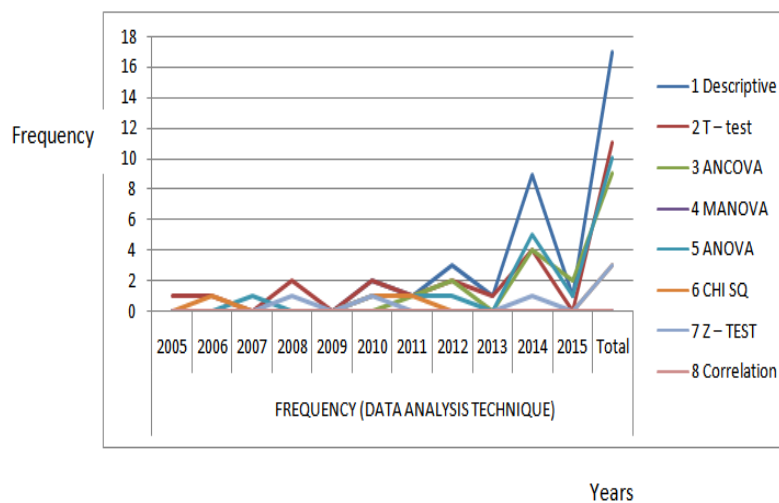


Fig. 4: Graphical Distribution of data analysis tools

IV. DATA ANALYSIS

Research design.

The analysis of data as indicated in Table ii and Fig. 1, revealed a frequency of 20 applications of the experimental design, being 74.1%, while the descriptive survey design had a frequency of 7 applications, ie 25.9%. We therefore conclude that the experimental design is the commonly adopted research design amongst curriculum and education science researchers in the University of Port Harcourt within the period 2005 to 2015.

Sampling method

The simple random sampling method was most frequently applied by majority of the researchers. It had a frequency of 12, ie (46.1%). The next, the stratified random sampling technique had a frequency of 6, ie 23.1%. It tallied with the intact class sampling method, which also had a frequency of 6 (23.1%). The least preferred is the purposive sampling method with a frequency of 2 ie (7.7%)

Instruments for data collection

Achievement tests and questionnaire were the most frequent instruments utilised for data collection by curriculum and education science researchers in the Department of Curriculum Studies and Educational Technology of the University of Port Harcourt. They had frequency of occurrence rating of 19 and 9, being 61.3% and 29% respectively. The observation, interview and checklist methods were the least preferred methods of data gathering. Each of them recorded a frequency of occurrence of 1.

Data analysis

Most of the researchers utilised the descriptive method of data analysis. It had a frequency score of 17 which is 32%. The next preferred tool of data analysis is the t – test. It had a frequency of 11 (20.7%). The followed the ANOVA and the ANCOVA with frequency counts of 10 (18.9%) and 9 (17%) respectively. The Chi square and the Z test tallied at frequency of 3 (5.7%), while the MANOVA and Correlation test also tallied at frequency of zero (0).

V. RESULTS

In summary, major methodological outcomes revealed in the study include the fact that 74.1% of the curriculum and education science studies undertaken in the Department of Curriculum Studies and Educational Technology of University of Port Harcourt adopted the experimental design. The remaining 25.9% utilised descriptive research design.

On sampling technique, it was revealed that simple random sampling technique was the most utilised method of sample selection. This applied to 46.1% of the studies while the next most frequently utilised method of sample selection is the stratified random sampling technique which was used in 23.1% of the studies. The instrument for data collection saw the use of achievement test in 61.3% of the studies while questionnaire accounted for 29% of the studies. Data analysis saw the use of descriptive method in 32% of the studies while t – test statistical tool was applied in 20.7% of the studies. ANOVA and ANCOVA were applied in 18.9% and 17% of the studies respectively.

VI. DISCUSSION

Although promotion and tenure criteria in colleges and universities have been strongly biased towards experimental studies, thereby tilting the pendulum of research studies towards that direction [5], experimental designs command the innate capacity to accord educational projects a positive evaluation. It is therefore a welcome development that most of the research conducted in the Department of Curriculum Studies and Educational Technology of the University of Port Harcourt adopted the experimental design. Other benefits of the scientific experimental design include:

- 1) It constitutes a basis for determining what works in education as entrenched in the “No child left behind” legislation [6]
- 2) It can serve as evidence to provide technical assistance to practitioners in the industry and to generate scientific research evidence on important educational intervention [5]

The Department of Curriculum Studies and Educational Technology of the University of Port Harcourt is therefore duly poised to contribute to the technological development of Nigeria through educational intervention projects.

VII. RECOMMENDATION

This study is recommended to future researchers and policy makers in the field of curriculum studies and the education sciences.

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