# TRAINING NEEDS ASSESSMENT OF RESEARCH SKILLS AMONG GRADUATE STUDENTS IN UNIVERSITIES IN CROSS RIVER STATE, NIGERIA

BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DOCTORAL DEGREE (Ph.D) IN EDUCATIONAL RESEARCH AND STATISTICS

JULY, 2019.

## CERTIFICATION

I, Bitong Anthony Aranrie with registration number EDR/Ph.D/16/005, certify that this dissertation on "Training Needs Assessment of Research Skills Among Graduate Students in Universities in Cross River State, Nigeria" is original, and has been written by me. It is a record of my research work and has not been presented before in any previous publication.

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## CERTIFICATION

We certify that, this thesis titled "Training Needs Assessment of Research Skills among Graduate Students in Universities in Cross River State, Nigeria by **Bitong, Anthony Aranrie** with Registration Number: **EDR/Ph.D/16/005** carried out under our supervision, has been found to have met the requirements of the University of Calabar, Calabar. We therefore recommend the work for the award of Doctorate Degree (Ph.D) in Educational Research and Statistics.

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## ABSTRACT

Training Needs Assessment required standards) and assessment (process for identifying needs and placing them in (TNA), is the right step to design an appropriate, cost-effective training programme with clear priorities aimed at achieving specific knowledge, skills and practice. The study focused on assessing the training needs of research skill of post-graduate students in two Universities in Cross River States, Nigeria. To achieve the purpose of the study, eight (8) null hypotheses were formulated to guide the study. The descriptive survey design was adopted, while stratified random sampling technique was deployed to select six hundred and eighty - three (683) graduate students from the two universities: University of Calabar (UNICAL) and Cross River University of Technology (CRUTECH). The instrument used for collecting data for the study was 54-items Training Needs Assessment Survey Questionnaire (TNASQ) on nine research skills training needs and students' demographic characteristics. The results of a trial testing of the instrument gave a reliability estimates of 0.85-0.94 for the nine sub-variables. The eight (8) null hypotheses were tested at .05 alpha level using one sample population t-test, independent sample t-test, one way analysis of variance (ANOVA) and Fisher's Least Significant Difference (where appropriate). The result obtained showed that there is significant need for training on all the sub-variables of research skills, there are gender-based differences in the research skills training needs; students' age, academic programme, marital status, all have significant influence on their research skill training needs. Results showed that full time students were more in need of research skills training than part time students. The differences due to ownership of institution attended were not significant. From the results, it was concluded that the level of research training needs is significantly higher than the expected level of the sub-variables and that these training needs are influenced by graduate students' demographic variables. It was therefore, recommended among others that

lecturers should identify the level of research skills needs students strongly desire training or the gaps or areas of needs of research skills to be addressed, thereby, helping students achieve quality research.

**(Word count 340)**

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the study

The mission of providing skilled workforce is the task of University all over the world. Training is the only available tool to achieve this mission. The ability to achieve the mission of training distinguishes Universities. Therefore, universities are ranked on these bases. Universities that meet the required conditions and missions are ranked higher than others. Meeting this mandate involves requisite research skills, knowledge and attitude, to enable students to realize their potential and become self-reliant which is one of the major goals of tertiary education in the National Policy on Education of Federal Republic of Nigeria (frn, 2013). According to Nigerian National Policy on Education, the students will acquire both physical and intellectual skills, which will enable them to be self-reliant and useful members of the society and also promote and encourage scholarship and community service. Despite Government effort to maintain educational standard in higher institutions, the goal is yet to be achieved (Musari, 2009).

Moreso, the graduates of any Higher Institutions in this 21st century seems skill deficient, which is students lacking basic research skill among others. Thus, they lack what it takes to adequately carry out qualitative, quantitative or mixed study in research. This has given rise to producing students who are more of job seekers and dependent on others for survival. It increases every year because of the number of graduates that enter the labour market and unemployment rate has increased from 21 percent in 2010 to 24 percent in 2019 (Muslim, 2013). Jakpa (2013), sums that our educational system does not train our youth to acquire research skills that will make them to meet the needs of the society. Empowering students with relevant research

skills helped to be self-reliant, relevant and functional members of the society whether employed by-government or self-employed. If research skills are acquired and applied appropriately, policy makers and other beneficiaries will have confidence in the outcome of research to solve problems (Mike, 2014).

There is therefore the pending confrontation challenging the quality of project prepared by students in universities (Okebukola, 2002). Okebukola (2002) also noted that University students' performances in research methods examination is not commensurate with the growing demand for good research that meet the local and national standards for publishing with the sole aim of contributing substantially to the knowledge bank. Some students develop negative attitude, during the learning process, on courses like research and basic statistics. Lack of commitment to course of study can adversely affect the students' performance in the acquisition of research skills and in solving national problems. It has also been observed that there is an ample evidence to show that research conducted by higher education (especially graduate) has not contributed to the expansion of world knowledge, and improvement in the economy of a nation (Bako, 2005). This is not supposed to be so, since research results in general are the pillars on which new knowledge can be discovered and upheld. Students are therefore supposed to be conversant with the expected research skills during and after graduation to be able to impact positively on the society.

However, what obtains these days among project students, especially graduate students, leaves much to be desired. For instance, it has been observed that some graduate students go to other universities or tertiary institutions, to obtain copies of already completed research work and present these same topics to their supervisors. Their supervisors who are usually not aware of the existence of such research topic, approves the topic and the supposed research student simply then copies word for

word, chapter to chapter and presents to his or her supervisor regardless of the consequence of plagiarism. This aspect of academic fraud and dishonesty is common among graduate students who are being guided by complacent supervisors. Also, it is common these days to hear some lecturers telling their research students to write all and submit. Write all and submit instruction gives room for the students to engage in this kind of fraudulent academic practice (Obot, 2014).

In another instance, it is speculated that some students undertaking research project do hire other persons believed to be more skillful in the art of project writing to write for them upon agreed fees. In this, case, another student does the entire work. Such other researcher may know next to nothing of what is purportedly written as the content of the work from his/her client (Okebukola, 2002). In the scenario above, the supposed student is aimed at only fulfilling necessary the conditions for graduation and not developing the research skills needed.

Another act exhibited by some research students which negates the correct practice of research occurs during data collection. Here, the researcher writes all that is to be written. However, instead of gathering data from the field or through experiment for analysis, he or she formulates or cooks up arbitrary or fake data on his/her own for the research. Research is intended to make new discovery. But in this case such research student knows even the conclusions of his or her work before he/she starts the research work. Thus, he or she manipulates his or her data to suit his or her purpose. Furthermore, one of the most grievous of all the practices by students of research is the photocopying of old projects written by other persons either in the same department or in another institution and presenting same to their supervisor as their work (Eze, 2011). In order therefore to address the problem of quality of research prepared by graduate students in Nigerian universities, there is the need to improve the quality of training

provided to graduate students so as to achieve meaningful results. This implies that empirical data should be provided through research on various areas of research skills that graduate students have trouble.

The universities however, have not been unmindful of the difficulties graduate students are having in research skills. In the University of Calabar, the Graduate School Board has provided a guideline to help minimize graduate students in difficulties in understanding their research skills. To ensure quality in theses writing, graduate students are made to pass through a four stages of ritual proposal, mini defence, departmental defence and post field defence before final defence, with a panel headed by an external examiner. At early stage a student is expected to demonstrate that he/she has a fair understanding of research skills. In spite of all the steps taken by relevant University authorities, many graduate students are most times wanting in their ability to understand research skills appropriately in their theses writing. The identified research skills in the study include the following: Problem identification skill, research questions/hypotheses formulation skills, literature review skill, sampling skill, instrum ent development skill, use of statistical tool skill,

computer application in data analysis skill, references skill and report writing skill.

Abounding literally work exist on the potency of research in Nigeria, there seems to be paucity of research on the evaluation of research skills training needs. There is need for needs assessment study of research skills among scholars, especially higher degree students. A need assessment is a systemic process of ensuring and addressing needs, or 'gaps' between current conditions and desired conditions of wants. The discrepancy between the current condition and wanted condition must be measured to appropriately identify the need. The need can be a desire to improve current performance or to correct a deficiency (Kizlik, 2009). Needs assessment is an integral

part planning process. It is usually utilized as a means of improving individual's training in an organizations. It can refine and improve a product such as training or service a client receives. It can be an effective tool to clarify problems and identify appropriate interventions or solutions (fulgham & Shaughnes, 2005). When a problem is properly identified, finite resources can be directed towards developing and implementing a feasible and applicable solution (altschuld, james & Kuma, 2010). Gathering relevant and appropriate sufficient data informs the process of adequately developing an effective tool that will address the group's needs (Altschuld, 2010). Needs assessments are only effective when they are end-focused and provide concrete evidence that can be used to determine which possible means to the ends are most effective and efficient for achieving the desire results (Kaufman, Rogas & Mayer, 2008).

Needs assessments can help improve the quality of policy or programme decision thus, leading to any improvements in performance and the accomplishment of desired results. Improving results that is, moving from current to desired performance is typically a worthwhile and valuable effort. The results of a needs assessment will guide subsequent decisions including the design, implementation and evaluation of projects and programs that lead to achieving desired results (Watkins, Meiers & Visser, 2011). Defining needs is an essential starting place for needs assessments. The Word needs is conceived by different scholars from different perspective. Need is often defined as a gap in results where its satisfaction or partial satisfaction is necessary for the achievement of another specific, socially – permissible result (Kizlik, 2009).

There are three perspectives on need in a needs assessment; Perceived needs centered on people's thought of their need and its varied with each respondents; Expressed needs on the other hand are defined quantity of help seekers based on

circumstances surrounding their feelings and action. A major weakness of expressed needs assumes that all people with needs seek help; Relative needs are concerned with equity and must consider difference in population and social pathology (Kaufman, 1998). Needs assessments, carried out with useful keen focus and intense integrity, will answers relevant questions and better ensure the success of any organization. It is not enough evaluating students' appropriateness in application of research skills as had been found in many studies over the years, needs assessment of students' research skills is said to be the cornerstone researchers have neglected over the years, which is the central focus of this study.

Practice and pragmatic need assessments provide a process of identifying and prioritizing gap between current and desired results (Kauftman, 1998). Needs in the study context is on gaps in research skills that graduate students need help. This also refers to areas of research skills that researchers have troubles. Researcher may express need in an area of research where they are insufficient knowledge and need specific skills required for thesis writing or doing research generally.

Again, available need assessment evidence (More, 1977, Okpala & Onocha, 1986; Odinko & Oshokoya, 2004; Ekuri, Egbai & Ita, 2011) has identified individual characteristics as critical in explaining perceived programme needs among programme users. This study is designed to provide a description of express needs of graduate students on research skills, and how these may be explained in terms of level of research skills training needs, students' age, programme of study, ownership of school attended, marital status as well as students' gender and academic disciplines influence on their research skills.

## 1.2 Theoretical framework

Among theories of psychology, the following theories that this study can be anchored upon are;

(i) McClelland's Need Achievement Theory (1960)

(ii) Victor Vroom's theory of expectancy (1964)

(iii) Rogar Kaufiman need Assessment (1975)

### 1.2.1 McClelland's Need Achievement Theory (1960)

This is one of the theories of human motivation that used human need classification. The theory was developed by McClelland in 1960. There are however, other need achievement theories for example Maslow's theory, which stresses a universal hierarchy of needs. But McClelland's theory stresses that there are certain needs that are learned and socially acquired as the individual interacts with his environment. In other words, McClelland believes that many needs are acquired from culture, and some may be learned through training. The emphasis of the theory is on three major needs such as the need for achievement (n-Ach); the needs for affiliation (n-Aff); and finally the need for power (n-Pow). Among the above identified three needs, the most extensively studied by the proponents of this theory is the need for achievement. This is the one at focus in this work.

The need for achievement (n-Ach) can be conceived as a desire for productivity; the desire to perform excellently; the desire to be successful in competitive situation. In an effort to assess people's achievement need or motive, different perspectives are used to score the responses of individual so as to determine those who had high achievement need or not. Though, centered on numerous with the need for achievement has the following features:

i. Taking personal responsibility and solving identified problem.

ii. Solving a problem without resulting to chance outcome

iii. Taking moderate risks rather than high or low risks, set moderate, realistic and attainable achievement goals, and are inclined to take calculated risks and they desire regular and concrete feedback on their performance (p.24)

The implication of this theory for this study is that students with need achievement generally show more initiative and exploratory tendencies towards solving problems with high degree of satisfaction. Put in another form, the need to excel and advance educationally will motivate students to be serious with their research work which is part and parcel of their graduation requirement at the end of their educational programmes. In addition, the need for achievement of excellence in their academics serves as a force that compels students to undergo the necessary procedures in carrying out their research work. The outcome of their research spurs them to exhibit positive attitude towards their research work. The fear of being a failure academically serves as a driving force to these students.

### 1.2.2 Victor Vroom's theory of expectancy (1964)

Victor Vroom first propounded this theory in 1964. The preposition is that a person will decide to behave or act in a certain way because he is motivated to select a specific behavior over other behavior due to what he expects the result of the selected behaviour will be. The motivation of the behavior selection is determined by the desirability of the outcome.

The theory hinged on the role of mental processes in choice making". Process undertaken by individual to make an informed choice. The emphasizes of the theory is on the need to relate rewards directly to performance, ensuring that the rewards provided are those deserved and governed by the several alternative form of voluntary activities, a process controlled by the minds of individual. The individual choses

existing goods based on estimates of outcome and a given behavioral pattern which are similar with or definitely will lead to the results. Several authours have concluded that motivation is a function of individual's expectancy that a consistent effort will result in the intended performance, the tool of this performance is to achieve a certain result, and the desired outcome for the individual is referred to as valance.

The theory gives insight to behavioral processes of choose between one behavior options and another. Silver (1983) maintains that the instrumentality construct highlights the motion that direct outcomes of action can be viewed as a means toward the accomplishment of goals or ends. That is, direct outcomes are the ends of particular action but may also be the means (instrumentalities) for attaining other ends. Whether an outcome is an end in itself or a means toward other ends is solely a matter or individual perception (Silver, 1983). Three variables within the expectancy theory were introduced by Vroom. These are Valance (V), Expectancy (E) and Instrumentality (I).

Opie (2006) opines that students that have high desirability for higher grade in their research project manifest this expectation through the exhibition of high positive attitude towards their research works. This will be seen in their level of commitment, seriousness and desire for originality in their work. Students' expectation for high grade in their research work can also be influenced by intellectual climate of the institution, personality of his or her supervisor and the students' desire to pursue his academic career to doctorate level will show a more concern for higher grade because without meeting the required grade point average, he will not grow higher in the academic leader.

This quest for higher academic attainment is the earnest expectation that will motivate the students to exhibit positive behaviours that will bring the desired reward.

External needs assessment takes a look at needs from a holistic point of view outside the organization, that is, in society. Thus, external needs assessment is defined by the authors as attempting to identify the results that are important in order for someone to be, at least self-sufficient, self-reliant and not economically dependent, once he or she is outside the organization. He suggested that the requirement for this independence should be used as a basis for planning. In other words, an external needs assessment considers what individuals will have to do to be self-sufficient once they exist educational or training system. Can they make contributions to their community and society? Can they embark on research? Can they critic research work? Since gaps exist between what an individual does in present circumstance (what is) and what he/she will be able to do (what should be) with regard to the criteria of self -sufficiency and contribution, then effort should be put in place to close the gap.

External needs assessment is mostly influenced by formal research that generate relevant information from clientele. Therefore, it always results in information that is tallied to needs of individuals, and in most cases, it can be quantified in terms of chances and confidence and is advisable that it should be conducted periodically for major programme efforts.

According to Kaufman (1975) internal needs assessment identifies and correct previous result through an external needs assessment. It uses secondary data or asks surrogates (advisers) for their opinions about priority, needs and issues. However, even for non-formal assessments, if the results are to be credible, procedures must be followed and the results must be carefully documented.

According to Macawley (2004), proper needs assessment is a systematic approach to studying the state of knowledge, ability, interest or attitude of a defined audience or group involving a particular subject. Needs assessment is carried out to enable the

target populace to verify level of knowledge in the said skill, interests and opinions, or learning habits and preferences. It also provides an opportunity to look into what has already been done and what are the existing gaps to be filled. In other words, collecting and analyzing needs assessment data allows the investigator to describe the 'gap' between what exist and what is needed. This in-depth insight ensure that educator to make informed decision about needed investments, thereby extending the reach and impact of educational programming.

Thus, the implication of Kaufman (1975) and Macawley (2004) necessitate the periodic study of needs assessment to evaluate and suggest evidential prove answerable for a gap created and to lay out a template to fill in the existing gaps for the actualization of the set goal.

### 1.3 Statement of the problem

Graduating students in universities are expected to possess and apply essential skills that can enable them to display high level of research skills. Where these skills are readily available and effectively utilized in research situations; they serve as veritable engine of the vehicle of research activities in accomplishing national and international goals.

Moreso, 21st century University graduates appear to be skill deficient, that is, students lack basic research skills. They lack what it takes to appropriately carry out a quality research work. This has given rise to producing students who are more of job seekers and dependent on others for survival. It increases every year because of the number of graduates that enter the labour market and unemployment rate has increased from 21 percent in 2010 to 24 percent in 2019.

Also, our educational system does not train our youth to acquire research skills that will make them to meet the needs of the society. Equipping students with research

skills in the university will help them to be self-reliant, relevant and functional members of the society whether employed by-government or self-employed. If research skills are acquired and applied appropriately, policy makers and other beneficiaries will have confidence in the outcome of research to solve problems.

Studies had indicated that University students' performances in research methods examination is not commensurate with the growing demand for good research that meet the local and national standards for publishing with the sole aim of contributing substantially to the knowledge bank. Lack of commitment to course of study can adversely affect the students' performance in the acquisition of research skills and in solving national problems. It has also been observed that there is an ample evidence to show that research conducted by higher education (especially graduate) has not contributed to the expansion of world knowledge, and improvement in the economy of a nation (Bako, 2005). This is not supposed to be so, since research results in general are the pillars on which new knowledge can be discovered and upheld. Students are therefore supposed to be conversant with the expected research skills during and after graduation to be able to impact positively on the society.

The universities however, have not been unmindful of the difficulties graduate students are having in research skills. In the University of Calabar, the Graduate School Board has provided a guideline to help minimize graduate students in difficulties in understanding their research skills. To ensure quality in theses writing, graduate students are made to pass through a four stages of ritual proposal, mini defence, departmental defence and post field defence before final defence, with a panel headed by an external examiner. At early stage a student is expected to demonstrate that he/she has a fair understanding of research skills. In spite of all the steps taking by relevance University authorities, many graduate students are most times wanting in

their ability to understand research skills appropriately in their theses writing. The identified research skills in the study include the following: Problem identification skill, research questions/hypotheses formulation skills, literature review skill, sampling skill, instrument development skill,use of statistical tool skill,Computer application in data analysis skill, references skill and report writing skill, ranges from.

While there exists a considerable literature on the potency of research in Nigeria, there seems to be paucity of research on the evaluation of research skills training needs in the study area. There is need, for needs assessment study of research skills among scholars, especially higher degree students. Needs assessments, done with useful focus and integrity, will answers questions and better ensure the success of any organization". It is not enough evaluating students' appropriateness in application of research skills as had been found in many studies over the years, needs assessment of students' research skills is said to be the cornerstone researchers have neglected over the years, which is the central focus of this study.

This study is designed to provide a description of express needs of graduate students on research skills, and how these may be explained in terms of level of research skills training needs, students' age, programme of study, ownership of school attended, marital status as well as students' gender and academic disciplines influence on their research skills training needs among graduate students in Universities of Cross River State, Nigeria.

### 1.4 Purpose of the study

The main purpose of carrying out this study is to assess the research skills training needs among graduate students in Universities situated in Cross River State, Nigeria. More specifically, the study focused on the following objectives;

5. What are the training needs of graduate students in terms of academic discipline on their research skills.
6. What are the training needs of graduate students in terms of programme of study on their research skills
7. What are the training needs of graduate students in terms of method of study on their research skills
8. What are the training needs of graduate students in terms of in terms of ownership of institution attended (federal and state universities) on their research skills

## 1.6 Statement of hypotheses

The following null hypotheses were formulated to guide the study.

1. The level of research skills training need is not significantly different from the expected level.
2. Students gender has no significant influence on their research skills training need.
3. Students age has no significant influence on their research skills training need.
4. Marital status has no significant influence on students' research skills training need.
5. Students' academic discipline has no significant influence on their research skills training need.
6. There is no significant academic programme- based difference in students' research skills training need.
7. Method of study has no significant influence on students' research skills training need.

8. Ownership of institution attended does not significantly influence research skills training needs of graduate students.

## 1.7 Significance of the study

This study is significant from the viewpoint of its remarkable insight to improve the performance of post graduate students in research skills application and other groups that will benefits. They include: Graduate students, Lecturers and supervisor of these dissertations work, Policy makers/government (state and federal), and the society.

The findings of this study would be beneficial to students in view of the fact that it will help in improving graduate students' appropriate application of research skills while undertaking their research project. Also, the findings of the study may improve students' preparation and help them to be well equipped to take part successfully in a changing and influencing economy. It would add substantially to supervisor's knowledge and discovery of research skills of the students they are supervising or guiding. It may give lecturers many insights on how to teach research related courses like research methods. It may also enable lecturers to know their imperative role in supervision of research project and how to handle such work so as to help the educational institutes in achieving their aims of producing graduates that are well vested in research skills.

The findings of this study may add to the knowledge bank, through subsequent discussion of the levels of research skills of the students whom they are to serve as guides and directors. Policy makers'/government agencies will benefit from this study, since they will have confidence in the outcome of researchers and the funding agencies investment will yield the needed reliable result for recommendation to the various agencies of government. The society as a whole will derive some gain

from the findings of this study as it will add to the knowledge bank on research skills, thus, providing a basis for future related studies.

### 1.8 Assumptions of the study

The following are assumptions of the study:

1. The researchskills of graduate students are measurable and normally distributed.
2. That the graduate students have their various characteristic which are identifiable and can be measured on investigation.
3. The responses of each respondent in the study reflected his/her true feelings, perception or opinion hence, the responses were assumed valid and reliable..

### 1.9 Scope of the study

The study covers all the postgraduate students of the university of calabar (UNICAL) and cross river university of technology (CRUTECH). Only post graduate students in Education, Sciences, Management sciences, Art and Agricultural sciences of the university of Calabar (UNICAL) and Cross River University of technology (CRUTECH) for 2016-2018 academic session were involved in the study. In this study, three attributes namely; research skills training needs of graduate students, student's characteristics in term of gender, age, marital status, programme of study, method of school attended and discipline were used as independent variables while research skills training needs of graduate students constitute the dependents variables which were assessed in relation to postgraduate research skills in Universities in Cross River State.

### 1.10 Limitations of the study

Since the study relied heavily on the respondents' assessment and self-disclosure, not knowing the extent of their honesty in responding to the items can

# CHAPTER TWO

# LITERATURE REVTEW

Studies conducted by various scholars and researchers that are relevant to this investigation will be the focus of this chapter. The sources of these reviews are numerous, they are: textbooks, journals, seminars and conference papers, projects/theses/ dissertation reports and internet materials. The researcher therefore reviewed related and relevant available literature, which includes expert's and professional opinions in the area, empirical findings conducted in Nigeria as well as other countries as much as possible. The review was done under the following headings:

2.1 Concept of Training Needs Assessment (TNA)

2.2 Level of Research Skills Training Needs Among Graduate Students

2.3 Students Gender and Research Skills Training Needs

2.4 Students age and their research skills training need

2.5 Marital Status and Research Skills training needs Assessment

2.6 Students' academic discipline and research skills training needs

2.7 Academic programme and students research skills training needs

2.8 Method of study (Full-time and Part-time) and research skills training needs of graduate students

2.9 Ownership of institution and research skills training needs

2.10 Summary of reviewed literature

## 2.1 Concept of training needs assessment (TNA)

For any training to be effective, knowledge of the requirement is paramount for individual, department and organisation in general. Insufficient resources necessitate proper budgeting to finance training sessions. Result oriented training needs

assessment (TNA) is primarily necessary as technological advancement is influencing working activities. TNA aids channelling resources to most challenging aspect like employee development, morale enhancement and organisational performance. TNA is a natural function of appraisal systems and is key requirement for the award of Investors in People. Effective TNA involves systematic planning, analysis and coordination across the organisation, to ensure that organisational priorities are taken into account, that duplication of effort is avoided and economies of scale are achieved. All potential trainees should be included in the process, rather than rely on the subjective evaluation of managers.

### 2.1.1. The various types of training needs

The need in this context is viewed as the existing gap between the present and the desired situation. In other words, refers to what is indispensable or at least valuable, to the organization or to individuals for the purpose of achieving an evaluated, appropriate objective (Fernandez 1988). Training needs may be individual or collective.

### 2.1.2 The purpose of training needs analysis

The purpose of a training needs analysis is to close the gap between the actual and desired situations by determining discrepancies in outcomes, placing them in order of priority and selecting the most important for closure or reduction (Rothwell and Kazanas, 1998). Therefore consists in collecting, analysing and comparing concrete (measurable) data representing, on the one hand the actual performance of a system (objectives, outputs or variables in terms of actions) and, on the other hand, its desirable performance, whether wanted internally or externally, with the overall goal of identifying as accurately as possible the specific needs of the clienteles affected by

the activities of an educational or training system (Lapointe, 1992). The training needs analysis must be carried out before training activities are organized, since it guarantees the success of those activities. It ensures synergy among individual learning needs and the quest for effectiveness, job performance, and strategic organizational development (Potter, 2003).

To achieve this, the data analysis process must allow collection of the largest possible volume of information concerning the type of optimum skills required to perform a task, the actual level of skills among the population(s) under review, their opinion concerning their own terms of reference for training needs analysis. Continuing education will improve the performance, potential causes of the gap between the actual and desired situations, and various possible solutions, from a number of perspectives (Rossett, 1987).

2.1.3 Circumstance necessary to perform a training need analysis

The training needs analysis is a pivotal to strategic planning required in training that will successfully close the gap between the actual and desired situations. It amounts to substituting the right remedy and applying same to the right problem. Since limited budgets are available for training, the preferred areas of training must be those ensuring that the anticipated outcome will be achieved, as well as maximum gains for the professionals and their organization (Sims, 1990). McConnell (2003) described how crucial Needs analysis is in planning for training.

1. Systemic changes in work: When a work description is changed or operating methods are reviewed, or simply in the case of new expectations, training is often required. At that time, a training needs analysis allows identification of staff training needs, to enable them to adapt appropriately to the changes introduced.

2. Introduction of new technology: adopting new technology goes hand in hand with a method of use that must be the subject of training. In addition, this training must anticipate how use of this new technology will be adapted to the specific organizational context to which it is introduced. Accordingly, learning to operate a specific new technology requires acquisition of additional skills or knowledge, which may vary in the various staff groups likely to make differing use of the technology in question. It is therefore appropriate to perform a training needs analysis to specify the training needs of each of these groups as regards use of the new technology.
3. New government standards: Periodic revision or new government standards normally require training for professionals whose practice is affected by these changes. This is the best way to ensure compliance with the new standards. At that time, the training needs analysis will allow definition of the skills that must be developed for correct implementation of these new standards.
4. Declination in work quality and performance in department or organization: Several factors give rise to a declination in work quality and performance of a given department or area of activity. Therefore training need analysis among the various professional groups involved will indicate whether training is one of the ways to improve attainment of pre-set objectives.
5. Departmental meetings, opinion poll, organizational research and separation interrogation of previous employee, although conducted for other purposes, creates opportunity to reassessed demonstrated training needs. Training needs analysis will then provide the possibility of establishing whether these needs are common to all staff.

6. Inexistence of required skills and knowledge: Setting of specific objectives by an organization does not provide information as regards staff capacity to attain them. A training needs analysis will determine whether training needs exist associated with attainment of these objectives and, if so, which ones (Rossett, 1987).
7. Lack of motivation: None existence of motivation tactics negatively influence work performance. Value ascribed to work and individual value ascribe to work are the two factors that increased work motivation. In such a situation, a training need analysis can help identify the causes of lower performance or bring to light undeveloped skills. Well-targeted training to cultivating deficient skills, could possibly raise the level of self-confidence–a factor often intrinsically linked to motivation.

2.1.4 Skills require for conducting training need analysis

The individual responsible for carrying out the training needs analysis must be as objective as possible. Individuals questioned must feel comfortable with this individual; so that they do not skew the information provided in the training needs analysis process (McConnell, 2003). The individual responsible for the analysis must design, implement and carry out the entire analysis process. In addition to choosing the methods and indicators on which the analysis will be based, their tasks include selecting, implementing and managing the strategies designed to obtain the desired interactions with the various players in the environment in question. Pineaul (1986) added that establishment of a planning group is a valuable initial phase in this regard.

i. Ethical Issues:

Training need analysis involves two major ethical challenges. Certain supervisors generally assume what the training needs of their staff are regardless of the

investigation results. They place no value on the objective nature of the analysis process. Another ethical challenge for training needs analyses relates to the objective nature of the process, which is specifically ensured by the confidentiality of the results obtained. The person responsible for carrying out the needs analysis must, at the outset of their initiative, promote to senior management the value of an objective training needs analysis based on use of standardized and impartial measurements of the knowledge and skills involved. In an ethical process, administration, analysis and interpretation of the data must be completely independent of the analyst's subjective judgments (McConnell, 2003). Therefore, the person carrying out the training needs analysis must provide mechanisms to ensure confidentiality of the data collected and advise respondents that such is the case before beginning data collection (Rothwell & Kazanas 1998). McGhee and Thayer (1961) provided a three-tiered approaches in an attempt to prepare needs analysis. These include:

i. Organisation analysis

The organisation analysis allows to view the performance of the organisation. This analysis does not indicate a specific training need of an individual per se but it can highlight performance problems in specific departments within the organisational structure. The following areas assist the organisation in needs analysis:

(a) Departmental Profit and Loss statements

(b) Turnover of employee

(c) Downtime

(d) Organisational Business Plan including objectives and goals

(iii) Operational analysis

At the operational level of analysis is centred on the acquired knowledge, skills and abilities are required to perform assigned jobs/tasks. This information can be gained through:

(a) quality assurance procedures

(b) interviewing Heads of departments

(c) obtaining Job descriptions

(iv) Person analysis

This is where you analyse how well the team or individual performs the task/job. Again a range of tools are available to evaluate the extent of teams and individuals skills, knowledge and abilities. These include:

(a) Staff interview (about the job)

(b) 'On-the-job' observation

(c) Job profile

(v) The steps to conduct a training needs analysis

The Nigeria National Training Authority (1999) provides a diagram that lists out the required steps in conduct a training needs analysis.

Arshad, Yusof, Mahmood, Ahmed & Akhtar (2012) carried out a Study on TNA Process among Manufacturing Companies Registered with Pembangunan Sumber Manusia Berhad (PSMB) at Bayan Lepas Area, Penang, Malaysia. they found out that out of six, five organization contextual variable has a relationship with TNA factors. Even though it is not really an in-depth study, it is significant enough to agree upon that the recommendations made by TNA researchers are followed by organization in this study. Proper adoption and adaption of TNA process increases its effectiveness without wasting time, energy and money in order to achieve the desired performance. Johnson (1993) clearly pointed out that performance improvement is

achieved through skilled, knowledgeable and committed workers who want to make their organization successful. The most important organisational investment is investing on the people. Training needs identification is never an easy endeavour; it requires firstly, a good understanding of the business and secondarily, the future developments of the organizations.

Aartichahal carried out a study of training need analysis based on training and development: the result shows the effect of Training on Performance by Adopting Development Based Strategy. In changing environment, training is not just important but a necessity. Planned and systematic training should not only be compulsory in all private but in public banks as well. This is sequel to findings that it brings changes in behaviour, attitude at any age and helps in increasing the organizational performance. Sufficient training kids are necessary for off the job and on the job training. This acts as an encouragement to improve interest towards training and development of program. By providing training, employers support the skill development of their employees. If the training is good then the employees will contribute their maximum for the achievement of the organizational objectives. The result of the present study shows that the training practices in the selected branches of PNB and HDFC are average and there is lot of scope for improvement. Researcher found that the training and effectiveness programs have a positive impact on the performance of both male and female employees but the results shows that it has a greater impact on the performance of male employees group. The rationale between the variation is that mostly female employees bear additional responsibilities towards their families than the females. The researchers further found out that most of the banks have their own training institute, management attitude is very positive for training support and budget, incentives are given for trainees, and overseas training opportunity. However, the

study passively shows that there is lack of needs assessment before training. Therefore Corporate organisation should endeavour to take necessary steps in ensuring that employees should feel training is essential to enhance the productivity and customer satisfaction to meet the present challenges in Nigeria.

Shulagna and Sarkar (2013) carried out a study on the competency based on Training Need Assessment – Approach in several Indian companies. The finding shows that all organizations must focus on conducting training need assessment before deputing any employee for training. Though most of the organizations cannot claim ignorance of the fact of conducting a need assessment for training their employees; however, most completely failed in practice. In a large number of the smaller organizations, attending training is merely a luck factor where individuals are nominated for trainings only by the seniors. The individuals suffer from biased decision making. Thus the training of an employee fails to achieve the desired result. The described technique has been a solution to the sample organizations. As out of the seventeen sample organizations, only nine were following a systematic form of training need assessment whereas others were fully concentrating on training as a tool for motivation and fulfilling the industrial norms of 48 hours training for each employee.

Jacqueline (2013) carried out a study to investigate the role that TNA can play toward Organization change. The finding shows that Organisational culture and change issues had a very large role to play in the development of a needs analysis process for the organisation. The development of a needs analysis process was a struggle and in the end the determination of the specific methodologies to use was the easiest part of the whole process. The bulk of the training needs analysis literature focuses on

methodology and gives only passing reference to culture or change issues (Boydell and Leary 1996).

Cecilia Nfila (2005) conducted a study on Training Needs Analysis For Bachibanga Company in Botswana The study revealed that training is not the only possible solution to improve performance in Bachibanga Company. Study analysis indicates that "training can only close the performance gap by 16.7percent. Other performance improvement factors reviewed by the study include motivational factors such as, increase in rewards, recognition, appreciation, and availability of resources.

For training to work effectively, identification of performance problem must be analysed. Firstly, the needs assessment must be conducted to find out perhaps training is the best approach to solve the problem. Secondarily, training materials must also be tailored (building stage), and implemented (delivering stage). Finally, training evaluation. Participants' feedback gives the basis for a follow- up plan. It is carried out in their work place to see if they are applying the knowledge and skills learned.

Angelina (2009) carried out a study on needs assessment and analysis method. Many methods were found for conducting a needs assessment and analysis. These methods included task analysis, job analysis, performance improvement, competency-based needs assessment, strategic needs assessment, and knowledge and skill assessment. While performance analysis is used in literature to describe an aspect of needs assessment and analysis method, it aptly describes needs assessment and analysis itself. In essence, performance analysis is another term for needs assessment. Understanding the mannerism and mechanism of using these methods can be confusing for new practitioners. Absolutely, there is not one correct way to apply each method, but there are best practices for each described method. Since performance is

such a broad term, practitioners need more information on how to evaluate performance problems and how to implement assessment and analysis methods.

Syed, Irfan, Muhammad Zubair, Muhammad Umar & Kashif (2013) carried out a study on Training needs assessment practices in corporate sector of Pakistan, The findings of the study indicated some disparate findings in terms of effective outcomes of training. The reason is that the organizations only focus was on conducting the personal analysis of TNA before starting training program. As a result of not engaging in comprehensive TNA approach, the result of the training program is poor and considered a subjective nature. The study concluded that lack of comprehensive TNA approach gives less result and does not meet objectivity criteria of training program. No single respondent had perceived that the organization achieved the training objectivity in a real scene. Most organizations end up achieving the subjective motives and not objective motives of the training. According to the study, many managers perceived training to be a long term investment. Further thorough analysis of TNA or comprehensive TNA approach leads to better result of training outcomes; because comprehensive TNA starts from micro level to macro level or TNA scanning start from organizational level and come to personal level. If the problem is not at organization level, then it is a possibility that the problem may be at operational or task level and again, if the problem is not at task level, the training manager comes up at personal level. Obviously, it has a good impact on the outcomes of the training. Simply, when the TNA comprehensiveness increases, the last two levels of Kirkpatrick model objectivity will also increase and a lack in TNA comprehensiveness results in a low achievement of training objectivity.

Jen, Tseng and Chen (2012) conducted a study on the systematic construction and influential factors of training needs assessment. The study shows that TNA are one

type of management systems, and they are also the first procedure of training systems. TNA are a technique, in which analysis tools should be well applied, so HRD personnel should be capable to analyze needs. Whether starting from the establishment of needs assessment procedures or proceeding needs analysis steps, it is necessary to construct TNA dimensions in order for HRD personnel to conduct systematic needs analyses according to the dimensions. The TNA dimensions include strategy, performance, and competency. If the three dimensions correspond to McGehee and Thayer's three-fold analysis, organization-level analysis indicates strategy, task-level analysis indicates performance, and individual-level analysis indicates competency. Training is not panacea. It is just one of the methods to solve organizational problems. If problems are caused by employees lacking capability, training can be used as an intervention, so TNA are a critical assessment procedure to decide if training should be employed to solve the problems. On the other hand, the premise is that training should be able to solve organizational problems. That is, training must be of benefit, and training needs should be properly evaluated from the perspective of either solving problems or investment.

However, among the possible obstacles of promoting the ROI of training, Phillips (2007), aiming at TNA drawbacks, addressed that proper needs assessments were not conducted in a great number of training courses, and many training courses were based on management requirements or for catering to industrial fashion. However, if training courses are not really necessary for organizations, the effectiveness of the courses will reduce, and the ROI of the courses which are not needed will be negative. Real obstacles are caused in a lot of courses since needs assessments are not properly done.

Rodrigo and Gardenia conducted a study on training needs assessment: where we are and where we should go. The study shows that TNA practice and research skill have an almost exclusively diagnostic/procedural and reactive focus, concerning how to do it in the present. Prospective TNA approaches, based on available literature on competence and competences management citing Sparrow and Bognanno (1994), are still rare. Research is mainly applicable to investigating methodological or practical problems and solutions that are related to TNA systems. Although this is of great value, gap still exist on the applicability of theory development and/or evaluation. Further, there is serious concern on the development of existing organizational policies on TNA. Areas worth researching are: the relationships between the TNA concepts, work needs, and competence or competences management based on future scenarios (Sparrow & Bognanno, 1994); the missed conceptual link between individual and organizational needs; and to propose new kinds of needs, as learning needs, educational needs, development needs, avoiding practices and research to be dependent on only one kind of possible instructional solution to meet competence gaps (training).

According to Pérusse, (2011), the analysis of training needs is a step often skipped in the process of developing training activities. However, the needs analysis process is essential in order to maximize attainment of the objectives of this type of activity. Accurate description of training requirement is the final product of training needs. This can be adapted to the real situation of the professionals in and of the environment in which they operate. Thus, according to McConnell (2003), the training needs analysis makes it possible to transform the identified needs into learning objectives, which can then be achieved through appropriate training activities. The relevance of training is to improve work quality and performance.

## 2.2 Level of research skills training needs among graduate students

### 2.2.1 Problem identification skill

Yaxley (2009) studied skills in identification of a researchable problem using 501 lecturers in five federal Colleges of Education (COEs) in southern Nigeria. Stratified random sampling technique was used in sampling 208 lecturers. Data was analysed using simple percentage. The result revealed that identifying a researchable problem required critical thinking in the areas problem identification (23.01%), logic and reasoning (28%) feedback (30.41 %) from the findings, logic and reasoning (17.97%) influence problem identification skills.

Feletti (2004) studied assessment of graduate assistant lecturers in research problem identification. The sample consisted of 1,221 lecturers in three different State colleges of education in Jordan. Two hundred and ninety three (293) lecturers of this sample were in in-service courses. An instrument of thirty (30) item questionnaire developed by researchers and used. Chi-square was used in data analyses. The findings revealed that those in in-service courses had higher skills in research problem identification than those who are full time practitioners.

According to Tenopir (2003) to carry out a study on problem solving as the ability to identify, define and analyze problems, to create solutions and evaluate them, and to choose the best solution for a particular context. It requires imaginative and innovative thinking to find new ways to approach a problem, analytical skills to examine the consequences of a particular solution, and reasoning skills to weigh one solution against another. A common form of problem identification in science involved the background skills of imagination, reasoning, data collection, conceptual thinking, reflection and feedback and scientific experiment.

Problem identification, according to Willingham (2007) is searching for different approaches to a problem or situation, looking for alternatives to common or accepted methods and solutions and trying to examine issues from a different point of view (such as seeing an argument from another person's perspective). Similarly, (Halpern, 2015) defines it as the use of those cognitive skills or strategies that increase the probability of a desirable outcome. Critical thinking when compared to rational thinking, (West, Toplak & Stanovich, 2008), defined as adopting appropriate goals, taking the appropriate action given one's goals and beliefs, and holding beliefs about the world that are commensurate with available evidence. Willingham (2007) states that there exists areas for agreement as specific sub-skills encompassed by both definitions, which include Analyzing arguments, claims, or evidence; Making inferences using inductive or deductive reasoning; Judging or evaluating and; Making decisions or solving.

Willingham, 2007) sees problem identification as relevant to critical thinking that include asking and answering questions for clarification, defining terms, identifying assumptions, interpreting and explaining, reasoning verbally, especially in relation to concepts of likelihood and uncertainty, predicting and seeing both sides of an issue. Case (2005) states that researchers also agree on skills of background knowledge as imperative for lecturers to express their skills in conducting standard research. Kuncel (2011) agrees with Willingham (2007) and Case (2005) that critical thinking skills are essential in research problem identification. In other word there is such thing as generalized critical thinking skills. He argues that generalized measures of critical thinking are indistinguishable from general intelligence or ability, and that such measures do not contribute meaningfully above general intelligence to the prediction of important educational outcomes.

Furthermore, Toplak and Stanovich (2002) demonstrate that critical thinking dispositions, such as need for cognition and reflectivity, are better predictors of performance on domain-neutral disjunctive reasoning tasks than general cognitive ability. They showed that a generalized measure of critical thinking and performance on syllogistic reasoning task is a better predictor of the ability to avoid cognitive biases than is general cognitive ability. Paul (1992) and Smith (2002) argue that critical thinking encompasses both general and domain-specific aspects. In other words, some critical thinking skills apply to multiple domains (e.g., formal rules of logic), whereas others are unique to specific subject areas (e.g., the use of proofs in mathematics or the scientific method in science).

Paul and Elder (2008) suggested that flexibility, a sub-skill of creativity, supports critical thinking to the extent that being open-minded and willing to see from diverse perspectives is a key disposition when making decisions or solving problems. Likewise, the critical thinking skills of analysis, synthesis, and evaluation are often identified as key components of the creative process towards problem identification.

Treffinger, Young, Selby and Shepardson (2002) assert interplay between creative and critical thinking skills is essential during creative problem solving. When presented with problems, contradictions, or challenges, the creative thinker generates many possible solutions in a search for meaningful new connections. Sternberg (2006) states that critical thinking is then required in order to analyze and evaluate the possible solutions Critical thinking skills are also necessary in the overall creative process of generating a new idea or product. To be creative, an idea or product must be both novel and valuable. Each potential idea must be analyzed and evaluated to determine whether it has value and if it is worth pursuing for a solution.

Treffinger, Young, Selby and Shepardson (2002) state that critical thinking interplay with creative thinking skill when presented with a problem. In this process a creative thinker formulates many possibilities in search for new solutions. They went further to state that critical thinking is required to analyze and evaluate the possible solutions. Critical thinking skills are important in creative process of formulating fresh ideas in research. In the creative skills process, one is required to both novel and valuable. Every import possibilities are evaluated and interpreted to see whether it has the worth of pursuing for a solution.

According to Lile and Nagard (2005) states that problem identification skill requires the skills in breaking a research problem into sub-problems that are manageable, defining related concepts, synthesizing concepts and data to provide solution, drawing conclusions about the value and ideas.

2.2.2 Research question/hypothesis formulation skill

It is the understanding of problem that leads to a correct formulation of research questions for which the relationship between the people and the subject investigated, would leads to the formulation of research hypothesis. It believed that answer provided from the exercise, can provide the desired solution to the problem, addressed by the research exercise. According to Austin (2010), a clear, unambiguous research question of the problem is critical. This statement is an exercise in intellectual honesty. The ultimate goal of the research must be set forth in a grammatically complete sentence that specifically and precisely answers the question, what problem do you intend to solve? When you describe your objective in clear, concrete terms, you have a good idea of what you need to accomplish and can direct your efforts accordingly.

Feletti (2004) suggest that in order to organize a workshop on the training of lecturers on the research process, the stage of training provides an overview of the

stages in the research process and problem. This has been designed with a view to having the lecturers engaged as participants with an emphasis on research processes and problems. Felettis sample consisted of 545 Master's degree lecturers enrolled in three different public college of education in Northern Nigeria comprising of two hundred and ninety three (293) lecturers. A thirty (30) items questionnaire was developed by Feletti and used for data collection. The task required lecturers to represent problems in their own words, question, and hypothesis.

According to Feletti (2004), after problem identification and sub-variables outlined, the researcher translated the sub-variables in research questions that direct the researcher thinking and information in providing solution to the problem understudy. This is the presentation of reasonable guesses. In so doing, the research is hypothesizing. Felitti (2004) state the research questions and hypotheses enable the researcher to provide solutions to the problem.

Alon (2009) state the formulation of research questions and consequent formulation of hypothesis skill develop as one level of education improved. At the undergraduate level, question/hypotheses may be simple and limited in scope while a larger scopes are encourage at masters and Ph.D levels that will provide a wider scope for formulation questions/hypotheses. At these higher levels complex research skills are required.

The graduate students and the skills of formulation of research problems, research questions and the subsequent formulation of hypotheses formulation of problem research questions or sub-problems and the subsequent formulation of hypotheses is the basis of examining the whole research procedures and conclusion. Apart from other sources of knowledge acquisition, theories are often used to utilizing existing knowledge in an effort to explain new problems, which may not be adequate.

Though new theories can be constructed to explain events that are new in our education system or our society. On this note Enokuha, Emeh and Umoinyang (1994) stated that beginners must be skilled in constructing new theories to explain the many environmental problems confronting us. This is applicable to every researcher including junior researchers, and more so clarity of language used for theory construction is very important, to avoid ambiguous use of words and vagueness. The reason why theory construction skill is needed by the researcher is because hypotheses are derived consequences of theoretical consideration. Enukoha, (1994) outlined the two important things that follow from hypotheses: the first is that hypotheses must be grounded in a theory. The second is that any empirical lest of hypotheses is in fact an indirect test of a given theory.

We can precisely state that the use of theory or theories whether existing or the formulated, forms the basic foundation of research proceeding the need to acquire the skills that will help in fulfilling this all-important i.e. becomes necessary to junior researchers. Theory' formulation should clearly the variables contained in our theories, the consequences of tie theory, try to investigate and write down factors that seem to be responsible for such behaviour. Still on formulation of research problems, Kerlinger) slated that if one wants to solve a problem, one must general low what the problem is: It can be said that a large part of the solution lies in knowing what it is, one is trying to do. Denga and Ali (2015) supported this view when they stated that, a promising research topic should be based on a problematic situation. There is therefore the need for graduate students to acquaint themselves with the logic of problem formulation, since it is the basis on which the whole research is built. Lack of this fundamental principle can delay the students from choosing a topic and this can eventually hinder them from embarking on research.

### 2.2.3 Literature review skill

The review of existing literature is an academic exercise of searching for, identifies and critically examines knowledge that exists on a subject or problem under investigation. Morner (1993) conducted a research on library research skills using a test of library research skill, designed for doctoral students in education, which was developed in response to literature suggesting that these students were unprepared to conduct dissertation literature reviews. The library research skills test adequately measured doctoral student's library performance, and his findings confirmed "many education doctoral students were not equipped with library research skills.

A research was conducted by e-scholarship (2006:5), in library research skills and recognized its usefulness, and conduction of library research skills for education doctoral students. The value reliability of the investigation showed that the test, as a whole adequately measured doctoral student's library performance, and confirmed prevail findings that many doctoral students are not well equipped for doctoral library research skills. It is the usefulness of computers as enumerated that motivated some colleges and university libraries, reference department to offer computer assisted literature searches (especially some universities outside Nigeria), though we have already mentioned the need for e-library in Nigerian universities.

Isangedighi, Joshua, Asim and Ekuri (2004) look at literature review as the activity, which involves identifying, locating, reading and evaluating existing area with a view to sharpening and clearly define the problem in specific terms. Such knowledge to be sought for includes conceptual frameworks, empirical evidence, theories, hypothesis and conclusions of other scientific works related to the question under investigation. Again, Bruce (2014) states that literature review skills is essential and occupies central position in any research work. It provides background and

justification *to* the study. He notes that the importance of literature review forms an important chapter or section of a paper in a thesis, where its purpose is to provide the background and justification for the research to be undertaken.

In the same vein, he noted that a critical review of relevant literature is an important section to the extent that its omission represents avoidance or absence of a major element in research. There are therefore good reasons for acquiring research skill, spending time and effort on a review of the literature before embarking on a research project. The good reasons according to Bourner (2012) include to identify gaps in the literature, to carry on from where others have already reached (reviewing the field allows you to build on the platform of existing knowledge and ideas), to identify other people works in the same fields (a researcher's network is a valuable resource), to identify seminar works in your area, to identify opposing views, to put your work into perspective, to provide the intellectual context for your own work, to demonstrate that you can access previous work in your area, to identify methods that could be relevant to your project, to put your work into perspective and critically evaluate the above good reasons, the need to acquire literature review skills is imperative in thesis writing. These skills include the use of the library, the internet and the computers.

Morner (2003) conducted research on level of research skills among COE library lecturers using 309 sample size from 804 in Lagos State. Questionnaire was used for data collection. The data analyze using descriptive statistics, the finding revealed that 72% of the lecturers are not equipped with literature review skills; 89.34% of sampled lecture apply sampling technique by quests work; and 8.49% apply them wrongly. Edem (2005) states that sample technique used by a researchers must be effective enough to avoid redundancy and provide sufficient data for research analysis and

interpretation. He concluded that, anything short of this, will affect the generalization of results. Cozby (2009), emphasizes that it is important to acquire the skill of searching for literature that justify former authors view and or effort in finding solution to the problem understudy. This according to Cozby can only be achieved through skillful use of library, internet and related printed materials.

2.2.4 Instrumentation development skill

Robson (2002) studied the differences in lecturers' perceptions of competence in research methods, data collection and research reporting. The mean and standard deviation of the validation was 1.74 (.87), Develop a questionnaire 2.60 (.80) Conduct an interview 2.75 (.75), Interpret graphic data 2.24 (.81), Present information in tabular form 2.68 (.99) Compile a document using word processing 2.26 (1.01), Disseminate research results 1.81 (1.25) Compile a research report 1.90 (.85) at $p<.001$. From the result, lecturers were most competent in constructing interview instrument, followed by presentation of information in tabular format while the least skill was in instrument validation.

Nunnaly (2017), in his book Psychometric theory asserts that in the early stage of study of any construct, reliability coefficients of 0.49 should be considered high enough to be used in generating data for the actual study. According to Kline (2005), alpha value of .90 is considered excellent, .80 very good, and .70 acceptable.

2.2.5 Use of statistical tool skill

Joshua (2011) states that there are various statistical tools used in research process and in data analysis Each of these tools requires different steps or procedures. He presented the statistical tool/technique, when applicable, conditions to be satisfied and example of research situation in a table as presented in Table 1. According to Denzin (2001) states that skills in development of an instrument include knowledge in data

type, different data formats including nominal, ordinal, interval and ratio data. This determines the analysis to be undertaken to provide solution to the problem. The skills of instrument development include data collection and categorization base on statistical analyses techniques.

Dicks and Mason (1998) state that categorization of continuous data is provided in columns relating to the size of the property operated. In this case the range of responses in column 'D' were examined and the size of the class were determined and computed as a new variable in column 'E' This is one example of transforming variables to create new variables to assist in summary and analysis of the survey responses. In other cases, transformation of responses may be necessary because of the assumption that normal distribution requires some statistical tests, including one-way ANOVA. Building capacity for statistical skill is a background requirement for data collection, data analysis, reflection and feedback as well as scientific experiment.

Dicks and Mason (1998) state that the skills in instrument development include the placing and construction of items that permit transformation of responses on assumption that nominal data is use in particular statistical technique or creating new valuable to assist in summary that allow the use of statistical technique like One-way analysis of variance. He went further to report that the types of data involved among variables determine the structure of the instrument. The skill require for operationalization of the variables facilitates items construction that elicit the needed data from the respondents.

### 2.2.6 Computer application in data analysis skills.

Joshua (2008) provides some guidelines on data analysis using the statistical packages for social sciences (SPSS) software for some simple/regular statistical analysis techniques in education and social science. In these guidelines, he assumed

that the data have been coded and keyed into the system (computer) and are ready for processing (analysis). Zin, Zaman, Judi, et al (2000) state that ICT skills have led to acquisition of new research skills, capabilities/competences to handle research data. ICT skills are vital among lecturers in their process of carrying out research in every discipline. Waldman (2003) states that skills in ICT influence by such factors like computing large data for analysis and interpretation among academia researches.

Hwang (2008) opines that there should be a transparency and reliability of the data analysis processes, to enhance the credibility of the research processes. Hwang warned that data analysis is not accomplished automatically, but time saving may be garnered through the use of computer assisted quantitative data analysis system (CAQDAS) packages as the computer can act as a research assistant, which can save time and make work better, especially for large data sets. Cuba (2005) states that new categorization during data analysis process may be require in a dynamic and fluid process. The ICT skill may be require to modify, group, merged or discarded when using CAQDAS package to support more systematic data analysis and data management. This support the conclusive finding of Lee and Estevhulgein, (2000) which stated that computer skill is important to understand data linkage, patterns and re-encoded data. Denzin (2001) observes that computer package like statistical Package for Social Science (SPSS) skills facilitate the use of spreadsheets to enter, organized and calculate descriptive statistics to responses to different questions. The skill build the researcher to understand different data type/format requires different summary measures (the entering of data, management of survey data and analysis of data is up to the researcher).

Bank (2004) observes the research skill involves categorization and transformation of data to facilitate analysis. In open question instrument, the researcher

is required to re-categorize the initial responses before analysis. Anne and Marlyn (2010) report that skill in computer analysing qualitative data analysis has been accepted by researchers, but the software should not control the data. To Robson (2012), data entering, organizing, categorizing and managing are not retrieval task but skills to be applied by researcher. Malterud (2011) states that manual process and use of technological are two methodological skill use in managing data. He concluded that mixed approaches of manual and automated data management and analysis are accepted as the skill required in research data management for effective result.

Lee and Esterhuzen (2000) states that information communication have made effective effort in research world. He went further to report skills in IT are assets for those in research. The search for IT skill is necessary for lecturers to achieve their discipline related research. Lee and Estahaizen (2000) states that ICT skills will enable the researcher to transfer data from excel to SPSS for effective management and analysis. Data can be used at excel and SPSS stoftwares. Once data has been process, they can be presented on table to ease interpretation. According to Zenold (2001) for effective management and analysis of huge data in qualitative research on data collected, including interview, transcripts, field notes and audio/visual data. ICT data manages and analysis system in required computer software is require to manage, save and help in analyzing the data in different ways. Malterud (2011) concluded that a mixes approach that melds manual and automated data analysis seems most appropriate.

Atherton and Elsmore (2017), discovers that skill in data entry, management and analysis safe time that would have been consumed manually in contemplating, and thinking reflectively on emergent pattern and categorization. Miles and Huberman (2014) state that qualitative research software on data analysis are capable of tracking

and retrieving data, analysis and draw conclusion from the data collected. Fielding and Lee (2012) report that superior data management skill is beneficial performance and merits among researchers. Andrew and Monday (2012) carried out a study on the correlates of computer skill and application of research skills among lecturers in Federal Colleges of Education in Middle Belt Zone of Nigeria, involving 2004 lecturers from a population 3186 in six Colleges. Computer skills assessment and application of research skills questionnaire was adapted for data collection. Data collected were analyzed using correlation. The result reveals a significant relationship between computer skill and application of research skills ($r=.187$, $df=2002$ $p<0.05$) among lecturers.

### 2.2.7 Referencing skill

Referencing skill is an aspect of the required skills by research students. This is because, in academic work, the author of any material or ideas borrowed from their material for your work must be credited. When this is not done, the researcher could be charged with Plagiarism when sources of information are not duly acknowledged. Therefore, it is expected of all educational researchers to be acquainted with the current method of referencing. Every researcher however, is expected to cite only materials that are usually used so as to support a case or clarify, confirm or maintain concepts. Since the main goals of reference are to credit the author and to enable the reader to find the material, it must be properly documented both inside the main work and in the reference page.

According to Jackling, Levies, Brandt and Snell (2010) referencing skill is one skill required by researchers. This is because, in academic work, the original sources of quoted material or ideas must be acknowledge or documented. When this is not done, the researcher could be charged for plagiarism. Jones (2008) opines that every

researcher is expected to be acquainted with the logic of referencing. The researcher is expected to cite only materials that are usually used as to support a case or clarify, confirm or maintain concepts. Since the main goal of reference is to credit the author and to enable the reader to find the material, it must be properly documented both inside the main work and on the reference page. There are two main reference materials at the current time; one is material from books, journals, newspapers, dissertation/theses etc., while the other is electronic media, otherwise known as on-line sources through internet browsing.

The American psychological Association (APA), sixth edition recommended the following format for listing reference? Indent the first line of every reference one half of an inch, and for books, type the surname of the author first, followed by a comma, type in his initials followed by a full stop for every initial followed by year of publication and name of publishing company, all in single line spacing. Furthermore, referencing skill is one other aspect of the required skills by graduate students. This is because, in academic work, the author of any material or ideas borrowed from their material for your work must be credited. When this is not done, the researcher could be charged with plagiarism. Every researcher is expected to be acquainted with the method of referencing. The researcher is expected to cite only materials that are usually used so as to support a case, or clarify, confirm or maintain concepts. Since the main goals *of* reference are to credit the author and to enable the reader to find the material, it must be properly documented both inside the main work and in the reference page, immediately after chapter five or so. There are two main reference materials at the current time; one is material from books, journal, newspapers, dissertation/theses, while (he oilier is electronic media, otherwise known as on-line sources through internet browsing. The American Psychological Association (APA)

recommends the following, formal for listing reference (2011). And when reference is made to more than one work published by the author(s) in the same year, the suffix 'a, b, c' etc., shall be used after the year.

Data collection and analysis which is empirical in nature is very vital to the graduate student-Here, most graduate students experience some difficulty. Such data are based on valid, reliable and usable instrument. And research analysis accuracy is the ability to use the right statistical analysis tool that is best fitted for (the hypotheses, since incorrect statistical tools give wrong interpretation, wrong findings and wrong knowledge transfer, etc. Furthermore, all scientific investigations must possess certain characteristics, such as; empirical: which involve the collection of data, which provide the basis for drawing conclusions. Conclusions are not based on what the author feels or think, but on concrete evidence deduced from data collection by careful observation of the phenomena being investigated. Also, a study was conducted by Akanbi (2005) on the importance of Business Mathematics and quantitative skills, gap between theory and practice in the polytechnic curriculum. Of the four research questions developed, the conclusion was that Mathematical skills are not required on a day-to-day basis because the necessary calculations were done by computer software package. However accountants need to understand the fundamental principles and concepts of the computer output for effective management decisions.

Also, Lubbcri and Sanders (2005) conducted a research on the skills in Mathematics, Sciences and Technology. In their findings, the data provided examples of impacts the skills for Development Programme has had on a further degree-training programme, on the development of a national professional organization, and on classroom interactions. The data further suggested that outcomes in terms of an increase in research capacity are limited by poor contexts, where potential novice

researchers give priority to income-generating professional activities. The poor content of research capacity has some significant influence on School Sciences Curriculum which is dangerous for a progressive technical scientific and informal on technology of our lime in terms of education program. This is in connection to the importance of research skills to avoid the similar problems encountered in STM, i.e.to lack of skills. In addition, George (2006) and Stein & Sandra (2006) conducted a study of the graduate students' satisfaction on library collection and services. The study indicated that graduates do not come to library as their first source of information, but rather they consult with their advisors (supervisors) or Professors. Students also reported feeling overwhelmed by the number of articles in databases and online resources. Also, Huffman (2008) studies revealed that on the overall, 72 percent of respondents had been taught how to search online article databases at some point in their academic career, but this percentage decreased for most other skills (such as, instrument development and validation skills, data analysis, reporting skills, etc), down to only 0 percent who had been taught. In our own institutions (Nigeria Universities). Online researching has not been inculcated in practical class situations, neither has it been entrenched in our tertiary curriculum, that is, information communication technology (ICT) is yet to be made a compulsory or ('acuity course, neither library instructions skills.

### 2.2.8 Report writing skill

Blank (2007) stated that report writing remains the process through which research finding is formatted and published for academia consumption and development of such discipline. Knowledge created through research findings are reported and published in acceptable standard and format. Therefore university is saddled with the duty of making report writing skills a hallmark of its students. Graduate students and lecture

opine that the literature review identifies flaws or holes in previous research which provides justification for the study. Often, a literature review is conducted in a given subject area before a research question is identified. A gap in the current literature, as identified by a researcher, then engenders a research question. The research question may be parallel to the hypothesis. The hypothesis is the supposition to be tested. The researcher collects data to test the hypothesis, after which he and interprets the data via a variety of statistical methods, engaging in what is known as empirical research. The results of the data analysis in confirming or failing *to* reject the null hypothesis are then reported and evaluated. At the end, the researcher may discuss avenues for further research.

The skill of communication is an important aspect of research procedure, because it is the vehicle Will which (he whole process, procedures and information are passed to the public, likewise the reporting. On this note, the San Francisco State University (SFSTJ) develops a vision for teaching and learning which stands on a foundation of discovery and invigorating liberal education that turns creativity into innovation and bridges theory to practices. In their attempt to produce qualitative graduate equipped with the ability to think, learn and act, they emphasize intellectual rigor and creativity. The two important tools that enables students to become proficient in the skills and knowledge of their chosen field are disciplinary and professional programme. With these, as appropriate, students will develop their creative imagination and abilities. Their Master and doctoral Programme and out for their advanced disciplinary and interdisciplinary know ills (SFSU; 2007). And this is so because writing is taken as the foundation of learning and inquiry, the University strives to make good writing a hallmark of its graduates. Their graduate

students are expected to be both fluent in (the 'language of their chosen field and technically competent in its practices.

Among the three broad learning objectives is the ability to participate in the intellectual life of a discipline to think cogently about that discipline, and to use its tools. The ability to communicate clearly, concisely, and compellingly and the ability to link disciplinary theories to reality-based practice, and this is achieved through the emphasis on writing. The research design must have sonic features to consider. They are;

i. Ethical Considerations: strong emphasis on ethical code is unusual in research design writing. Students should be able to know how ethical considerations are present during each step of the research process. Apart from knowing the American Psychological Association's ethical principle, ethical consideration should be infused practically in our design,

ii. Integration: That, the research work be organized around the research project. This unifying focus gives our research product a coherent look and attractive in writing procedure,

iii. Writing Style: Our research design and product should be easy to read style, for the readers to actually read the work with difficulty. That is easy communication,

iv. Depth: A research work should have a greater depth and not shallow. Research design, research product can both contains a lot of important or interesting ideas and palatable,

v. Balanced: Coverage, whether of experimental or non-experimental design can be strictly followed or patterned,

vi. Our research process should follow a logical and flexible plan *of* the research.

Studies conducted in Australia, United Kingdom (UK) and New Zealand (NZ) have shown that what non-academic and academic employers say they are looking for, are good communication skills, a flexible attitude, project management ability and leadership experience/potential (Bondavalli, 2007). While academic employers say in addition to good communication skills, they require a strong research and/or leaching track record, all say they also look for someone who will be collegial and gel on well in the department in the ability to impart research skills.

Therefore graduate students are never to underestimate the importance of working on and demonstrating our communication skills. At the "University of Maryland, Baltimore County, (The Department of Computer Science and Electrical Engineering) has developed a new class on Basic Research skills for 61undertaking are considered as an important tool for graduate student, hence the need for the computer based system of learning the skills.

### 2.2.9 Sampling technique skills

Mangabeira, Lee and Fielding (2004) conducted a research excise on extent of lecturers sampling technique skills in China. 1,221 lecturers were sampled from a population 542 I in ten colleges of education. A 40 item questionnaire was used for data collection. Data was analysed using descriptive statistics. The result revealed 89.34% of the sample applies sampling technique by guess work. According to Ndem (2005) a technique used should be effective enough that the sample will provide enough information against redundancy though, the available time and resources may limit the full use of that sampling technique. It is not necessarily a problem as Owuamalam (2012) states that the sampling technique used should be regarded as adequate based on the observation. Seaberg (2011) as well as Grinnell and Williams

(2013) have suggested that in most cases, the technique should be effective enough to get 10% sample which should be sufficient for controlling sampling error.

According Owuamalam (2012), the minimum sample size can be calculated using the following formula $N = \frac{Z2Pq}{D2}$; N = minimum sample size required; Z =standard normal deviation set at 1.96 which corresponds to the 95% confidence level; P = expected prevalence rate (%) = 15%; q= 1-p. (1 - 0.15 = 0.85); d= first degree of accuracy desired set at 0.05.

Research is as important to any economy as air is to life. The importance of research to any economy cannot be overemphasized. This is why Cheto (2003) observed that a careful analysis of the pattern of economic growth of developed countries reveals that these countries spend heavily on research. Research is the development in all its ramifications which include education, economic, technological, and scientific among others. Recognizing the stated fact, Nworgu (1991), for instance opined that in the developed countries of the world, research has come to assume an indispensable status in national development. According to him, in such countries research has so advanced that no matter how complex a problem is, it can still be solved. Techniques and equipment are developed daily and these are increasingly becoming sophisticated. As would be expected, these countries have attained enviable heights in educational research, food productions and conservation, energy production and storage, waste management, health care delivery, information and communication technology (ICT), biotechnology and genetic engineering, sciences and technology as a whole. These attainments are not myths but outcomes of research works.

Researcher also forms the basis for developing and testing theories. A theory is used to denote many and varied intellectual constructions, and heuristics: systems of evolving explanations, personal reflections, and craft knowledge about events or

authorities have defined research from different perspectives. However, the essential elements contained in these definitions is the systematic search for solutions to problems. For instance, Parket (2015) defines research as a scientific investigation aimed at discovering and applying new facts, techniques and natural laws. Nworgu (1991) believes that research is a systematic search for solutions to problems. Isangedighi et al (2012) define research as a systematic, organized, and controlled process involving observation(s) and the analysis of such observation(s) aimed at discovering the truth. They maintained that the purpose of research is that it is aimed at the understanding of objects and events in the world. Osuala (2001) submits research as the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data. Kerlinger (1986) in his book foundations of behavioural research submits that research is a systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena.

Notwithstanding, these varied definitions and interpretations of research, what constitutes the core of an acceptable definition of research must include testability, verifiability, purposefulness and activity-based. Research, therefore, is geared towards the discovery of new ideas and the relationship that exists among the various phenomena, and it is also a means of solving the problems of humanity. Thus, the most important tool often used to understand a phenomenon, delineate issues surrounding it, is research (Umoru, 2004).

Research by its nature is scientific. By this, it means that research employs the scientific method, which provides the basis for verifiable information that tests and explains several phenomena. Being a scientific activity also implies that research has the characteristics of science. These characteristics include the description of the

objects and events for which it is interesting, observation of the regularity with which these events occur and the order in which they occur; and finally it tries to formulate theories and laws to formalize and generalize the regularities observed (Isangedighi et al, 2004). To this end, any research activity must adopt the scientific method as its mode of operation so that its findings could be empirical, replicable and predictable. It must also be able to explain the process on a certain clearly defined, logical and measurable continuum (Umoru, 2004). The adoption of the scientific method, therefore, excludes any reasoned opinion, guesses, and unsubstantiated views from being acceptable as research findings.

Another methodological issue about the nature of research is that research is systematic. This means that research is a well-organized tool for fact-finding and is executed within an academic domain of ideas. The relevance of a system of ideas or a discipline is of two fold. Therefore, Preece (1998) argues "that only a systematically trained mind is likely to be aware of the possible significance of any chance observation from which the trained mind develops a 'hunch"'- for instance, by what is known as induction. Therefore if the steps or order in which research activity is undertaken are not systematic, it may not be possible for the mind to deduce a relationship or develop a 'hunch', which could lead to useful findings.

Secondly, the inductively formed ideas must be tested systematically according to procedures. This systematic set of procedures is what is known as the research process. Nworgu (1991) identified seven (7) basic steps, which are considered as the research process. These are:

a. problem identification and definition

b. Relevant literature review

c. research question and hypotheses formulation

possible for a single research project to lead to discovery but by incrementally building up knowledge. In some instances like in the physical sciences, it may be possible to talk about discovery however in education and social sciences, talking about discovery sound over-ambitious. In any case, the research tries to study the relationships between a general state of knowledge in such area and hopes that perhaps new knowledge would result or something new may turn up. In these circumstances, the sum of knowledge arising from both the new knowledge, which adds to the previous ones, forms a wealth of ideas, which better explain the phenomenon or puzzle. Both the new and the original knowledge are valuable to humanity. From the above explanations, it should be noted that any activity that does not increase the sum of knowledge is not research work. Isangedighi et al (2004) observed that many people confuse fact-finding surveys, library fact-finding which results in academic paper writing and so on as research.

According to them, such activities are not researches but mere transcription of facts, which only amount to the transfer of information from one place to another. Umoru (2004) opined that such organization and cataloging of existing information is basic to research activity although as Preece (1998) puts it; these only furnish the setting or context, system of ideas, within which research will take place and often provides the material itself which is to be researched. Therefore, such rearrangement of what is already known is not in itself the essence of research unless it leads to the development patterns or classification of systems, which as in evolutionary biology, do reveal new knowledge about the relationships and which prompts further research and testing.

Relevance and the universality of research is another common denominator of research. For any piece of activity to be described as research work, then it must be

relevant or useful to the researcher and the needs of the people. Usefulness in research terms means the research is useful to the intellectual progress of the discipline and other stakeholders.

**2.3 Students gender and research skills training needs**

This aspect of the review is concerned with determining whether there is a difference between male and female students in their application of research skills, although much has not been done in this respect, the researcher, however, reviewed some studies that are focused on gender differences as they provided insight to the present study. Keeves (2009) found that female teachers showed a more favorable attitude to application skills than their male counterparts. With a sample of 78 teachers randomly drawn from six schools, the researcher discovered that, while 62 percent of the females showed favorable disposition to testing of students, only 41 percent of the males did. In that study, it was concluded that female teachers were likely to apply the skills of testing better than their male counterparts. Consequently, Onyeukwu (2008) working with hospital patients has shown that males are better able to retain new quantitative information than females when testing for immediate recall. That is to say, male students may remember techniques and research skill techniques taught far better than female counterparts. In the study carried out by Ainley and Fullarton (2000) to see the difference in the performance of teachers concerning sex. It was found that with regards to the effective teaching of technical studies, 80 percent of students taught by male teachers performed creditably well, while it was 65 percent of enrolment in computer studies, and 67 percent of enrolment in physical education. This is compared to the performance of those students taught by female teachers who in the same subjects scored 60. 62, 71 and 68 percent respectively. From the presentation, the performance of students taught by male teachers was significantly higher than that of

those taught by female teachers, except in physical education with performance of 67 and 71 percent in favour of students taught by female teachers. Although this study was not directly on research skills, it provides insight into the present study. Recent studies have reported gender differences in the application of research skills of students in medical schools.

In addition, the studies carried out by Frederick (2009) on the acquisition of research skills in the department of medicine, Harvard medical school, Boston, it was revealed that gender differences existed in the application of research skills in articulating research problems, and formulating testable hypotheses. The study further highlighted significant influences of male students' acquisition of research skills. Similarly, a recent study on grant applications and funding outcomes across institutions at Harvard medical school showed that female faculty members, particularly those at the lowest ranks, submitted fewer grant applications than men. In both studies, women in the faculty requested less support and received less funding, although, the percentage of requested funding received was similar to men. According to Sommer in All (2009) working with hospital patients has shown that males are better able to retain new quantitative information than females when tested for immediate recall. That is to say, male students may remember techniques and research skills techniques taught far better than what female students can, in the context of our discussion.

In their studies, Oxford, Young, Ito and Sumrall (2013) reported that females scored higher means than males in a Japanese Language class. Numerous researchers have focused on the differences between genders in language learning strategies. A common finding is that female student employ more learning strategies more effectively. In the same manner, Noldon and Sedlack (2018) conducted research on

gender differences in attitudes, skills and behaviours among academically talented university freshmen. They assessed sex differences among 172 males and females academically talented college freshmen admitted into a university honour programme on a series of attitudinal, behavioural, and skills acquisition. Survey items using a 5-point Likert scale and discovered that differences were greatest in the skills acquisition, extracurricular and personal/social areas. Also, "men and women significantly differ on these types of items have implications for the nature and types of programmes and services offered to enhance their academic and social integration in the college.

Similarly, Falaye (2011) examined the sex difference and research skills acquisition among University students in the North-East region in Nigeria. The research design used was the survey method. The sample of 450 students which include 250 females and 200 males were randomly drawn from undergraduate students using simple and stratified random sampling techniques. Questionnaire was the research instrument. The research questions and research hypotheses were formulated. The data collected were analyzed using an independent t-test. Amongst other research hypotheses, there is a significant difference between sex and research skills acquisition among Nigerian university students. Although this study was not directly on research skills, it provides insight into the present study.

Furthermore, Asim. Kalu, Idaka and Bassey (2005) conducted a study on teachers' competency in Sciences, Mathematics and Technology Assessment (STMA). The case study *of* Primary Science Teachers in Cross River State. It was found that teachers' competency in STM assessment is a function of teachers' sex. That is, more females than males were found competent in STM assessment even though they found themselves in large classes and were generalist teachers like the males.

Gender differences are a recurrent theme throughout the literature in academic studies in general and maths studies in particular. Math is often considered to be a domain in which boys are higher achievers, both in terms of attitudes and self-concept. Contrary to this finding shows that math school achievement and grades do not differ significantly between boys and girls (Scafidi and Bui, 2010). This similarity in performance between males and females is clear in the meta-analysis conducted by Lindbery (2010), with data from 242 studies representing 1.266. 350 people, indicating no gender difference (d=0.05) and nearly equal male and female variances. There are, however, noticeable differences in the beliefs held by boys and girls. Research has consistently shown that girls have a lower math self-concept than boys (Shaalvik, 2004). Results concerning gender differences in attitude are less consistent than those in self-concept. Some studies have reported significant differences when we compared girls' and boys' attitudes towards statistics. (Eshun & Asante, 2012), nevertheless there are several studies where these differences are not identified. Nonetheless, there is research that concludes that gender does not affect attitudes towards statistics.

The meta-analysis which was conducted by Ma and Kisher (2010) which look at 113 studies (n=55265), when studying the effects of gender, concludes that this variable did not have a significant effect on the relationship between attitudes and performance in statistics because a separate analysis by gender demonstrated similar significant effect sizes. Geogiou (2007) showed that there was no difference either in statistics achievement or in statistics attitudes between boys and girls. However, high achieving boys and girls, despite both considering statistics as an attractive subject, differed in the explanations they gave for their performance. Since the ability attributions of boys were higher, they believed that their grades were due to their intelligence more consistently than girls did. Akey (2008) observed that several aspects

of school context (eg, teacher support, student-to-student interaction and the academic and behavior expectations of the teacher) were significantly related to student attitudes and behaviours. He concluded that the class environment where teachers whom students see as supportive promote student feelings of control and confidence in their ability to succeed.

From the review, there are significant differences between male and female students in the acquisition of research skills and these differences are related to previous training, adequate usage of internet and high level of scholarly abilities in term of paper writing. Women are more significantly less likely than men to indicate strong research career intentions and skills in research work.

**2.4 Students age and their research skills training need**

There is this assumption that experience is the best teacher, and experience count on age. So the popular believe that the older you are the better you become and perform, and this is what the researcher is set out to confirm. Zhang (2003) examined differences in the rates of change in test scores, first-and second generation students had similar growth rates in mathematics, reading and sciences than third-generation students. But the mathematics and science, test scores of first and second-generation Asian Americans increased at significantly higher rates than that of their third-generation counterparts, and the social studies of second-generation youth also increased at a rate higher than did third-generation youths. Studies relying on the National Education Longitudinal Study (NELS) data set of Americans, have also examined generational differences among Asian Americans in a test of Mathematics, reading, sciences and social studies, found that second generation youths out perform their first and third generation counterparts (NELSC, 2008; Zhang, 2003). Zhang (2003) further found that at each grade level, second generation youths lead higher

scores in mathematics, reading, science and social studies than first and third-generation youths. These studies are also confirming the age of students does not really have any significant influences on academic performances of student. It does implies that the age of students may in some instances have significant influences in application of research skills.

Researchers have querried the appropriate age a child should start school. This is opined on the optimal school start age that maximizes the chances of educational performance by all or the majority of children. In a study carried out by Konarzewski (2015), to investigated the relationship between school achievement and pupilage at entry into first grade and age relative to the class. Data was collected from 1015 grade 4 pupils selected from TIMSS 2011 achievement data in mathematics and science from national samples of 25 European countries. Hierarchical regression analysis showed that the effect of class relative age was greater than the effect of grade relative age and it was significantly higher in younger than older classes. The study added that average achievement (especially in science) was better in older classes.

A study by Maputo (2018), on the impact of age on the academic performance of students and how it relates to their performance of research skills. The study variables were students' age, academic motivation and academic performance among secondary school students attending day school within Abuja Municipality. The identified objectives were to investigate the influence of students' age on academic motivation and academic performance. Ex-post facto research design was adopted for the study and the study population were form two and form four students in selected sixteen secondary schools. Seven day schools were sampled using the stratified random sampling techniques. The sample was made up of 489 students. The research

instrument adopted was questionnaire. The findings of this study indicated that there was a positive relationship between academic motivation.

In another study carried out by Voyles (2011) on study academic success as related to student age. The study examined the relationship between student age in their first, second and third grade years on academic achievement on a state-mandated assessment for a cohort of North Georgia elementary school students. The results indicated that student age had a statistically significant impact on academics for students in their first and third-grade years on the mathematics portion of the assessment, older students within the cohort scored at higher academic levels of achievement on the mathematics assessment than did younger students. Students' age did not have an impact on scores for the reading portion of the assessment. Also, a study carried out by Navarro and Ohvares (2015) on the relative age-effect and it influence on academic performance. The study population was a representative sample of 15,234 8$^{th}$ graders (50.4% female, average age =13.61 years) in the 2011 National System of Quality Assessment in Education Survey (SRMCE) from Chile. The SIMCE for global academic performance consist of 4 tests; reading, mathematics, social studies, and science. All tests consist of multiple-choice and closed questions. In addition, to have the information of general academic performance, an extra variable expressing the average score of each student was created. The results achieved in the structural equation modeling indicate a good global fit. Individual relationships show significant effect of the three variables observed on academic performance.

Meerah, Osman, and Mahmod (2011), on measuring graduate students' research skills carried out a study in Kebangsaan University. Graduate students graduating at the end of 2010/2011 were random selected and asked to complete a questionnaire to measure their performance in research knowledge and skills. The results indicated that

the graduates in general have moderate knowledge and competencies to conduct research. The major factors influencing research skills negatively were age and students field of specialization. Lasode and Aotetu (2013) indicated that there is significant relationship between age and academic performance of NCE students. The (r-value = .417 and P-value = .005 and P< 0.005). The finding is consistent with previous studies of Naderi, Abdullah and Kumar (2009) which revealed that there was significant relationship between age and academic performance. This means age was a correlate of academic performance in Kashun Ibrahim College of Education, Maiduguri.

**2.5 Marital status and research skills training needs assessment**

Having to study poses challenges for both married women and men due to their family responsibilities and several challenges arise when individuals tend to negotiate the role of university students with their role inside of marriage and the family. Married women from time immemorial have been saddled with many family responsibilities and are traditionally assigned many roles including custody of children, maintenance of the home, feeding and preservation of the family health. The married graduate students are also expected to perform duties as wife/husband, in addition to fulfilling their academic responsibilities. (Kerpelmen & Solheim, 2001).

A study carried out by Lasode and Awotehi (2013) on the challenges faced by married university undergraduate female students in Ogun state, Nigeria. The question as to whether marriage is an assert or liability especially to female undergraduate is yet to be answer satisfactorily. This study seeks to find out common challenges faced by married undergraduate female students in universities in Ogun State, Nigeria factors responsible and effects these have on them. The study utilized the survey design with sample consisting of 150 married undergraduate female students purposively selected

from two of the six universities in Ogun State. The result indicated that combining work with family responsibilities and school obligations lead to stress among 108/83.1%) respondents and these have the greatest effect on their general life. When female married student find time to do school work, they often do not have a quiet, private space in which to do so. Finding adequate time to do homework without interruption was identified as a major challenge student with family responsibilities face.

Another study carried out by Amuda and Ali (2018) on relationship among study marital status of NCE students in Kashim Ibrahim College of Education Maiduguri, Borno State, Nigeria, in both department of Educational Psychology, Guidance and Counselling and department of Vocational and Technical Education, university of Maiduguri, Borno, State Nigeria. Five objectives translated into five hypotheses were tested. With a sample of 142 NCE, 2 and 3 students were selected through simple random and stratified sampling techniques, that is 20 NCE II and NCE III married students (males 71 and female 71) were involved. Results indicate that, there is significant relationship between marital status and academic performance. The result indicates the mean of 2.79 and 1.60, and standard deviation of .750 and .74. Also the R-value of .370 and P-value of 0.016, at $P<0.05$. The result shows that there is significant relationship between academic performance and marital status. This means that marital status has a significant correlation on academic performance. This finding agreed with the work of Tambuwal (2011) who investigated the relationship between marital status study habits and academic performance among female students of Shehu Shagari College of Education, Sokoto State. The result revealed that, there was significant relationship between study habits of married and unmarried students. The

female married performed better and have more effective study habits patterns than the unmarried.

A study by Beard and Langlais (2018) on examining marital status and academic performance. Data for this study comes from an online survey of undergraduate students from a university in the Midwestern United States (N=111, 81.1% female, 87.4% white Caucasian, 21.2% married). Results revealed that marital status is negatively associated with cumulative grade point average (GPA) and perception of GPA.

Research on marital status, specifically in terms of training need of research skills among graduate students is relatively scarce, focuses on non-traditional students or does not primarily focus on post graduate university students. There are some studies examining academic performance on graduate students, revealing that marital status is positively associated with academic performance as it relates to application of research skills, particularly when receiving spousal support (Stern, 2008). Another study, which focused on graduate students, found married men had better student outcome than single men, but married women did not do worse than single women in terms of student outcomes (Price, 2006). This study 0provides some support that marriage may be beneficial for academic performance, but probably more so for men than women. It them implies the research training needs in appropriate application of research is high among the married couples than the single men and women.

The goal of this review was to examine how marital status predicts appropriate application of research skills among graduate students, studies that relate to research training need and research skills are scarce. The researcher believes that deficient performances interferes with the quality research and invariably relate to the student

research training needs not attended to, thereby resulting to inadequate research outcome.

### 2.6 Students' academic discipline and research skills training needs

There is this belief that students in sciences, educational measured research and statistics could carry out research successfully without much difficulties than students in other disciplines, in faculties of education in our universities as well as other places. Some however, have contrary opinions and they seem to oppose this idea. In this section of the review, the researcher reviewed materials that are connected to students' application of research skills with respect to their disciplines. There is a demonstrated need to develop graduate students' library skills, but no single approach has emerged as the best for doing so, but researchers have developed interest in library use and information literacy of graduate student's population, especially in foreign universities. In line with this, a survey of physical science students (Brown. 1999) revealed high levels of information literacy skills among respondents, although half of them reported receiving library instruction. This finding raised the question of how these students acquired these skills, since attendance at library instruction session was low. In the same vein, it was discovered that library instruction for graduate students is often not offered- a survey of librarians with responsibilities for physics students (Forsmirc, 2001), found that only 23% of graduate students received discipline-specific library instruction in most Nigerian universities, such specific library instruction for various discipline or faculties is not offered.

Furthermore, Brown and Krumho (2002) surveyed an upper-year geomicrobiology course, including both senior undergraduate graduate students that received librarian instructions related end of the course, the students self-reported level of information will increased. Bellard (2007) also surveyed graduate students in social

work fuel and after an online information literacy workshop. Again, student's self-reliance library skills levels increased slightly. In a similar dimension, a study of upper-year psychology undergraduates Paglia and Donahue (2003) used multiple methods to assess the usefulness of discipline-specific instruction and that such instruction resulted in improved skills and confidence. Ala (2006) in Hoffman (2008), in his study conducted on searching skills of graduate students online discovered that patient searching is a very specific skill; however,. It is relevant to students in scientific and technical disciplines.

In a study conducted by Hoffman, Antwi-Nsiah, Peng and Stanley (2008), on library research skills of graduate students it was found that, on a general note, students in all the four faculties (Engineering, health sciences, medicine and surgery, and sciences), identified challenges with choosing keywords and search terms, refilling searches or narrowing results, and sorting through result sets to find relevant information. They also identified challenges related to accessing the collection, such as difficulty in accessing the full-text of resources, frustration with off-campus access, and frustrations because materials they wanted were not in the collection. Less frequently mentioned were challenges with knowing where to look for information and finding materials in the library. Hoffman et al (2008) further found that other challenges mentioned were more discipline-specific, that is, the area of specialization. For instance; Engineering students more often identified difficulties with finding theses, conference proceedings or technical report, while students in health sciences, and medicine and dentistry idei: challenges with finding older materials e.g. "30 years old" or pre-1950. Bui students in health sciences commented on challenges with doing comprehensive searches and finding reliable information. These last challenges were not mentioned at all by

students in Engineering or Sciences, although the faculty focus group participants (Supervisors) in these disciplines all mentioned that their students had trouble with these aspects of library research skill. Critically evaluating these findings. There exist similarities across faculties in challenges encountered by students during their research work, as well as noted differences between faculties (special areas of students).

From the report in a study embarked upon by Tan (1994) he reported that Asian - American students who attended a small, private, highly selective university in the Northeast had lower GPAs than non-Asians. Tie pointed out that these lower college GPAs among Asian Americans may be due to their disproportionate enrollment in Mathematics and Science courses, where on the average, students received lower grades than in other courses. Studies have found that a greater proportion of Asian American students are Mathematics/Science majors, or enroll in Mathematics and sciences course than other ethnic group. In other words, die subject area (students' area specialization) has significant influence on students' Academic Performance as with the Asian American university students.

In a similar manner with the review of related materials on student area of specialization, the researcher likewise reviewed materials that were in line with the impact of professional area of supervisors on research skills. Supervisors (Faculty members) seem to agree that subject specificity would be valuable for workshops such as identifying key research papers and writing the research paper, where it would be important to address different tools or styles depending on the discipline, and that it could be difficult to teach searching and selecting data bases if the students were in several different disciplines (area of specialization). Hoffman et al (2008) in their study included what information seeking skills faculty members (Supervisors or lecturers) think are most important for their students, it was found that faculty members seemed

iii. The Arts and science faculties better articulated the basic skills of thought that students need to effectively address issues and concerns in their life such as clarifying questions, gathering relevant data or information, formulating or reasoning to logical or valid conclusions, interpretations or solutions, etc.

Of the education faculties, 40 percent failed to mention any of these skills while only 5 percent of the non-education faculties failed to mention any. And education faculties were also less likely to ignore the need for emphasis on peer and student self-assessment (2 percent of this group failed to mention it, while 55 percent of the Arts and science failed to mention it).

Also, Evans (1990) carried out a related study on effectiveness of professionally qualified tutors, in Banbury School in North Oxford shire. The Study indicated that among other things, the Professional tutors attempted to concentrate their attention in giving help with skills and being generally available to students. The Professional teacher was found at most times developing an enabling environment that will provide the necessary assistance that students need for effective learning compared to their unprofessional colleagues. This, of course, is applicable to supervisors of graduate students in research work. In line with Evans (1990), Gartfort (1992) attributed the failure or poor performance in chemistry to the main fact dial (here is lack of qualified professional teachers in addition to other secondary reasons. From the position of Gartfort above, it will have little or no error to conclude that graduate students' inability to apply research skills appropriately with the view of using the result for effective research procedure was due to lack of qualified lecturers in guiding and leaching of research, statistics and evaluation hi sonic faculties. We can deduce that the professional areas of supervisors can aid the students in their research work. The above findings further support that areas of specialization of the faculty

difficulty in accessing the full-text of resources, frustration with off-campus access, and frustrations because materials they wanted were not in the collection. Less frequent) mentioned were challenges with knowing where to look for information and finding materials in the library. Hoffman et al (2008) further found that other challenges mentioned were more discipline-specific (that is, area of specialization). For instance; Engineering students more often identified difficulties with writing theses, conference proceedings or technical reports, while students in health sciences, and medicine and dentistry identified challenges with finding older materials e.g. 30 years old or pre-1950. But students in health sciences commented on challenges with doing comprehensive searches and finding reliable information. These last challenges were not mentioned at all by students in Engineering or sciences, although the faculty focuses group participants (supervisors) in these disciplines all mentioned that their students had troubles with these aspects of library research skills. Critically evaluating these findings, there exist similarities across faculties in challenges encountered by graduate students during their research work as well as noted differences between faculties (special areas of students).

Furthermore, from the report in a study embarked upon by Tan (1994) he reported that Asian-American students who attended a small, private, highly selective university in the Northeast had lower GPAs than non-Asians. He pointed out that these lower college GPAs among Asian-Americans may be due to their disproportionate enrollment in Mathematics and Science courses. Studies have found that a greater proportion of Asian-American students are Mathematics/Science majors or enroll in Mathematics and Sciences course than other ethnic group. In other words, the subject area (students' area of specialization) has significant influence on students Academic Performance as with the Asian-American university students. In a similar manner with

articulating how they bring critical thinking into the curriculum on a typical class day (33 percent) of the Arts and Science faculties had little or no conception of how to do this which only 15 percent of the Education faculty had the same lack of conception.

(iii) The Arts and science faculties better articulated the basic skills although students need to effectively address issues and concerns in their life such as clarifying questions, gathering relevant conclusions, interpretations or formulating or reasoning to logical or valid conclusions, interpretations or solutions, etc. of the education faculties, 40 percent failed to mention any of these skills while only 5 percent of the non-education faculties failed to mention any. And education faculties were also less likely to ignore the need for emphasis on peer and student self-assessment (3 percent of this group failed to mention it, while 55 percent of the Arts .and science failed to mention it) (p. 12).

In line with Evans (1990), Garfort (1992) attributed the failure or poor performance in chemistry to the main fact that there is lack of qualified professional teachers in addition to other secondary reasons. From the position of Gartfort above, it will have little or no error to conclude that graduate students' inability to apply research skills appropriately with the view of using the result for effective research procedure was due to lack of qualified lecturers in guiding and teaching of research, statistics and evaluation in some faculties. We can deduce that professional areas of supervisors can aid the students in their research work. The findings further supported that area *of* specialization of the faculty member (supervisors' area of specialization) have some significance in critical thinking skills acquisition of students. In other words,

the subject area of the supervisors has significant influence on students' academic performance as with the Asian-American university students.

From the review professionalism or area of discipline is considered as an advantage to students' acquisition of research skills in the course of their study. From the finding most students do not have a good understanding of the critical research skills or possible ways of structuring a research. It is believed that graduate students in disciplines like sciences, education measurement, research and statistics could carry out research successfully without many difficulties than other disciplines. While in some quarters, contrary opinions are held which seem to differ with this idea. This section of the review is therefore based on the careful search of materials that are connected to graduate students' research skills application with respect to their academic discipline.

In a study Do Medical Practitioners make greater use of research findings than head teachers, and if so, why? carried out by Hemsley-Brown & Sharp (2004), "behaviour and attitudes of different professional groups, including those in education, medicine and other fields were compared. The study revealed, compared with surgeons, general practitioners (GPs), and teachers, that teachers appeared to be less involved or interested in research. This implies that academic discipline affects research practices. Other reviewed studies that bear relevance to the subject of academic discipline and research skills include: Hart (2008), who indicated that students in health institutions lack the critical and analytic problem-solving skills necessary to articulate research problems and scholarly abilities to carry out in-depth studies. Bassey, et al (2007), also found no significant effect of staff area of specialization on research productivity.

Ali (2009) is of the view that in review of graduate students area of discipline, staff seem to agree that subject specificity would be valuable for workshops such as

identifying key research papers and writing the research paper, where it would be important to address different tools or styles depending on the discipline and that it could be difficult to teach on searching and selecting data bases if the staff were in several different disciplines. Hoffman, Antwi-Nsiah, Feng and Stanley (2008) in their study, included likely information eliciting abilities supervisors and lecturers think are more important for their students. They found that lecturers seem to feel most strongly that their students should develop a catalogue of techniques for searching the literature and that cooperation between lecturers and librarians was an essential part of teaching library research skills. This is to say that the academic discipline of graduate students is considered as very important to their application of research skills in the course of their study. Also, Brown and Krumholz (2002), in their survey of an upper year microbiology course included both senior undergraduates and graduate students that received literary instructions related to their assignments. By the end of the course the students self-reported level of information literacy had increased.

The argument on academic discipline and research skills application became more heated when Hoffman, Antwi-Nsiah, Feng and Stanley (2008) in their study on literary research skills of graduate students found out that on general note, students in faculties like engineering, health science, medicine, surgery and sciences identified difficulties with choosing keywords and search items, refining searches or narrowing results and sorting through result sets to find relevant information. They also identified challenges related to accessing the collection, such as difficulty in accessing the full-text of resources, frustration with off campus access and frustration because materials they wanted were not in the collection. Less frequently mentioned were challenges with knowing where to look for information and finding materials in the library. The researchers further found out that other challenges mentioned above were

discipline specific. For instance, students in health sciences remarked on difficulties with carrying out broad findings and identifying dependable ideas, students in medicine and dentistry acknowledged difficulties in finding older materials, while students in Engineering identified difficulties with finding these conferences, proceeding, or technical reports. Evaluating these findings critically, there seem to exist some sort of similarities across faculties in challenges encountered by graduate students during the research work as well as differences between disciplines.

According to the study of Ekeh and Opara (2013), on the extent of research mentoring of junior academics for improvement of research writing, based on discipline, the respondents disagreed in all the 20 items used for the measurement except in Management Sciences where respondents disagreed with 15 out of the 20 items used. Other disciplines examined were Education, Engineering, Sciences and Humanities. The findings of the result indicated that the junior academic, irrespective of their gender and discipline are not adequately mentored. From the analysis of variance of discipline effect on the extent of research mentoring of junior academics, a table value of 2.39 which was greater than the F- calculated value of 1.425 at the .05 level of significance and with degree of freedom of 4 and 431 implied no significance and therefore a retaining of the null hypothesis. This therefore, showed that discipline do not significantly affect the extent of research mentoring of junior lecturers. It therefore, implies that as these cadres of lecturers were not mentored adequately in research writing, the skills required to conduct researches may not be adequately developed and applied. Viku-Steiner, Kurtz-Costes and Kinlaw (2000), opined that research shows that individuals who are not mentored in research decrease their academic self-confidence. Thus, individuals who are mentored in research publish at a higher frequency than those who are not. The aforementioned result further aligns with

the reason that the disciplines of faculty boards and research supervisors have some significance in critical research skills application by graduate students. In other words, the discipline of graduate students might have a significant effect on their research skills application.

The development or acquisition and application of appropriate research skills among students may differ according to discipline. Skills required for experimental research by students in natural sciences are not exactly the same as those in social sciences, education and arts. For high quality research culture to be maintained and sustained, it is therefore imperative for students to acquire the relevant research skills (Research skills for career and life, 2011).

However, there is no universally accepted framework for the development and acquisition of research skills, but one of the pivots in which research skills could be developed is through training and supervision by a professional researcher who is well versed or grounded in the field of research. It is through such a supervisor, that the student will be able to learn those necessary steps and ingredients that qualify a research to be described as valid (Opie, 2006). Opie (2006) further stated that the integration of research related courses in the institutions' main curriculum's is vital to understanding the usefulness and processes which research undergoes. These courses also provide the students opportunities to enhance their analytical skills whenever they engage in real research activities. In Nigerian universities, most departments engage their students in research related courses like research methods, statistics, mathematics, project seminars as preparatory to the actual research projects. Some departments engage their students in field works (i.e.) geology, geophysics, while others send their students to museums, collection centers and others for industrial training, where they

acquire experiences in laboratory analysis and other analytical skills necessary for real research.

Contributing to the issue of research process, Nwana (2007) has recommended a sequence of steps to be embarked upon mostly in educational problems and to the rest with minor modification. These sequential steps are:

(i) Problem identification

(ii) literature review

(iii) Formulation of research questions and hypotheses.

(iv) Design

(v) Collection and organization of data

(vi) Analysis/interpretation of data (p. 12)

Umoru (2004) adduced that the most important tool often used to understand a phenomenon and delineate issues surrounding it, is research. It is therefore imperative that researching students should acquire the necessary and relevant research analysis skills so as to be able to adopt the scientific mode of operation when carrying out their research activities so that their findings could be empirical, replicable and predictable. Umoru (2004) further stated that the adoption of the scientific method explain the process on certain clearly defined, logical and measurable continuum excluding any reasoned opinion, guesses and unsubstantiated views from being acceptable as research findings.

Contributing to the views on research process, Preece (1998) argues that if the steps or order in which research activity is undertaken are not systematic, it may not be possible for the mind to deduce a relationship or develop an induction which could lead to useful findings. He further adds that the inductively formed ideas must be tested systematically according to procedures and that it is this systematic set of

procedures that is known as research process. Nworgu (2006) in his view on the development, acquisition and application of relevant skills in research, identified seven (7) basic steps which are considered as contributing the research process; these are: identification and definition of the problem; reviewing the literature; formulating research questions and hypotheses; designing a study to collect the necessary data; collecting pertinent data for testing the hypotheses; analysis the data and drawing necessary inferences/conclusion based on the analysis.

Isangedighi, Joshua, Asim and Ekuri (2004), however, on their own part identified six (6) steps which they consider as the research process. These are:

(i) Identifying a research problem

(ii) Making a clear statement of the problem

(iii) Subdivisions of the problem into sub-problems

(iv) Formation of hypotheses

(v) Collection of data and data analysis

(vi) Interpretation of data analysis, results and conclusions (p. 21).

However, as at the time of this study, the researcher was not able to find empirical works related to the extent to which graduate students especially in Nigeria had acquired research skills. Nevertheless, it is hoped by the researcher that this study will be one of the first in this part of the country to have looked at the extent to which graduate students or indeed university students acquire research skills this study? According to Desjardin (2008), research skills are the special abilities to "undertake a careful study of a subject, especially in order to discover new facts or information about it. Research skills could also be defined as a set of abilities related to undertaking research, including strategies and tools of accessing and evaluating information. So, the abilities to follow the right principles, procedures, methodologies

and otherwise of a research in order to discover new knowledge for the purpose of adding to the knowledge bank are research skills. In general, research skills in education are considered as important vehicle for promoting national developments, consciousness and cohesion, and for furthering effective academic/economic independence. The government could decide to invest heavily in research works in our universities, which is to be a catalyst for development if research results of graduate students are reliable. The following are considered as adequate research skills;

1. Formulation of research problems, research questions and hypotheses. This is the ability to formulate research problems, and the subsequent ability to formulate sub-problems otherwise known as research questions, which also lead to the genuine ability to formulate concise hypothesis in line with the problem and research questions.
2. Literature review skills which could include: a. library skills and b. computer knowledge skills/internet usage skills. This is to know the right procedure to evaluate work done in the area of study. This may be achieved through the use of library research skills, which help the researcher to adequately and rightly consult textbooks, encyclopedia, journals, news bulletin, etc, and the use of computer for word processing and internet browsing.
3. The skills of instrument development and validation, which is the main source of data collection.
4. Report writing and communication skills: This is the medium of disseminating research findings across board. A good research instrument is also structured by writing and responses are enhanced through good communication. And communication skills which are the major tools of interaction between the

researcher and his/her respondents, supervisors and even the examiners (internal and external) are necessary tool.

5. Data analysis skills: This is the application of the appropriate test statistical technique for analysis.
6. Referencing skills: This is the ability to reference other scholars' articles in a coherent and sequential order of arrangement in the main work and at the end of the work, particularly according to the America Psychological Association (APA) current order (p. 56)

The researcher draws the enumerated skills from the following readings. Melntyre (2002) recommended six skills which include:

(i) The role of literature review

(ii) Formulating research questions

(iii) Gathering data

(iv) Analysis of data

(v) Writing a dissertation

(vi) Writing a useful readable report (p. 24)

Denga and Ali (1998) also identified the following subheadings as the basic skills needed for the preparation of research project:

(i) The skills of introduction and statement of the problem

(ii) Literature review skill

(iii) Research design

(iv) Analysis of summaries, conclusion and recommendations (p. 12)

Furthermore, Akpan (2006) in course requirement for advance research methods gave out a research critique guidelines to the students as guide to evaluate and critic research articles and it has the following subheadings:

(i) Appropriateness of the research title

(ii) The congruence between the abstract and the main study

(iii) Appropriateness of the introduction in leading the reader to follow through the research process. Were the theories underlying the study appropriate and suitable for the study?

(iv) Appropriateness of the population and sample.

(v) Appropriateness of hypotheses or research questions formulation and the corresponding statistical applications.

(vi) Appropriateness of the sampling designs

(vii) Appropriateness of the research instrument

(viii) Presentation of research report

(ix) Effectiveness of discussions and findings

(x) Tabulation of result

(xi) Accuracy of references

**2.7 Academic programme and students research skills training needs**

We have categories of postgraduate students in all the faculties in our universities. The master degree students have 1st degree as their entry qualification, while Ph.D degree students have master degree as their entry qualification. This section focused on the opinion and findings of other scholars with respect to level of study, since the study focused on ascertaining whether there is any significant difference between programmed of study and appropriate application of research procedures among graduate students. In view of the fact that the number of postgraduate learners proficiency in library research, librarians and educational researcher lecturers should equally deal with the fact of the rate of information knowledge and other research skills expected of masters and Ph.D students.

The most recent study on level of theses writing among graduate students by Streiner and Stanley (2005) indicated that Ph.D students are more proficient in their research procedure than master students because they have presented papers at conference or had co-authored or published papers. This study revealed that Ph.D students will be better placed in term of research work than master degree students, the reason being that they already know much about research procedures, have applied the skills to write papers during conferences; and have made presentation and publications.

Lacey (2007) further found that at each grade level Ph.D students had higher scores in Mathematics, reading Science and Social studies than master students. These studies are also confirming that the level of theses writing of graduate students does not really have any significant influences on academic performances of students. Golker (2018) examined differences among master and Ph.D students in their research undertaking the study indicated that Ph.d students are better procedure than master's students. Studies relying on the National Education Longitudinal Study (NELS) data set of American, have also examined differences Asian, Americans in test of mathematics, reading, science and social studies and found that Ph.D students out perform their master counterparts (Tan, 1994).

## 2.8 Method of study and research skills training needs of graduate students

Education is a vital tool that is used in the contemporary world to succeed. It is essential because it is used to mitigate most of the challenges that we encounter in life. It plays a pivotal role in shaping tomorrow's leaders. We become a better nation by acquiring the knowledge, values, and skills necessary to be productive agents of a civilized society. A study carried out by Cui and Ermac (2017) in Cebu Normal University-Cebu City, on Life of working students: Opportunities and Challenges. The study looked into the factors that prompted students to work and how they were

affected by the jobs and studies. The study used qualitative research specifically phenomenological approach in gathering the data. Interviews were conducted to substantiate the study. The informants were thirteen students who worked in off-campus and on-campus. The results of the study revealed that a working student is a person who works so he can finish his studies and help his parents. Basically, students worked for their tuition. Being a working student was becoming the best revision of themselves. It was about sacrifice and most importantly, it was about dedication and proving to the world that poverty will never be a hindrance to fulfilling one's dreams.

A study by Hall (2010) on the work study relationship: Experiences of full-time university students undertaking part-time employment at the university of New South Wales were investigated in four surveys conducted in 1994, 1999, 2006 and 2009. Respondents to the surveys reported the amount of time they spent during term time in paid employment, studying outside of formal class hours and in leisure's activities (1999 and 2006 only). Fifty full-time students in 2006 and 37 in 2009 who were identified through the survey identified through the survey as working in excess of 10 hours per week were interviewed about their work and study relationships. Findings are consistent with UK studies showing an increase in part-time work by full-time students. In addition, a steady decrease was found in hours of study outside normal class time and in time spent in leisure activities. Reasons for working offered by interviewers were predominantly financial although many reported that gaining work experience, even in areas not related to their studies, was an important consideration. While some of the students interviewed felt that the government should provide more support for full-time students, the majority thought that the university should cater more for the needs of working students by providing more online facilities for

assignment submission and communication and more flexible time tables and submission requirements.

The most obvious difference between part-time and full-time student hours is the amount of credit hours they take during a semester. Full-time is usually somewhere between six and eleven credits or two to three classes. Therefore, a full-time student spends more time in class during a semester than a part-time student (Anderson, 2019). According to the author, with part-time student status, there is more flexibility with your schedule. After all, it's lot easier to pick two classes that don't overlap than to try and work in five. An open schedule allows you to work more while moving through your college career. It is also most possible to pay off tuition costs as you have the time to work. This is most useful if you do not want to take out big loans or cannot get scholarships. Going to school part-time can also help you earn in-state residency (and therefore in state tuition, which can be useful if there is a significant difference) as you cannot become a resident of most states while going to school full-time. The benefits of full-time include completing school faster. There are also many scholarships that require you to be a full-time student in order for you to utilize them. There scholarships can help nullify the cost difference. But of course, you have to apply for them and continue to earn them. Sometimes the stress of full-time school can get to be two much, so taking a part-time semester or year is beneficial.

Jim (2019) indicated in his study that being a part-time student might be a good option for those who have already begun pursuing a career and are on their way to becoming financially independent. You can also take care of any family responsibilities while simultaneously working towards a degree. According to research conducted by times Higher Education (2019), part-time students gain higher pay, new skills, and greater responsibilities in workplace. A comparative study of part-time and

full-time students 'emotional intelligence, psychological well-being and life satisfactions in the era of new technology, by Yunus, Mustafa, Nordin & Malik, (2014) in faculty of education, university technology, MARA, Malaysia. The study compared the part-time distance learning students and the full-time student's emotional intelligence, psychological wellbeing and life satisfaction. The study employed a survey method involving 67 students. The finding revealed that there was significant difference in emotional intelligence between the part-time and the full-time students. However, there was no significant difference in psychological wellbeing and life satisfaction between the two groups of students. A study by Rokicka, (2014) indicated that full time students who engage in part-time work during the last year of compulsory education have a negative impact on educational achievement.

## 2.9 Ownership of school attended and research skills training needs

In the unit, the researcher reviewed research work and theoretical work on performances of federal versus state universities, since this will help us to compare our anticipated findings which shall be discovered, with respect to graduate students and applications of research skills. Though there is little or no direct work with respect to the topic in question, similar work was reviewed. In Nigeria today, more and more federal and state universities are emerging. Before this period and the current trend, university education was first in the hands of the federal government, and then state governments joined with the aim of closing the educational disparity and marginalization in admission at the tertiary level. Then private universities spranging up as well wildfire making a lot of claims and counter-claims that they are out to give quality education, and that they are doing better than public universities.

There is this claim that charges are commensurate with the quality of education they are offering to the public. The question is, is there any significant difference in the

quality of education offered by federal universities compared to state universities in Nigeria, including the knowledge of research skills, training needs, among graduate students. There are different opinions and findings with respect to this notion. Asim et al (2005) in their study discovered that teacher's competency in STM assessment is a function of university ownership; in other words, more state school teachers than federal school ones were found competent in STM assessment.

In early 2006, Taylor library started to plan a comprehensive library skills institutions programme for graduates. This is because, there was increasing number of international student into Canadian universities, so they could not assumed that graduate students possess basic literacy skills, since they were coming from different background (that is local and international, federal and state universities). In other words, there was an assumed difference in knowledge of research skills of graduate students due to background. A common theme related to graduate students'use of facilitiesis that, often times it is assumed that, when students enter graduate school, they know how to conduct library research (Williams, 2000, Bellard, 2007). But Bradigan (2015) observed their study that, students come to graduate study with vastly different levels of preparation and may understandably be aware of or reluctant to confront the deficiencies in their findings. They asserted that they (librarians) see these deficiencies in research skills at the reference desk and during individual consultation with graduate students. This is also in support of the assumed differences among graduate students with respect to application of research skills due to different backgrounds (different universities).

As argued by Baron and Strout-Dapaz (2001), Liano (2007), in their study indicated that Canadian universities resources, so Canadian students may have had the opportunity to use the specialized resources that they will need as graduate students for

international students (students from other states or nation) that opportunity may not have been available, and students may come from universities with vastly library systems. In line with this argument, Huges (2005) found that international students previous exposure to information library instruction is not uniform, although it must be acknowledge this is true for any group of student from different institution (state or federal universities).

In February 2002, the NUC executive secretary, Professor Peter Okebukola unveiled a report of a 1999/2000 accreditation exercise of the 36 federal and state universities in the nation. According to him, the aims of the exercise were noble. This work presents the ranking of universities according to performance of their academic programmes in the 1999 and 2000 accreditation exercise. He further stated that indices for comparing academic quality of university programmes, every effort will be made by the commission to improve the diversity of the performance indicator utilized for this purpose in subsequent exercises. Some of the finding are extracted from retrospective report of school academic performances for the purpose of comparing. There is no academic programmes of any university, which does not involve research work. The researcher assumed that the rating could be used to explain differences in research knowledge application of research skills and performance in research work of various universities. The study also indicated that universities performance is not a matter of age of the university.

Nigeria currently has 174 universities registered and approved by the Nigeria University Commission (NUC), though there are so many universities claiming to be approved and registered in Nigeria especially the state ones, that is the reason the NUC (2019) has come out clearly to list all approved universities in Nigeria, the list shows there are currently 43 federal universities in Nigeria, 52 state universities in Nigeria,

and 79 private universities in Nigeria. The main issue here is that everybody wants to attend the best university in Nigeria or at least one of the top 10 universities in Nigeria, hence the reason for ranking universities base on merit which include graduate students application of research skills, is not a matter of university age. In other words university age has no significant influence on graduate students research skills. Training needs.

Thompson (1998) whose study focused specifically on students attending the universities of California, Berkeley, have reported lower college GPAs for Asian, Americans compared to white. Whites had higher means GPAs (3.18) than Asian America Hispanic (2.86) and African American (2.71). this may be due to the type of universities attended, as it was further confirmed by Toupin & Son (2016) as quoted by Tan (1994) that of all Asian American students who attended small private, highly selective universities in the North East in 1984, 1985 and 1986 in the college of Arts and Sciences found that Asian American had lower GPAs than non-Asians (matched on socio-economic background and SAT scores). They were more likely to be placed on academic probation and likely to appear on the Dean's list at one time (Tan, 1994).

| Ranking | World Ranking | University |
|---|---|---|
| 1 | 1233 | University of Ibadan |
| 2 | 1677 | University of Nigeria |
| 3 | 1704 | Covenant University Ota |
| 4 | 2077 | Obafemi Awolowo university |
| 5 | 2094 | University of Lagos |
| 6 | 2216 | Ahmadu Bello University |
| 7 | 2726 | University of Ilorin |
| 8 | 2935 | Federal University of technology Ajure |
| 9 | 3057 | Adekunle Agasin University |
| 10 | 3182 | University of Port Harcourt |
| 11 | 3257 | Federal University of Technology Mina |
| 12 | 3375 | University of Benin |
| 13 | 3602 | Ladoke Akintola University of Technology |
| 14 | 3628 | Bayero University Kano |
| 15 | 3647 | Universityof Calabar |
| 16 | 3747 | Federal University of Technology Owerri |
| 17 | 3738 | Nnamdi Azikiwe University |
| 18 | 3745 | River State University of Science and Technology |
| 19 | 3750 | University of Jos |
| 20 | 3762 | Lagos State University |
| 21 | 3838 | University of Uyo |

Webometrics ranking july 2019)

## 2.10 Summary of literature review

The review focused on needs assessment of research skills' training needsamong graduate students, although the literature reviewed were mostly not contradict the local studies reviewed andare still relevant to this study to some extent, they have given considerable insight on how research skills training needs, students characteristic in terms of age, marital status, method of study, ownership of school attended, gender and discipline influence research skill.

On research skills among graduate students, it was concluded that many education acquired doctoral students were not equipped with library research skills. However, in all that was reviewed none showed a direct/indirect correlation between research skills by graduate students and the other independent variables considered in this study, but shown a correlation between independent variables and research skills training needs by graduate students. Therefore, the gaps in the cited studies necessitate and justify the need for this study. Consequently, this study focuses on research skills training needs assessmentamong graduate students in universities in cross river state, Nigeria.

# CHAPTER THREE

# RESEARCH METHODOLOGY

This chapter discussed the methodology of the research which was presented under the following sub headings:

i Research design

ii Area of the study

iii Population of the study

iv Sampling technique

v Sample

vi Instrumentation

vii Procedure for data collection

viii Procedure for data preparation and scoring

ix Procedure for data analysis

x. Operational definition research variables

## 3.1 Research design

The descriptive survey design was used for this study. This design is useful in gathering data about the attitude, behavior, practices and records of events that can be analyzed and interpreted to measure relationship between variables. According to Isangedighi (2012), descriptive survey involves having a systematic intense, accurate and purposeful observation of behavior, trait, or opinion and describing same as precisely as possible. The use of this design is justified in the present study since the study is descriptive, explanatory and has individual post-graduate students as the unit of analysis for evaluation and hence survey research design was consider the most appropriate.

### 3.2 Area of the study

. Cross River State the study area is one of the thirty-six (36) states of the Federal Republic of Nigeria with the state capital at Calabar. Cross River State is situated in the south-south geo-political zone of Nigeria with eighteen (18) local government councils, namely: Abi, Akamkpa, Akpabuyo, Bakassi, Bekwara, Biase, Boki, Calabar Municipality, Calabar South, Etung. Ikom, Obanliku, Obubra, Obudu, Odukpani, Ogoja, Yakurr and Yala.

According to National Population Commission (2006), it has a population figure of about 2,888,966 people. Also, according to the Cross River State 1991 diary, the state spanned over an area of about 23,074,425 square kilometers of land. The state is located within the rain forest-belt of the Federal Republic of Nigeria. The state lies between latitudes 5 $32^{1}$ and 4° $27^{1}$ north of Equator, and longitudes 7 $50^{1}$ and 9 $28^{1}$ East of the Greenwish Meridian. It is bounded on the north by Benue State, in the south by Bight of Bonny and Atlantic Ocean, in the east by the Republic of Cameroon, and in the west by Abia, Akwa-Ibom and Ebonyi states. It lies within the tropical region of Nigeria and has both wet and dry seasons. This area experiences heavy rainfall as it is close to the Atlantic Ocean. Cross River State is a peculiar state in Nigeria with tourism potentials such as Agbokim waterfalls, the canopy walkway, national wildlife park, Mary Slessor's residence constructed in 1887, Monoliths among others. Presently, the government has constructed another briskness potential known as Tinapa. The state has a cable car located at Obanliku to take people to the Obudu Ranch Resort, and it is described as the longest cable car in the world.

Educationally, Cross River State has many pre-primary, primary and post--primary schools and tertiary institutions, such as university of Calabar, Calabar, Cross River University of Technology (CRUTECH) with campuses in Calabar, Obubra,

Okuku and Ogoja, Federal College of Education Obudu, College of Education Akamkpa, School of Nursing and College of Health Technology Calabar. The major ethnic groups are the Efiks, the Yakurr, Bekwarr as and Ejahams. The state is mostly made up of Christians. The major occupations of the people in the state include farming, fishing and petty trading. Others include craft making, tailoring and hunting due to forest resources. The state is not heavily industrialized although it has the Nigeria Export processing zone (EPZ) or the free trade zone (FTZ). The adults mostly are civil servants.

### 3.3 Population of the study

The target population is the total number of graduate students in the two universities of Cross River State, and the accessible population of this study comprises of all the full time final year graduate students as at 2016/2017,2018/2019 in the universities of Calabar and (CRUTECH). This was made up of 1139 students as described in Table 1. The two university (UNICAL and CRUTECH) are the only unive rsity used for the study, this is because the third university Arthur Javis as of the time of this study were not or do not have graduate programmes.

TABLE 1

Estimated number of final yearpost graduate students 2016/2017-2018/2019

| S/N | University of Calabar Facilities | Masters | | Total | Ph.D | | Total |
|---|---|---|---|---|---|---|---|
| | | Males | Females | | Males | Females | |
| 1 | MGT Sciences | 109 | 74 | 183 | 66 | 16 | 82 |
| 2 | Sciences | 129 | 39 | 168 | 33 | 10 | 43 |
| 3 | Education | 121 | 94 | 215 | 27 | 37 | 64 |
| 4 | Arts | 60 | 26 | 86 | 31 | 8 | 39 |
| 5 | Agriculture | 13 | 18 | 31 | 31 | 11 | 42 |
| | Total | 432 | 251 | 683 | 188 | 82 | 270 = 953 |
| | Crutech Facilities | | | | | | |
| 1 | MGT Sciences | 28 | 6 | 32 | - | - | - |
| 2 | Sciences | 16 | 15 | 31 | 2 | 2 | 4 |
| 3 | Education | 31 | 1 | 32 | - | - | - |
| 4 | Art | 34 | 24 | 58 | - | - | 1 |
| 5 | Agriculture | 24 | 2 | 26 | 1 | - | 1 |
| | Total | 133 | 48 | 181 | 3 | 2 | 5= 186 |
| | Grand total | | | | | | 1139 |

Source: Field Work Survey 2019

## 3.4 Sampling technique

The study adopts a stratified random sampling technique. This sampling technique according to Nworgu (1991), is where the population is first categorized into groups that are distinctly different from each other on relevant variables and in which the elements are drawn at random within each stratum, such that the relative proportion of the strata in the resultant sampling are the same as they exist in the parent population. Stratified random sampling technique was chosen because of its capacity for proportional representative of subjects from the different strata of the population (graduate students in the universities, schools, disciplines and departments). In the stratification process the graduate students were stratified by gender (male/female), academic disciplines (mgt. sciences, sciences, education, arts and agricultural sciences), academic programme (masters and Ph.D), method of study (part time/full time), school attended (UNICAL & CRUTECH). For each stratum, simple random sampling proportion to their size in the population was used. The advantage is that the sample reflects a true representation of the graduate students understudy.

From each of the two universities, respondents were selected using the hat drawn from simple random sampling. In this process, required sample number of "yes" for a particular school/department in a particular university and other unsampled number labeled with "No" pieces of papers was folded and placed in a basket. Graduate students were asked to pick one and to return, this is balloting with replacement. Those who picked "Yes" were recorded and given the questionnaire to fill.

### 3.5 Sample

The survey monkey online calculator was used to determined the sample size. The sample was made up of 683 subjects (graduate students) from the universities of Calabar and Cross River University of Technology (CRUTECH). This means that 59.96% of the graduate students were sampled. Out of the 683 graduate students, 334 (48.90%) were males and 349 (51.09%) were fema les from both university; 520 (76%) were sampled from UNICAL both males and fema les, 266 (34%) were males from UNICAL and 254(285%) were females from UNICA L, while163 (23.86%) were sampled from CRUTECH, 68 (9.95%) were males from C RUTECH and 95 (13.90%) were females from CRUTECH. The sample of 520 from UNICAL and 163 from Cross River University of Technology (CRUTECH) consistsof each from the participating Universities.The sample fraction was 1.79, approximately 2. This means that each person in the study sample, represent 1.58 or 2 students in the sample frame. See table 2.

### 3.6 Instrumentation

The instrument used for data collection in this study is a questionnaire titled: Training Needs Assessment Survey Questionnaire (TNASQ) developed by the researcher. The TNASQ is sub-divided into part Aand part B. The Part A, elicit responses on personal and academic background information of graduate students; Part B on the other hand was designed to elicit information on the graduate students appropriate needs in research skills whichwas in turn divided into nine sub-sections namely; problem identification, hypotheses formulation skills, sampling skills, literature review,instrument development skills, statistical skills, computer application skills, the skill of referencing, data collection/data analysis skills, on report writing and communication skills. The TNASQ start with a brief introduction of the study

and the expectation of the instrument. It also included instructions on what the respondents are expected to do. In addition, Part B sub-section $N_1$ to $N_9$ consisting of sixitems each measuring the various research skills training needs of graduate students as the prepare to appropriate research practices.

The part B of TNASQ had items built on four-point numerical rating scale ranging from 1 to 4. That is, from lowest level of research skills training need (1 point), to the highest level of research skills training need, (4 points) respectively, respondents were required to ratetheir level of needfor training of each of the research skills on the questionnaire.

Furthermore, students were expected to indicate how much of those skills they felt, they appropriately need retrainingusing the following 4-points Modified Likert Scale developed by the researcher. 1 = means you do not need to require training, 2= means you require training, 3= means you strongly require training, 4 = means you very strongly require training.

### 3.6.1 Validity of the instrument

Validity generally refers to the degree at which a test measures what. It is purports to measure. The Training Needs Assessment Survey Questionnaire (TNASQ) was subjected to face and content validity. The face validity was achieved by giving the instrument(TNASQ) to three experts in Educational Measurement and Evaluation, and Research/ Statistices, for their criticism and thorough scrutiny, in terms of relevance, appropriateness of words, and representativeness of the items, this was done on face value. On the content validity, they screen the appropriateness of instrument of the items to content areas. After the suggestions and corrections were effected an approval was then given by the supervisor for the use of the instrument.

TABLE 2

Distribution of sample of post graduate sstudents according to iinstitutions, gender and aacademic discipline

| School | Gender | Education | Science | Arts | Management science | Agricultural science | Total |
|---|---|---|---|---|---|---|---|
| UNICAL | Male | 82 | 45 | 58 | 50 | 31 | 266 |
| | Female | 72 | 61 | 53 | 49 | 19 | 254 |
| | Total | 154 | 106 | 111 | 99 | 50 | 520 |
| CRUTECH | Male | 20 | 10 | 20 | 14 | 4 | 68 |
| | Female | 1 | 24 | 44 | 23 | 3 | 95 |
| | Total | 21 | 30 | 64 | 41 | 7 | 163 |
| GRAND TOTAL | | 175 | 136 | 175 | 140 | 57 | 683 |

Source: Field survey, 2019.

### 3.6.2 Reliability of the research instrument

Reliability refers to the extent to which a test measures whatever it is measuring consistently (Joshua, 2005). To determine the reliability of the instrument, a trial testing was carried out on thirty (30) respondents. These respondents were drawn fromuniversity of calabar faculties who were not part of the study population. The respondents were drawn randomly from the population. The Cronbach's alpha method of estimating reliability was used. The same instruments was administered on the thirty (30) respondents, as a means to determine the internal consistency of each sub-scale measuring each sub-variable. The result of this trial test shows a Cronbach's alpha reliability coefficient for the variables ranged between 0.858 to 0.944. These coefficients are satisfactorily high and therefore the instrument is considered reliable. The breakdown of the reliability results was shown in Table 3.

### 3.7 Procedure for data collection

The researcher collected an introductory letter from the Head of department of the University Registrars to permit his/her final year post graduate students to be used for the study. The researcher was accompanied by two research assistants who were-trained within two weeks by the researcher in the techniques of sampling, handling of questionnaire and how to relate with the respondents. Basically, they were trained to assist in the distribution and collection of the questionnaire. The researcher and the -two assistants visited the schools. University of Calabar (UNICAL) was the first school visited followed by Cross River University of Technology (CRUTECH),

TABLE 3

Result of the Cronbach Alpha reliability estimates of the instruments (n = 30).

| S/N | Variable | Number of items | Mean | Standard deviation | Cronbach Alpha |
|---|---|---|---|---|---|
| 1. | Problem identification skills | 6 | 16.267 | 5.311 | 0.925 |
| 2. | Research questions skills | 6 | 17.103 | 5.653 | 0.938 |
| 3. | Literature review skill | 6 | 16.600 | 5.230 | 0.891 |
| 4. | Sampling skills | 6 | 14.900 | 4.498 | 0.858 |
| 5 | Instrument development | 6 | 17.138 | 5.823 | 0,947 |
| 6. | Use of statistical tool skills | 6 | 15.600 | 5.679 | 0.944 |
| 7. | Computer application in data analysis skills | 6 | 13.733 | 5.753 | 0.933 |
| 8. | References skills | 6 | 16.167 | 5.503 | 0.932 |
| 9. | Report writing skills | 6 | 15.133 | 5.077 | 0.902 |

The researcher read the instruction and explained some points where necessary for a better understanding and guided the respondent properly on how to complete the questionnaire correctly. Two research assistants were used and the completed copies of the questionnaire were collected. This ensure hundred (100%) percent collection rate.

### 3.8 Procedure for data preparation and scoring

A coding schedule was prepared for ease of scoring to reflecting all items and their response options for easy coding of each retrieved questionnaire. In the questionnaire, 4-points coding scale was adopted for each of the items on the questionnaire and respondents were required to answer the questionnaire based on the extent they acquired each skill. It follows thus:

(i) 1 means you do not need to obtain training

(ii) 2 means you strongly welcome to obtain a training

(iii)3 means you strongly desire a training

(iv)4 means you very strongly desire training

For sex, male is labeled 1; while female is labeled 2. For academic discipline: education was 1. Sciences was 2, and Arts was 3, Agricultural Sciences was 4, Management Science 5, For Institutions, UN1CAL was 1; while CRUTECH was 2. The responses made by respondents were coded, in preparation for analysis. For aposit ively worded item, were coded as indicated on the research instrument and reversed for negatively worded items. The scores were summed up for each research skills' training need variable and for each respondent. The coding schedule for the instrument is shown on Table 4.

TABLE 4

Coding schedule of responses for data analysis

| s/n | Variable | Code |
|---|---|---|
| 1 | Serial No | 001-618 |
| 2. | Gender | Male – 1 |
| 3. | Academic discipline | Education 1<br>Sciences - 2<br>Arts -3<br>Management science 4<br>Agric. Sci. 5 |
| 4. | Institutions | UNICAL – 1<br>CRUTECH 2 |
| 5 | Problem Identification | Sum of scores in items 1-6 |
| 6 | Research questions/hypotheses formulation | Sum of scores in item 7-12 |
| 7. | Literature review skills | Sum of scores in item 13-18 |
| 8 | Sampling Skill | Sum of scores in item 19-24 |
| 9 | Instrument development skill | Sum of scores in item 25–30 |
| 10 | Use of statistical skill | Sum of scores in items 31-36 |
| 11 | Computer application in data analysis skill | Sum of scores in items 37– 42 |
| 12 | References skill | Sum of scores in items 43-48 |
| 13 | Reporting writing skill | Sum of scores in items 49-54 |

### 3.9 Procedure for data analysis

The research hypotheses was analyzed using SPSS and all results were tested at .05 level of significance.

(i) Hypothesis one

The level of Graduate students'research skills training need is not significantly different from the expected level.

Variable: Level of research skills training need

Statistical analysis: One sample population t-test

(ii) Hypothesis two

Graduate students' gender (male or female) has no significant influence on their research skills training needs.

Independent variable: Gender.

Dependent variable: Research skills training need.

Statistical analysis technique: Independent sample t-test.

(iii) Hypothesis three

Graduate students age has no significant influence on their research skills training need.

Independent variable: Age of students

Dependent variable: Research skills training need.

Statistical analysis technique: One way analysis of variance (ANOVA).

(IV)Hypothesis four

Marital status has no significant influence on'graduate students' research skills training need

Independent variable: Student marital status.

Dependent variable: Research skills training need.

Statistical analysis technique: One way analysis of variance (ANOVA).

(V) Hypothesis five

There is no significant influence of graduatestudentsacademic discipline (Education, Sciences, Art, Agriculture sciences, Management Sciences) on their research skills training need.

Independent variable: Student's' academic discipline (categorized into 5).

Dependent variable: Research skills training need.

Statistical analysis technique: One-way analysis of variance(ANOVA).

(VI)Hypothesis six

There is no significant academic programme based difference in graduate students research skills training need.

Independent variable: Students' academic programme .

Dependent variable: Research skills training need.

Statistical analysis technique: Independent sample t-test

(VII). Hypothesis seven

Method of study has no significant influence on research skills training need of graduate students

Independent variable: Method of study (Full time and Part-time) .

Dependent variable: Research skills training need.

Statistical analysis technique: Independent sample t-test

(VIII).Hypothesis eight

Ownership of School attended has no significant influence on research skills training need of graduate students

Independent variable: Ownership of School attended (Federal or State University) .

Dependent variable: Research skills training need.

Statistical analysis technique: Independent sample t-test

### 3.10 Operational definition of variables

Variables associated with this study are defined operationally in order to depict their contextual meaning as applied in the study.

i. Research skill in problem identification: It is the confidence level of the researchers to identify the major problem to be dealt with and also, determine the minor problems, arising from the major one. It was measured by the sum ofscores on responses to the research instrument.Items 1-6 of part B.

ii. Research question/hypothesis formulation skills: This is the level of skills a student needin posing research question/hypothesis, that can provide a clue, to the answer as to how the variable relates to each other.

iii. Literature review skills training need. This is the ability of the researcher to identifies and critically examines knowledge that exists in a problem, under investigation. Such knowledge include "conceptual frameworks, empirical evidence, theories, hypothesis and conclusion from other scientific works relating to the problem under research. This review must be accurate and relevant to the study".

iv. Research skills in computer application in data analysis skills : In this study the variable will be measured using the instrument.

v. Research skills in terms of statistical analysis: The skills to create variable data use for statistical analysis. In this study the variable will be measured using the instrument.

vi. Research skills in statistical tools: The skill to analyze and interpret the results in the computer software. In this study the variable will be measured using the instrument.

vii. Research skills in terms of referencing skills: The Ability of the researcher to apply the current American Psychology Association citation required in the body of the work and referencing as at the time of report writing and submission. In this study the variable is measured using the instrument.

viii. Gender: This refers to male and female final year university post graduate students. It has two levels in the study.

(a) Male

(b) Female

ix. Students' academic discipline: This refers to the broad area of study by the graduate student. And it consists of four levels namely; Education for all education related study, Sciences for all science related study, management science for all management science related study, Arts for arts related study and Agricultural science for all agricultural science related study by graduating student.

x. Students characteristics: This refers to the gender of students, age of students, area of discipline, programme of study, marital status and method of study.

xi. Ownership of school attended: This refers to school type either federal or state universities.

xii. A Needs: Refers to the gap or discrepancy between a present state (what is) and a desire state (what should be). The needs is neither the present nor the future state; it is the gap between them.

xiii. Needs Assessment: Is a systematic approach that progresses through a defined series of phases. Focuses on ends (i.e. outcomes) to be attained, rather than means (i.e. process). OR is a systematic set of procedures that are used to determine needs examine their nature and causes and set priorities for future action.

xiv. Reporting skills: The ability to package a research work using the acceptable spacing, paper size, font size, number of works, sequential chaptering and subheadings for dissemination or publication.

# CHAPTER FOUR

# RESULTS AND DISCUSSION

Chapter four deals mainly on the analysis of the data collected for this study as described in chapter three. The procedures are explained briefly, followed by the presentation, interpretation and discussion of the results. The entire content is arranged under the following sub-headings:

(i) General description of data

(ii) Presentation of results

(iii) Discussion of findings

## 4.1 General description of data

### 4.1.1 Demographic description of study sample

Data were collected from a random sample of 683 students. Their demographic description was done using frequencies, means and standard deviation. The results are presented in Table 5.

Table 7 result reveals that all the correlation coefficients were positive ($.387 \leq r \leq .739$) and significant ($p=.000<.05$). This means that increases in one of the variables are significantly associated with increases in all the other variables.

TABLE 5
Demographic description of study sample

| Demographic variable | Category | N | Percent |
|---|---|---|---|
| Age | 18-22 years | 105 | 15.4 |
| | 23-27 years | 139 | 20.4 |
| | 28-32 years | 184 | 26.9 |
| | 33-37 years | 140 | 20.5 |
| | 38-42 years | 55 | 8.1 |
| | 43-47 years | 60 | 8.8 |
| | Total | 683 | 100.0 |
| Faculty (Discipline) | Education | 175 | 25.6 |
| | Physical Sciences | 136 | 19.9 |
| | Mgt. Sciences | 140 | 20.5 |
| | Arts | 175 | 25.6 |
| | Agric. Sciences | 57 | 8.3 |
| | Total | 685 | 100.0 |
| Gender | Male | 334 | 48.9 |
| | Female | 349 | 51.1 |
| | Total | 683 | 100.0 |
| Degree in view | Ph.D | 296 | 43.3 |
| | Masters | 387 | 56.7 |
| | Total | 683 | 100.0 |
| Method of study | Full time | 545 | 79.8 |
| | Part time | 138 | 20.2 |
| | Total | 683 | 100.0 |
| Marital status | Married | 213 | 31.2 |
| | Single | 220 | 32.2 |
| | Divorced | 114 | 16.7 |
| | Widowed | 136 | 19.9 |
| | Total | 683 | 100.0 |

*Significant at .05 level. P<.05

Table 5 result shows that 334 (48.9%) were males and 349(51.1%) females. By age, 105(15.4%) were 18-22yrs, 139(20.4%) 23-27yrs, 184(26.9%) 28-32yrs, 140(20.5%) 33-37yrs, 55(8.1%) 38-42yrs and 60(8.8%), 43-47yrs. The distribution by faculty (discipline) degree in view (programme), method of study and marital status were as presented in the Table (Table 5). Thus, the sample is considered "heterogeneous enough for the study.

4.1.2 Descriptive statistics of study variables

The descriptive statistics-mean, standard deviation, standard error, minimum, maximum-were computed for the nine research skills training need variables: problem identification, research question/hypothesis formulation development, review, sampling, instrument development, statistical skills, computer application, referencing report writing. The results are presented in Table 6.

The nine variables were measured using the same number of items and response options. This makes their statistics comparable. From Table 6, the greatest problems of the students was report writing (x=17.551) followed by referencing (x=17.113) and the least was computer application (x=15.196). All the mean values were observed to be higher than the expected mean ($\mu$=15.000).

4.1.3 Inter-variable relationships

The Pearson Product Moment Correlation Coefficient and the associated p-values were computed for all possible pairs of the nine study variables. The results are presented in Table 7.

TABLE 6

Descriptive statistics

| Skill areas | N Statistic | Minimum Statistic | Maximum Statistic | Mean Statistic | Std. Error | Std. Deviation Statistic |
|---|---|---|---|---|---|---|
| Problem Identification | 683 | 6.00 | 24.00 | 17.056 | .1585 | 4.143 |
| Hypothesis Formulation | 683 | 6.00 | 24.00 | 16.997 | .1689 | 4.414 |
| Literature Review Skills | 683 | 6.00 | 24.00 | 16.958 | .1730 | 4.522 |
| Sampling Skills | 683 | 6.00 | 24.00 | 16.026 | .1707 | 4.462 |
| Instrument Dev .Skills | 683 | 6.00 | 24.00 | 15.943 | .1741 | 4.549 |
| Statistical Skills | 683 | 6.00 | 24.00 | 15.536 | .1902 | 4.9697 |
| Computer Application Skills | 683 | 6.00 | 24.00 | 15.196 | .1923 | 5.025 |
| Referencing Skills | 683 | 6.00 | 24.00 | 17.113 | .1902 | 4.971 |
| Report Writing Skills | 683 | 6.00 | 24.00 | 17.551 | .1787 | 4.670 |

TABLE 7

Inter-variable correlation coefficients

| Training needs variable | Problem identification | Hypothesis formulation | Literature review | Sampling | Instrument dev. | Statistical skills | Computer application | Referencing | Report writing |
|---|---|---|---|---|---|---|---|---|---|
| Problem identification | 1** | .564* | .488& | .387* | .440* | .425* | .389* | .410* | .489* |
| Hypothesis formulation | .000 | 1 | .691* | .603* | .615* | .580* | .521* | .533* | .665* |
| Literature Review | .000 | .000 | 1 | .638* | .670* | .625* | .580* | .668* | .725* |
| Sampling | .000 | .000 | .000 | 1 | .703* | .667* | .571* | .537* | .585* |
| Instrument development | .000 | .000 | .000 | .000 | 1 | .739* | .660* | .623* | .633* |
| Statistical skills | .000 | .000 | .000 | .000 | .000 | 1 | .693* | .605* | .612* |
| Computer application | .000 | .000 | .000 | .000 | .000 | .000 | 1 | .624* | .591* |
| Referencing | .000 | .000 | .000 | .000 | .000 | .000 | .000 | 1 | .653* |
| Report writing | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | 1 |

*Significant at .05 level. P<.05

** Values above main diagonal are correlation coefficients and below it are corresponding p-values.

## 4.2 Presentation of results

For each hypothesis, the procedures used in testing it are explained briefly, followed by the presentation and interpretation of the results. All decisions were taken at .05 level of significance, such that a null hypothesis was rejected if the p-value associated with the computed test statistics was less than .05 but retained if otherwise.

### 4.2.1 Hypothesis one

The level of research skills training need is not significantly different from the expected level.

To test this hypothesis, one sample population t-test was applied. The mean and standard deviation of each of the nine (9) sub-variables were computed. The observed means were compared to the expected mean ($\mu$=15.000). From Table 8, one of the mean need for training in computer application was not significantly higher than the expected mean (t=1.020, p=.308>.05). All the other observed means ($15.536 \leq x \leq 17.551$) are significantly higher than the expected mean ($.000 \leq p \leq .005$). This means that there is significant need for training on all the sub-variables of research skills.

### 4.2.2 Hypothesis two

Students' gender has no significant influence on their research skills training need.

To test this hypothesis, independent sample t-test was applied, with gender as the independent variable and each of the sub-variables of research skills training need as dependent variable. The results obtained are presented in Table 9and fig. 1-9.

TABLE 8

One Sample Population T-Test for Significance of Research Skills Training Need ($\mu = 15.000$)

| Research Skill | Mean | Standard Deviation | Standard Error | Mean Diff. | T-Value | P-Value |
|---|---|---|---|---|---|---|
| Problem identification | 17.056 | 4.143 | .159 | 2.056 | 12.966* | .000 |
| Hypothesis formulation | 16.997 | 4.414 | .169 | 1.997 | 11.824* | .000 |
| Literature review | 16.958 | 4.522 | .173 | 1.958 | 11.313* | .000 |
| Sampling | 16.029 | 4.462 | .171 | 1.026 | 6.011* | .000 |
| Instrument development | 15.943 | 4.549 | .174 | .943 | 5.417* | .000 |
| Statistical skills | 15.536 | 4.970 | .190 | .536 | 2.818* | .005 |
| Computer Appreciation | 15.196 | 5.025 | .192 | .196 | 1.020 | .308 |
| Referencing | 17.113 | 4.971 | .190 | 2.113 | 11.108* | .000 |
| Report writing | 17.551 | 4.670 | .179 | 2.551 | 14.273* | .000 |

* Significant at .05 level, $P < .05$

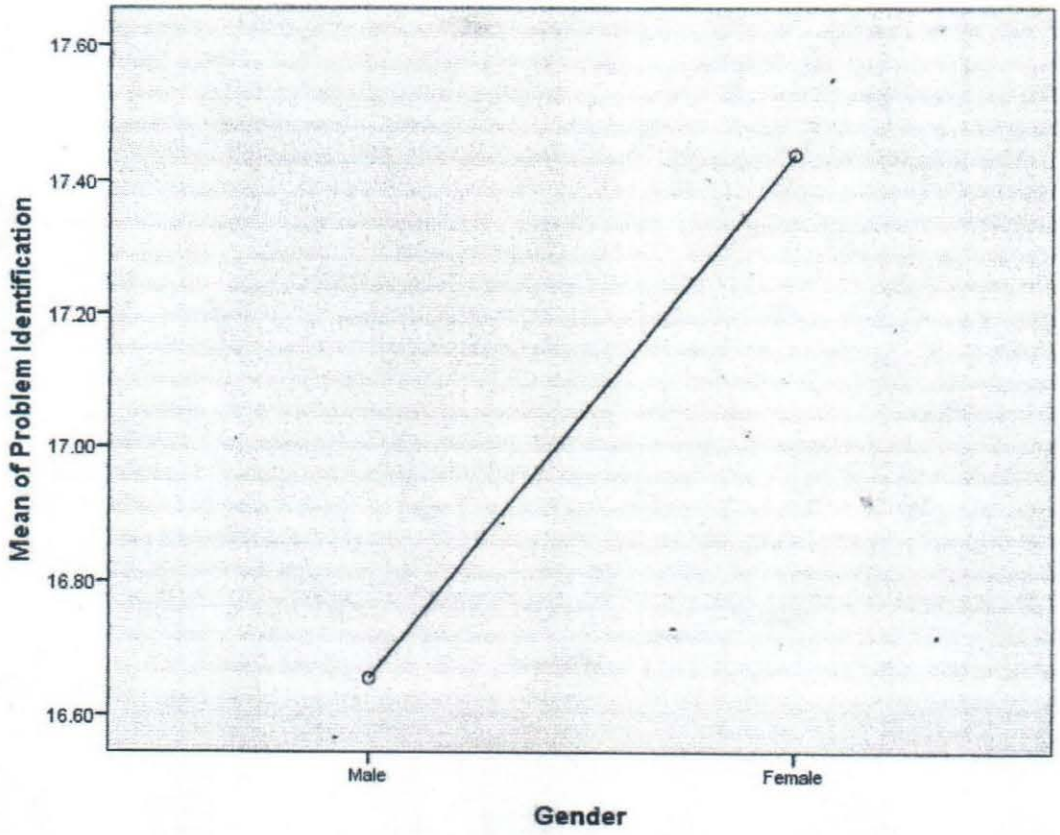


FIG. 1: Means plot of problem identification skills training need by gender

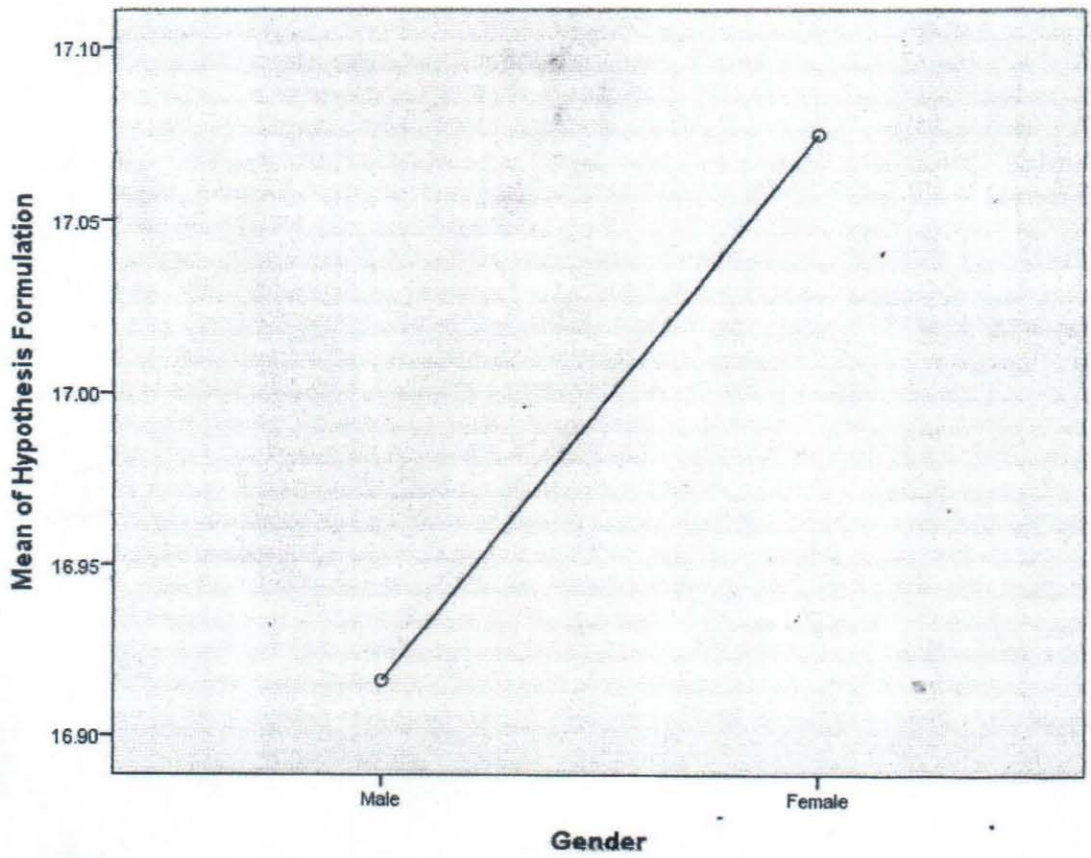


FIG. 2: Means plot of research question/hypothesis formulation skills training need by gender

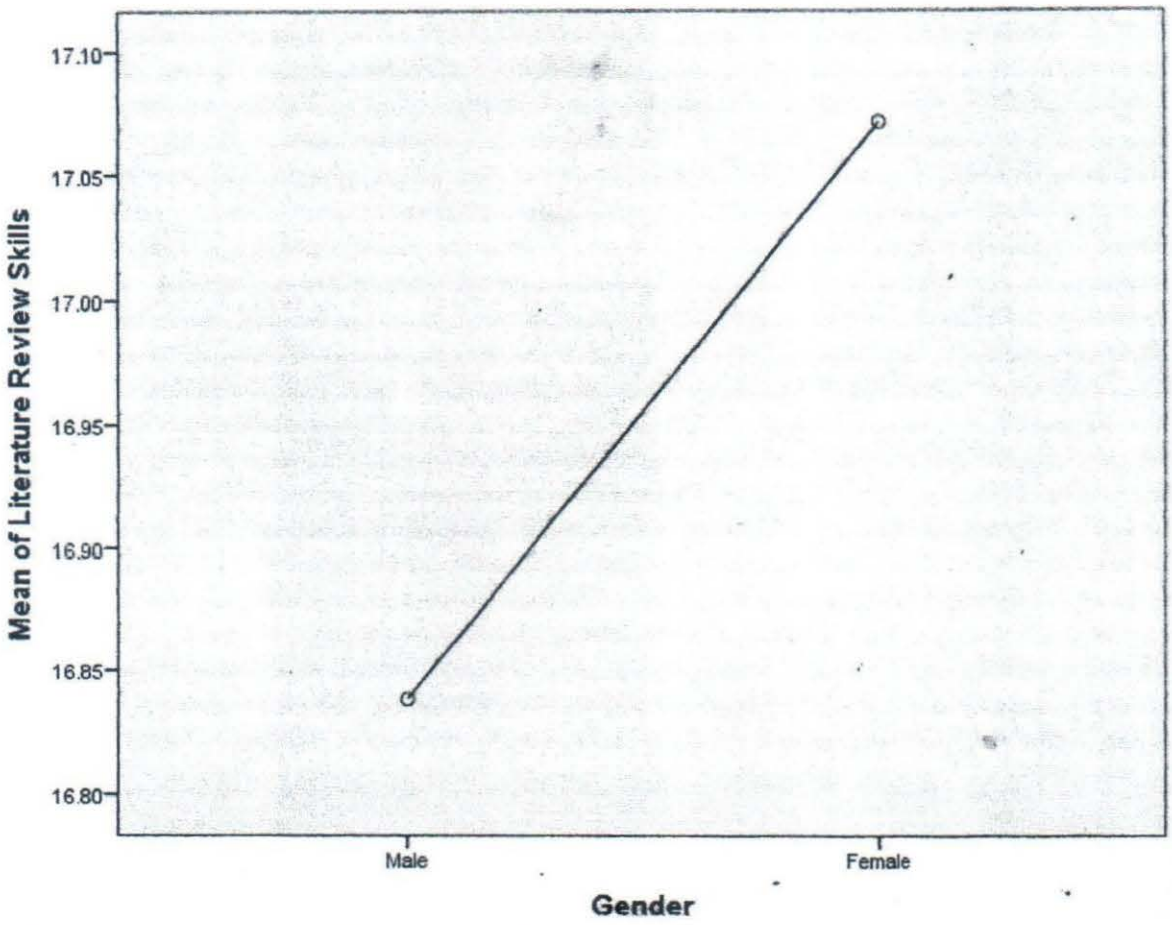


FIG. 3: Means plot of literature review skills training need by gender

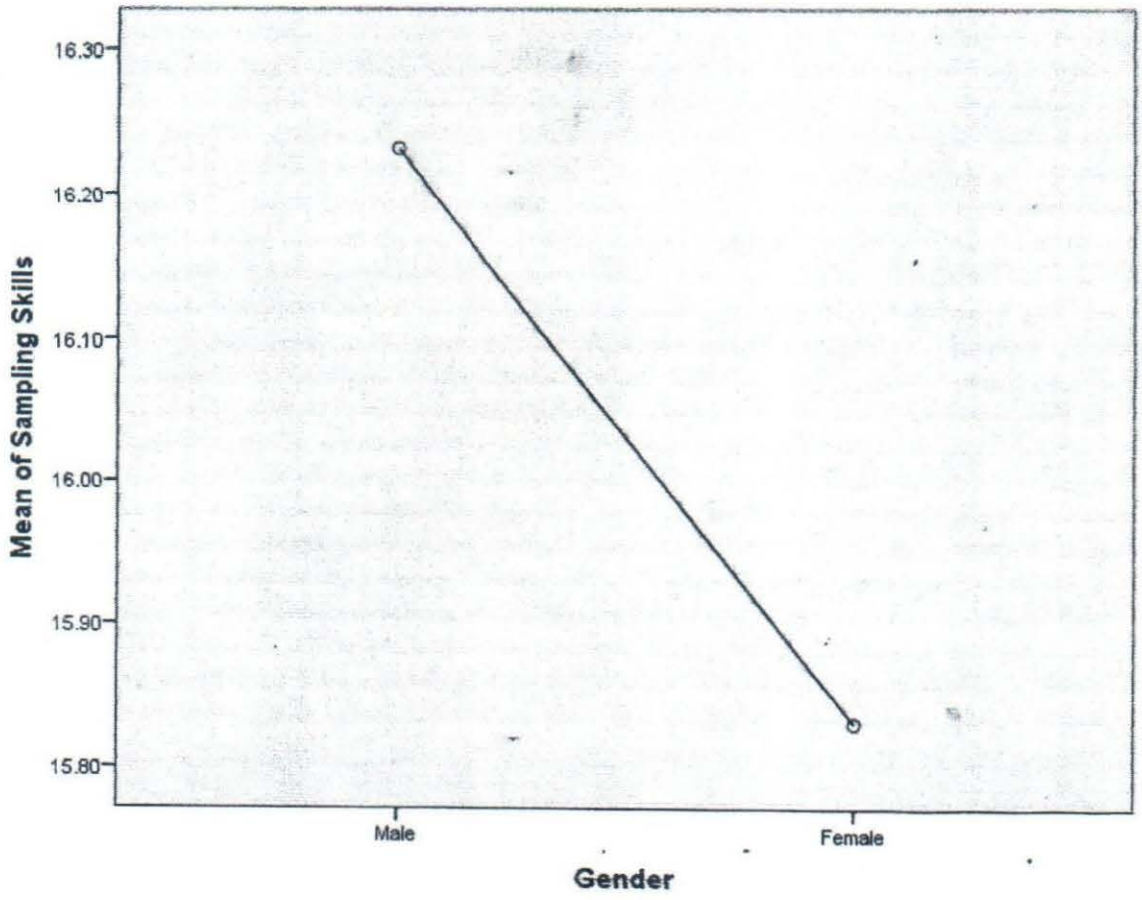


FIG. 4: Means plot of sampling skills training need by gender

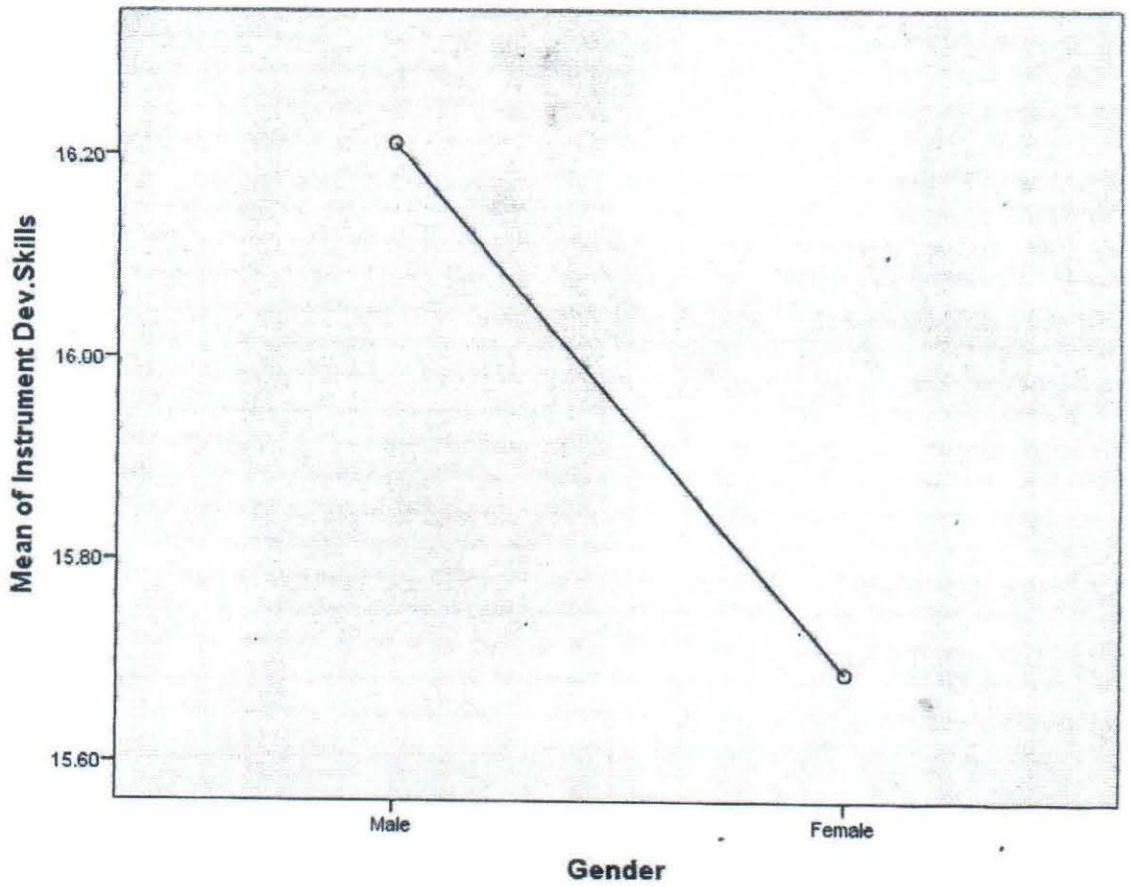


FIG. 5: Means plot of instrument development skills training need by gender

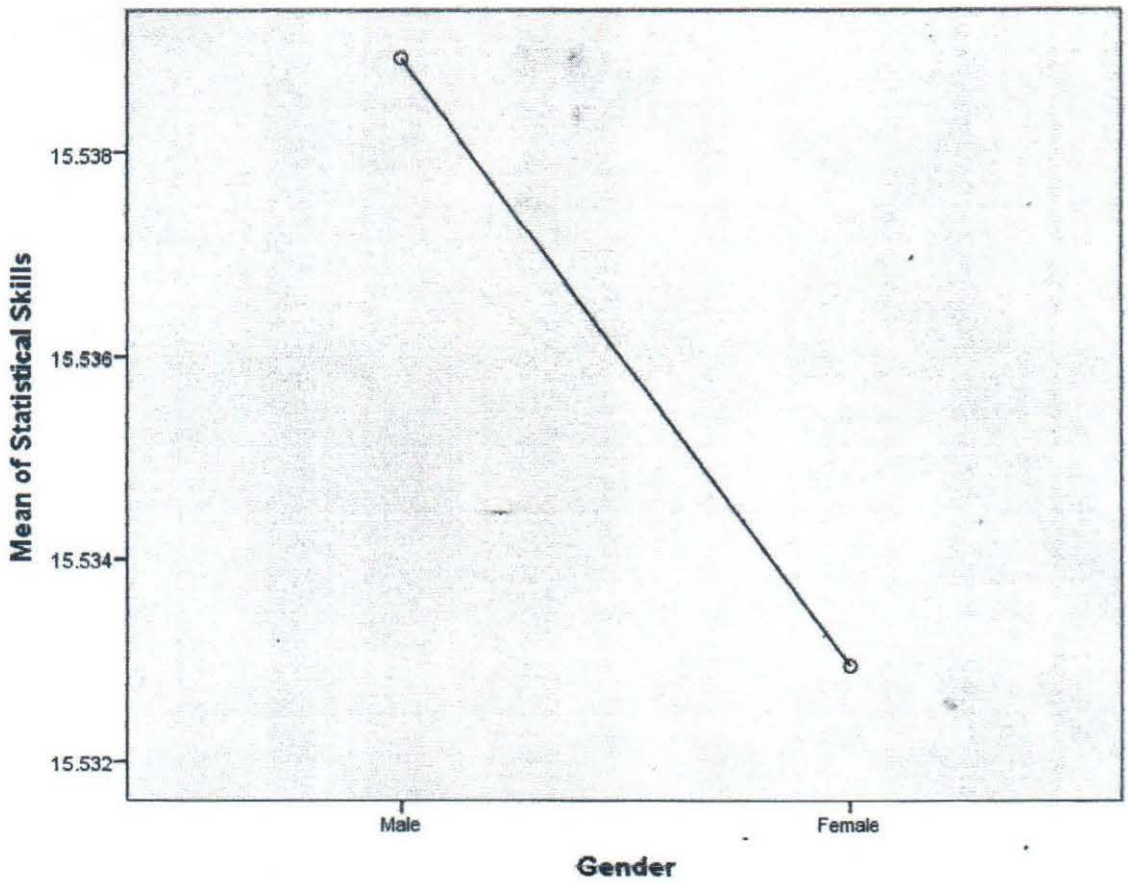


FIG. 6: Means plot of statistical skills training need by gender

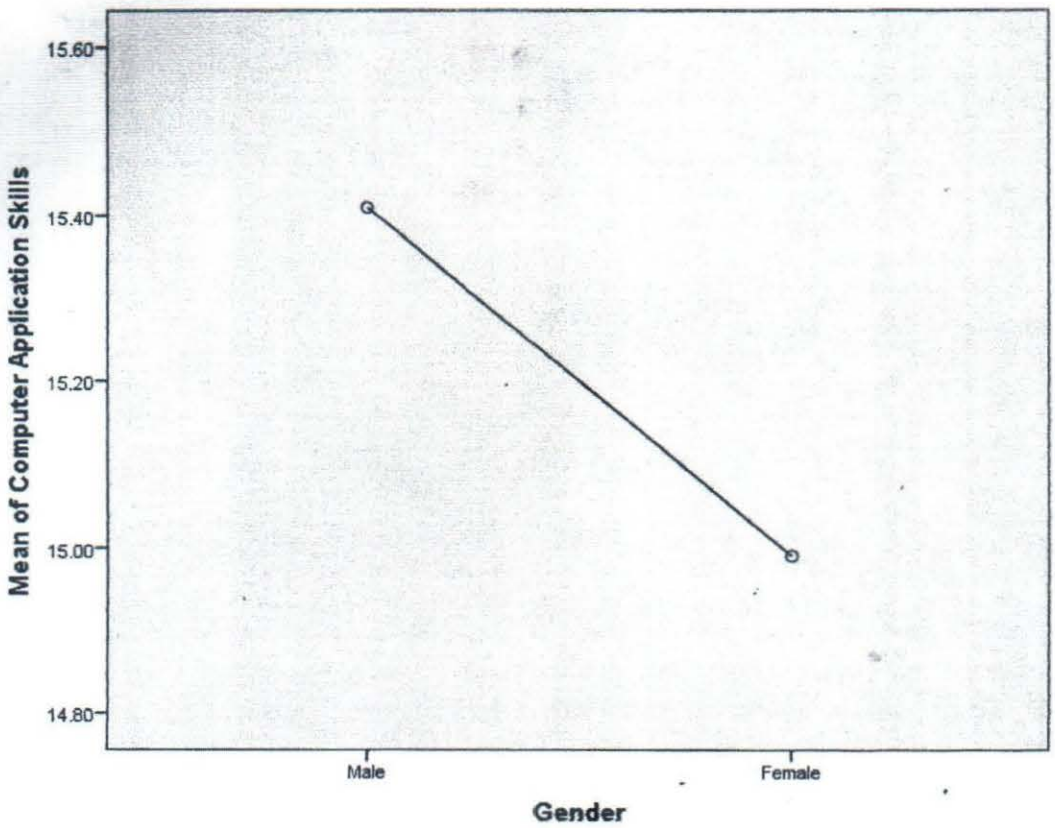


FIG. 7: Means plot of computer application skills training need by gender

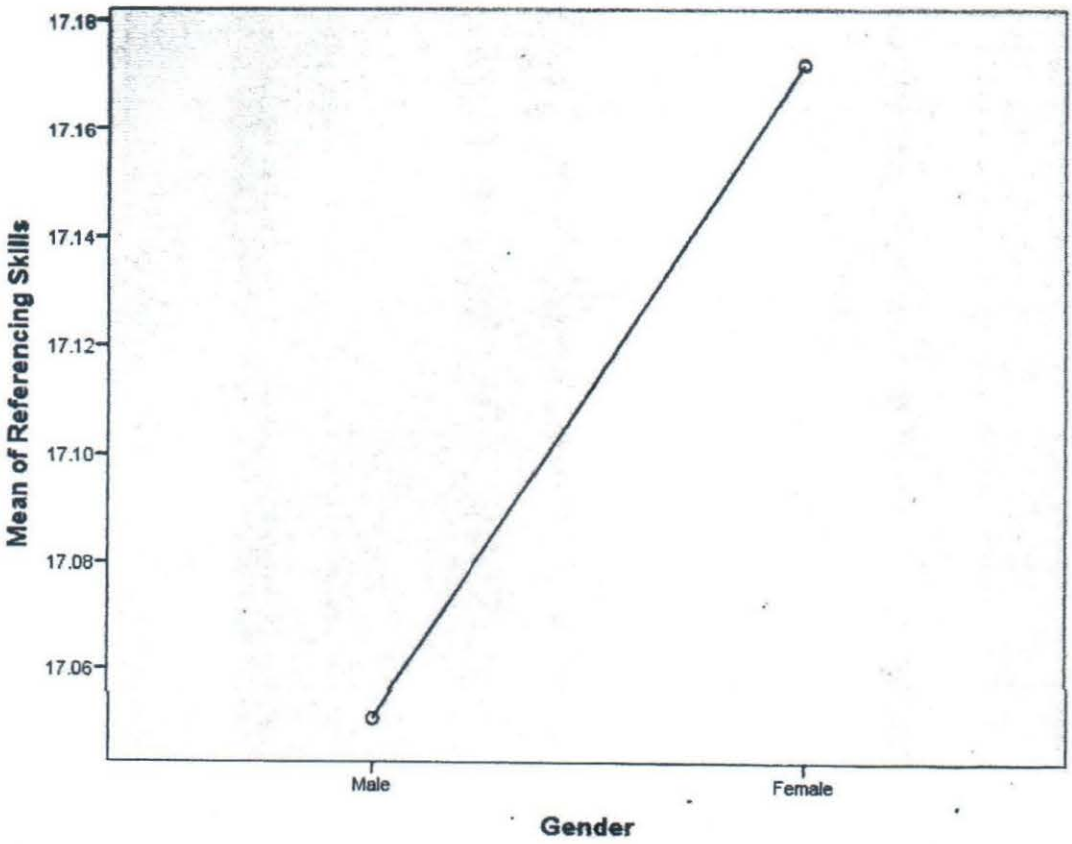


FIG. 8: Means plot of referencing skills training need by gender

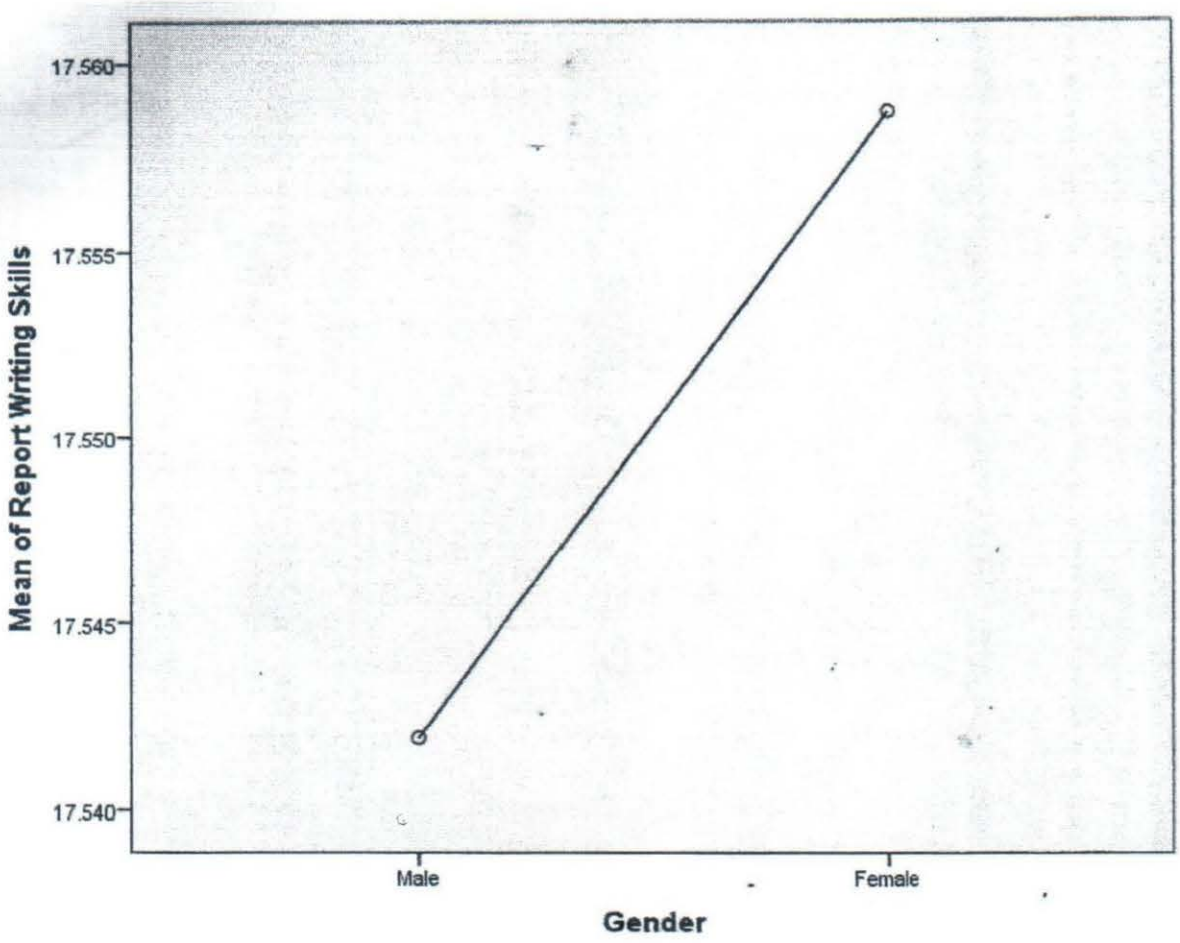


FIG.9: Means plot of report writing skills training need by gender

The results in Table 9 and for problem identification, show that with respect to this sub-variable, females are more in need of training (x = 17.438) than males (x = 16.656, see Fig 1). This same pattern was maintained for research question/hypothesis formulation skills (fig. 2), literature review skills (fig.3) referencing skills (fig. 8) and report writing (fig. 9).

With respect to sampling skills, males needed training (x=16.231) more than females (x=15.831, see fig. 4). This pattern was maintained for instrument development (fig. 5), statistical skills (fig. 6) and computer application (fig. 7). The p-value (.013) associated with the computed t-value (2.477) for problem identification skills training need was observed to be less than .05.

Consequently, the null hypothesis was rejected. This means that gender has significant influence on problem identification skills training need, in favour of females. The p-values ($.134 \leq p \leq .987$) associated with the computed t-values ($.016 \leq t \leq 1.500$) for the remaining sub-variables, are greater than .05. Thus the null hypothesis was retained for all these sub-variables (see Table 6). This means that there are gender-based differences in the research skills training need but these differences are not significant.

4.2.3 Hypothesis three

Students' age has no significant influence on their research skills training need.

To test this hypothesis, one-way ANOVA was carried out with age as a factor and each of the sub-variables of research skills training need, as dependent variables. The nine-sub-variable descriptive statistics are presented in Table 10 and fig. 10-18.

TABLE 10
Descriptive Statistics of Research Skills Training Needs by Students' Age

| | | N | Mean | Std. Deviation | Std. Error | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| Problem Identification | 18 - 22yrs | 105 | 15.629 | 3.5660 | .348 | 8.00 | 24.00 |
| | 23 - 27yrs | 139 | 15.978 | 3.5129 | .298 | 7.00 | 24.00 |
| | 28 - 32yrs | 184 | 18.685 | 3.4623 | .255 | 8.00 | 24.00 |
| | 33 - 37yrs | 140 | 18.043 | 4.4283 | .374 | 6.00 | 24.00 |
| | 38 - 42yrs | 55 | 15.909 | 4.8238 | .650 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 15.800 | 4.7649 | .615 | 8.00 | 24.00 |
| | Total | 683 | 17.056 | 4.1433 | .159 | 6.00 | 24.00 |
| Hypothesis Formulation | 18-22yrs | 105 | 16.362 | 4.3746 | .427 | 6.00 | 24.00 |
| | 23 - 7yrs | 139 | 15.949 | 4.0564 | .344 | 7.00 | 24.00 |
| | 28 - 32yrs | 184 | 17.773 | 4.1702 | .307 | 7.00 | 24.00 |
| | 33 - 37yrs | 140 | 17.993 | 4.3291 | .366 | 6.00 | 24.00 |
| | 38 - 42yrs | 55 | 15.982 | 5.1117 | .689 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 16.767 | 4.7385 | .612 | 6.00 | 24.00 |
| | Total | 683 | 16.997 | 4.4141 | .169 | 6.00 | 24.00 |
| Literature Review Skills | 18-22yrs | 105 | 16.371 | 4.5409 | .443 | 6.00 | 24.00 |
| | 23 - 27yrs | 139 | 15.863 | 4.6066 | .391 | 6.00 | 24.00 |
| | 28 - 32yrs | 184 | 18.049 | 4.1807 | .308 | 6.00 | 24.00 |
| | 33 - 37yrs | 140 | 17.657 | 4.4926 | .379 | 8.00 | 24.00 |
| | 38 - 42yrs | 55 | 16.000 | 4.3419 | .585 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 16.417 | 4.6842 | .605 | 7.00 | 24.00 |
| | Total | 683 | 16.958 | 4.5223 | .173 | 6.00 | 24.00 |
| Sampling Skills | 18-22yrs | 105 | 15.209 | 4.3449 | .424 | 6.00 | 24.00 |
| | 23 - 27yrs | 139 | 15.511 | 4.2433 | .359 | 6.00 | 24.00 |
| | 28 - 32yrs | 184 | 17.033 | 4.1579 | .307 | 6.00 | 24.00 |
| | 33 - 37yrs | 140 | 16.550 | 4.6539 | .393 | 6.00 | 24.00 |
| | 38 - 42yrs | 55 | 14.673 | 4.8383 | .652 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 15.583 | 4.6003 | .594 | 7.00 | 24.00 |
| | Total | 683 | 16.026 | 4.4622 | .171 | 6.00 | 24.00 |
| InstrumentDev.Skills | 18-22yrs | 105 | 14.448 | 4.3918 | .429 | 6.00 | 24.00 |
| | 23 - 27yrs | 139 | 15.496 | 4.4776 | .379 | 6.00 | 24.00 |
| | 28 - 32yrs | 184 | 17.000 | 4.3833 | .323 | 6.00 | 24.00 |
| | 33 - 37yrs | 140 | 16.679 | 4.5806 | .387 | 6.00 | 24.00 |
| | 38 - 42yrs | 55 | 15.273 | 4.2707 | .576 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 15.250 | 4.7358 | .611 | 6.00 | 24.00 |
| | Total | 683 | 15.943 | 4.5487 | .174 | 6.00 | 24.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Statistical Skills | 18-22yrs | 105 | 14.467 | 5.0822 | .496 | 6.00 | 24.00 |
| | 23 - 27yrs | 139 | 14.949 | 4.6863 | .397 | 6.00 | 24.00 |
| | 28 - 32yrs | 184 | 16.592 | 4.4294 | .327 | 6.00 | 24.00 |
| | 33 - 37yrs | 140 | 16.550 | 5.0938 | .431 | 6.00 | 24.00 |
| | 38 - 42yrs | 55 | 14.273 | 5.1942 | .700 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 14.317 | 5.4911 | .709 | 6.00 | 24.00 |
| | Total | 683 | 15.536 | 4.9697 | .190 | 6.00 | 24.00 |
| | 18-22yrs | 105 | 13.448 | 4.9633 | .484 | 6.00 | 24.00 |
| | 23 - 27yrs | 139 | 14.597 | 4.4179 | .375 | 6.00 | 24.00 |
| | 28 - 32yrs | 184 | 16.288 | 4.6151 | .340 | 6.00 | 24.00 |
| Computer Application Skills | 33 - 37yrs | 140 | 16.414 | 5.3294 | .450 | 6.00 | 24.00 |
| | 38 - 42yrs | 55 | 13.891 | 5.1699 | .697 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 14.650 | 5.4736 | .707 | 6.00 | 24.00 |
| | Total | 683 | 15.196 | 5.0251 | .192 | 6.00 | 24.00 |
| | 18 - 22yrs | 105 | 16.067 | 5.4088 | .528 | 6.00 | 24.00 |
| | 23 - 27yrs | 139 | 16.137 | 5.0191 | .426 | 6.00 | 24.00 |
| Referencing Skills | 28 - 32yrs | 184 | 18.059 | 4.4491 | .328 | 6.00 | 24 00 |
| | 33 - 37yrs | 140 | 17.993 | 5.0144 | .424 | 7.00 | 24.00 |
| | 38 - 42yrs | 55 | 16.146 | 4.6285 | .624 | 7.00 | 24.00 |
| | 43 - 47yrs | 60 | 17.133 | 5.0202 | .648 | 6.00 | 24.00 |
| | Total | 683 | 17.113 | 4.9709 | .190 | 6.00 | 24.00 |
| | 18-22yrs | 105 | 17.029 | 4.7240 | .461 | 8.00 | 24.00 |
| | 23 - 27yrs | 139 | 16.871 | 4.4589 | .378 | 6.00 | 24.00 |
| | 28 - 32yrs | 184 | 18.723 | 4.4248 | .326 | 6.00 | 24.00 |
| Report Writing Skills | 33 - 37yrs | 140 | 18.036 | 4.8256 | .408 | 6.00 | 24.00 |
| | 38 - 42yrs | 55 | 15.691 | 4.3838 | .591 | 6.00 | 24.00 |
| | 43 - 47yrs | 60 | 17.017 | 4.8134 | .621 | 8.00 | 24.00 |
| | Total | 683 | 17.551 | 4.6702 | .179 | 6.00 | 24.00 |

Table 11

One-Way ANOVA of Research Skills Training Needs By Students' Age

| | | Sum of Squares | df | Mean Square | F | Sig, |
|---|---|---|---|---|---|---|
| Problem Identification | Between Groups | 1166.831 | 5 | 233.366 | 14,988* | .000 |
| | Within Groups | 10541.055 | 677 | 15.570 | | |
| | Total | 11707.886 | 682 | | | |
| Hypothesis Formulation | Between Groups | 503.978 | 5 | 100.796 | 5.338* | .000 |
| | Within Groups | 12784.016 | 677 | 18.883 | | |
| | Total | 13287.994 | 682 | | | |
| Literature Review Skills | Between Groups | 558.166 | 5 | 111.633 | 5.644* | .000 |
| | Within Groups | 13389.603 | 677 | 19.778 | | |
| | Total | 13947.769 | 682 | | | |
| Sampling Skills | Between Groups | 444.255 | 5 | 88.851 | 4.579* | .000 |
| | Within Groups | 13135.271 | 677 | 19.402 | | |
| | Total | 13579.526 | 682 | | | |
| Instrument Dev. Skilite | Between Groups | 597.368 | 5 | 119.474 | 5.985* | .000 |
| | Within Groups | 13513.405 | 677 | 19.961 | | |
| | Total | 14110.773 | 682 | | | |
| Statistical Skills | Between Groups | 694.119 | 5 | 138.824 | 5.820* | .000 |
| | Within Groups | 16149.753 | 677 | 23.855 | | |
| | Total | 16843.871 | 682 | | | |
| Computer Application Skill | Between Groups | 909.609 | 5 | 181.922 | 7.550* | .000 |
| | Within Groups | 16312.101 | 677 | 24.095 | | |
| | Total | 17221.710 | 682 | | | |
| Referencing Skills | Between Groups | 572.278 | 5 | 114.456 | 4.760* | .000 |
| | Within Groups | 16280.041 | 677 | 24.047 | | |
| | Total | 16852.319 | 682 | | | |
| Report Writing Skills | Between Groups | 586.010 | 5 | 117.202 | 5.553* | .000 |
| | Within Groups | 14288.998 | 677 | 21.106 | | |
| | Total | 14875.007 | 682 | | | |

*Significant at .05 level. P<.05.

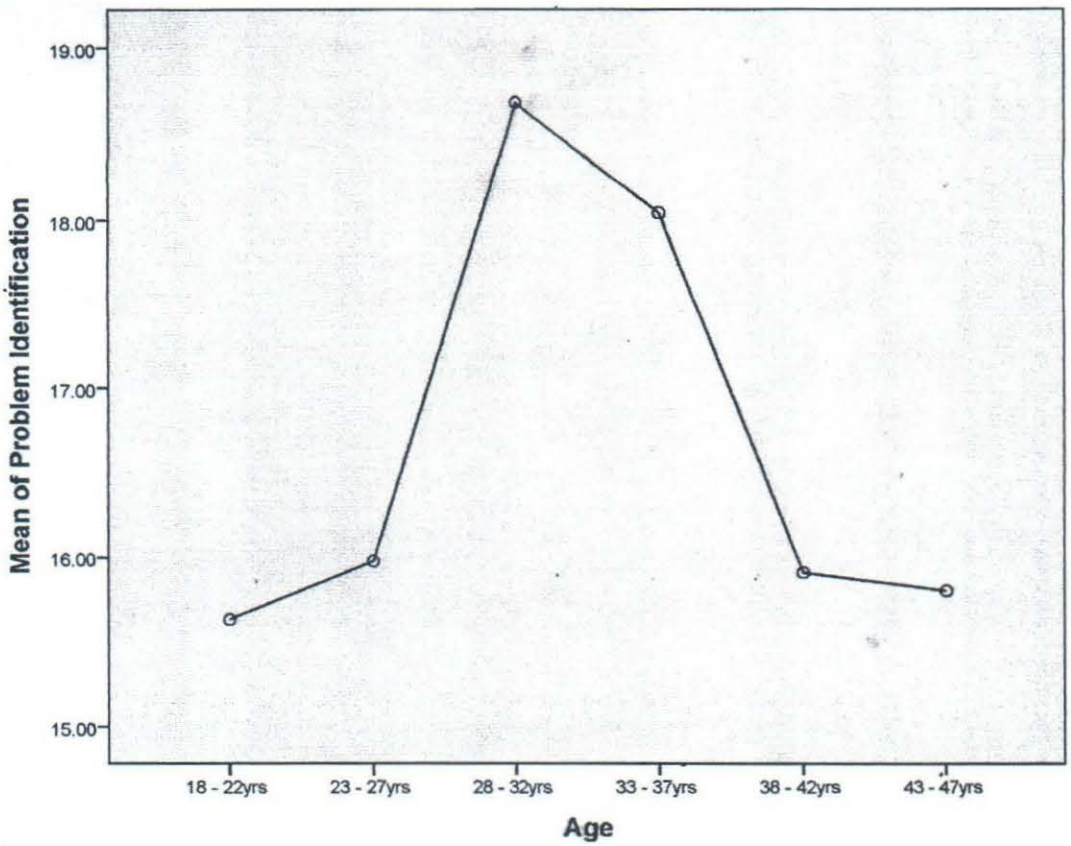


FIG. 10: Means plot of problem identification skills training need by students' age

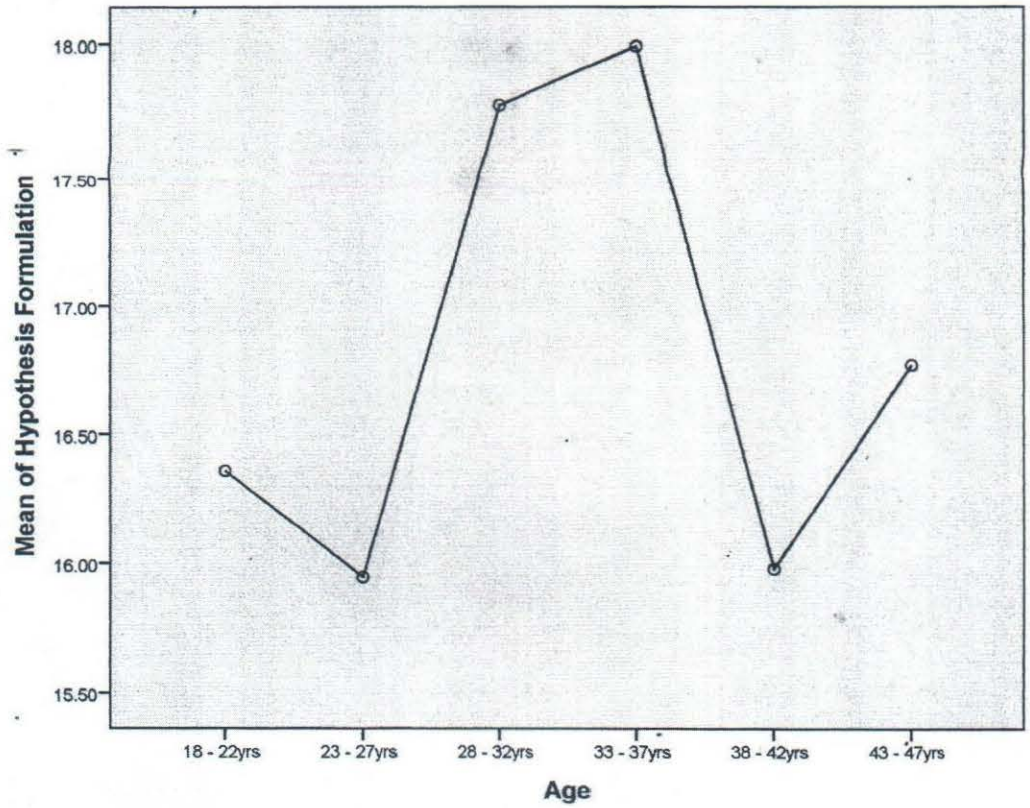


FIG. 11: Means plot of research questions/hypothesis formulation skills training need by students age

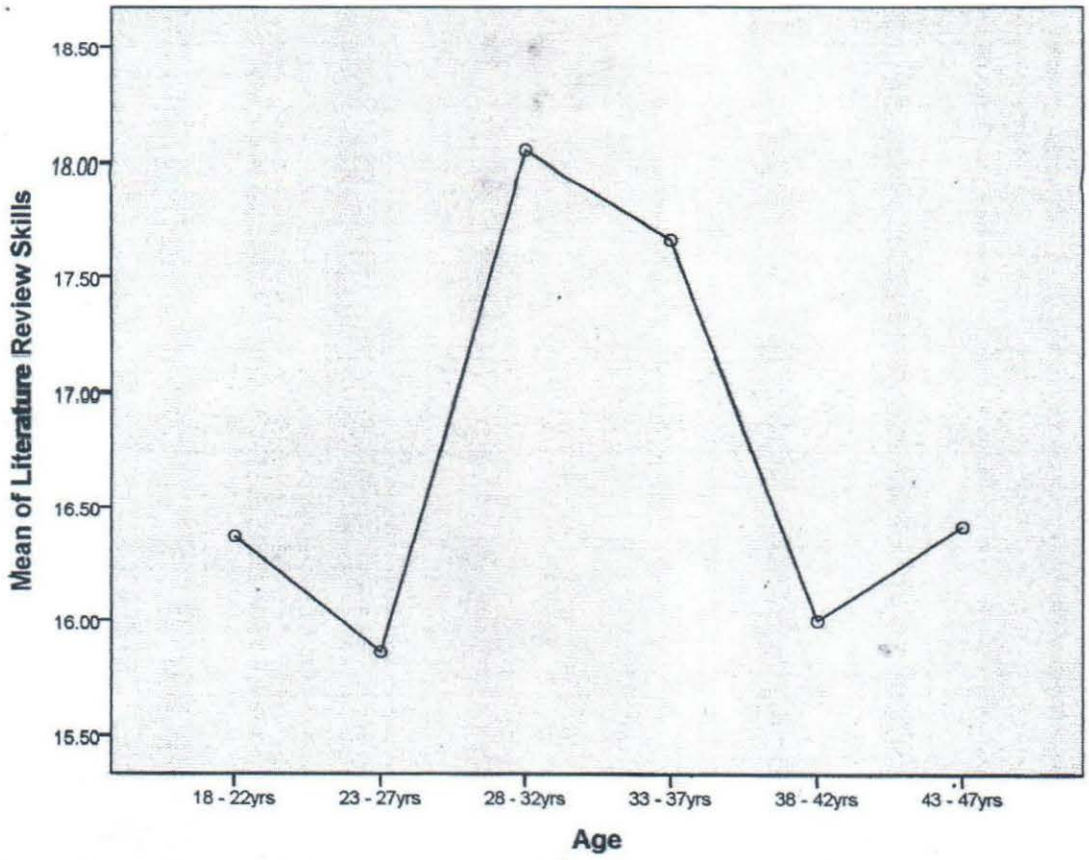


FIG. 12: Means plot of literature review skills training need by students' age

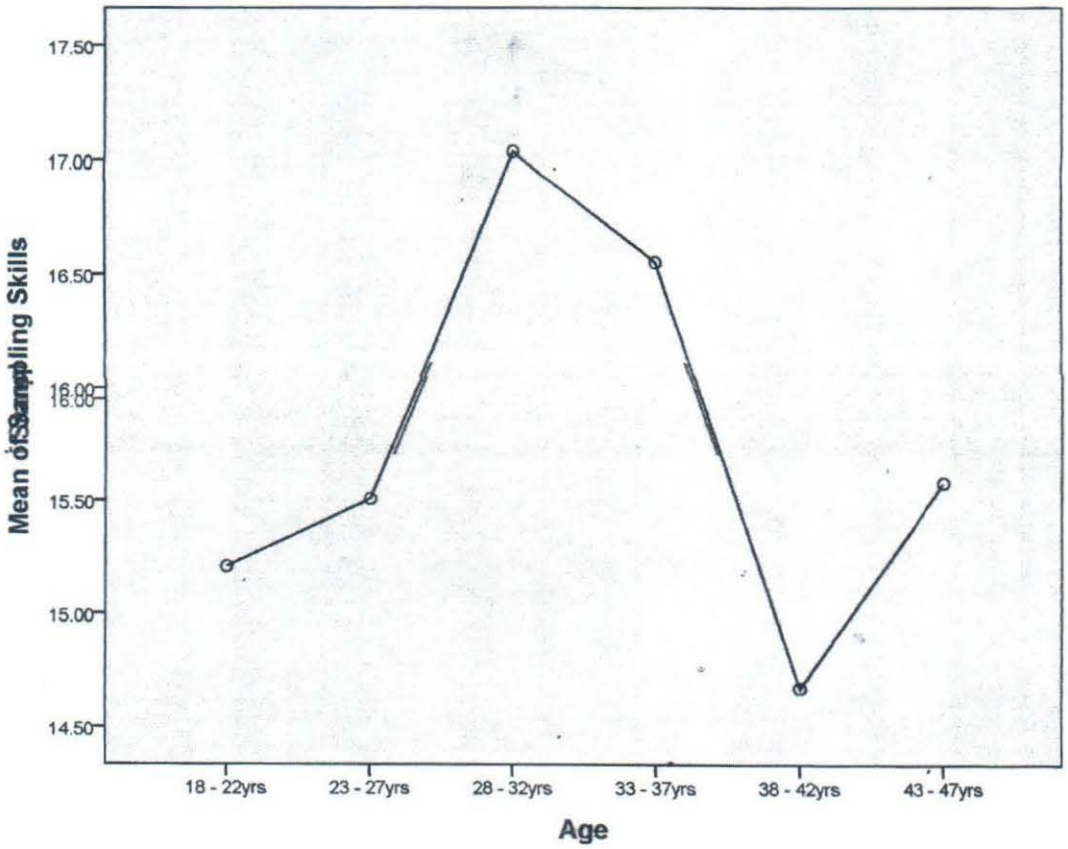


FIG. 13: Means plot of sampling skills training need by students' age

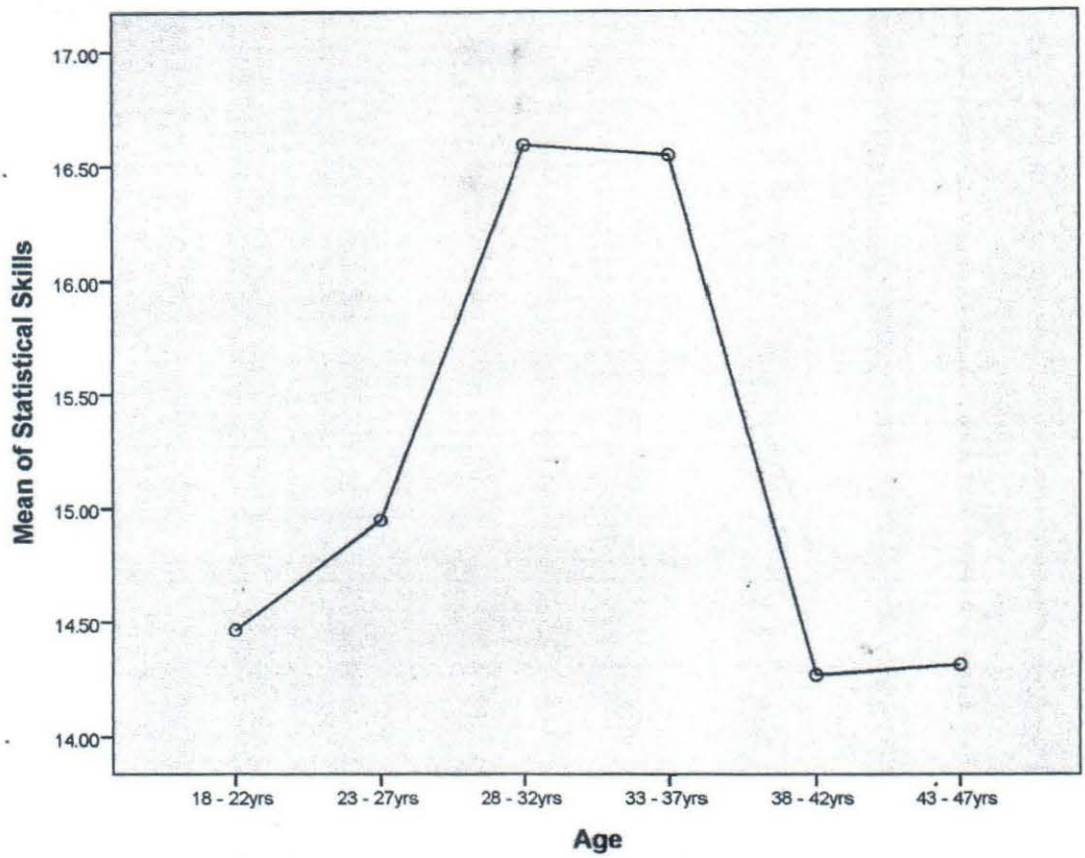


FIG. 15: Means plot of statistical skills training need by students' age

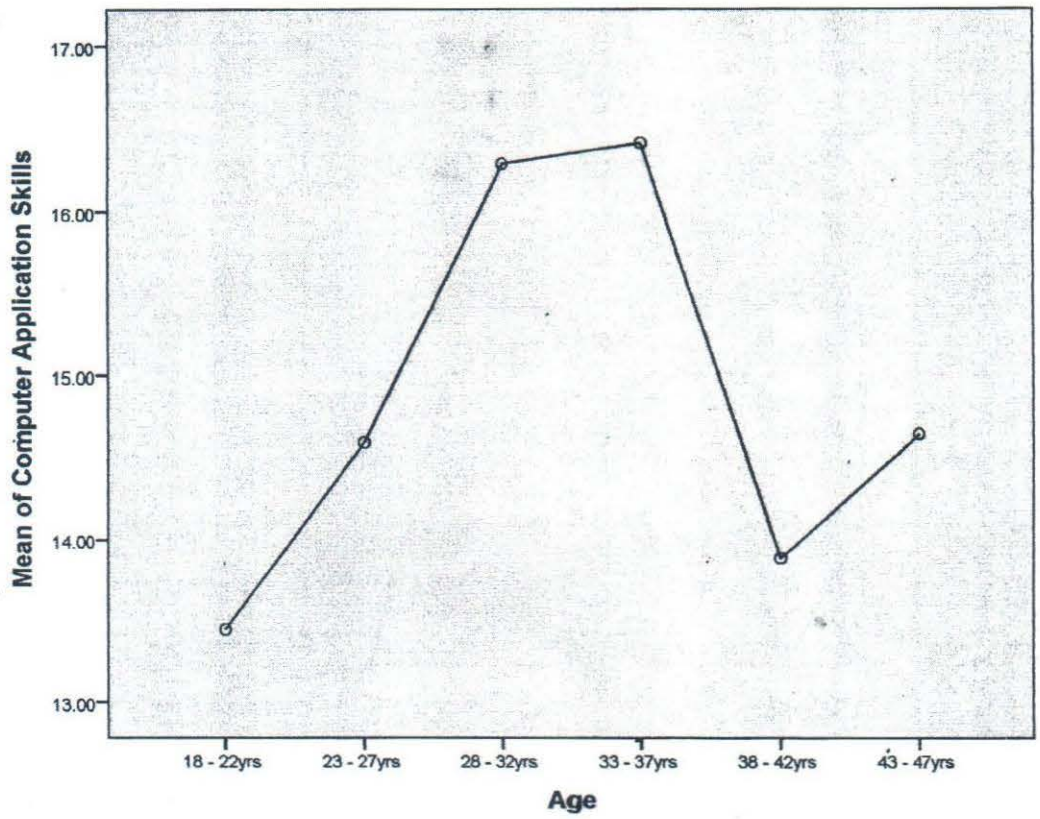


FIG. 16: Means plot of computer application skills training need by students' age

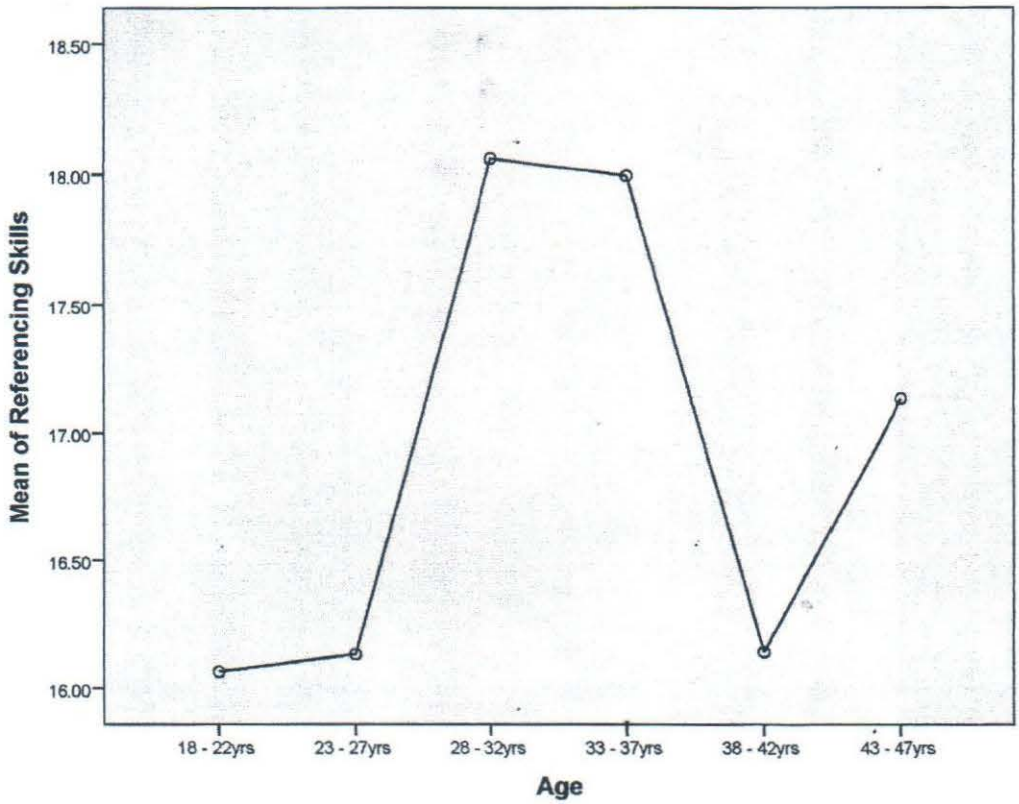


FIG. 17: Means plot of referencing skills training need by students' age

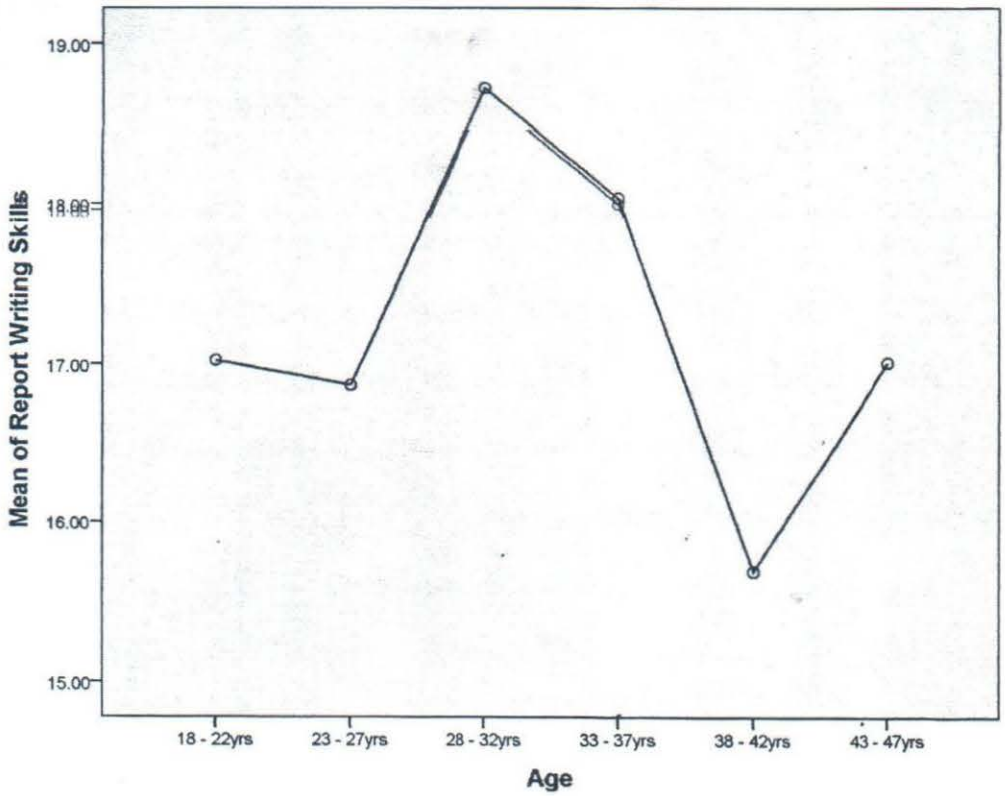


FIG. 18: Means plot of report writing skills training need by students age

TABLE 12

LSD multiple (pairwise) comparison of research skills training needs by students age

| Research skills | Students Age (yrs) | 18-22yrs | 23-27yrs | 28-32 yrs | 33-37 yrs | 38-42 yrs | 43-47 yrs |
|---|---|---|---|---|---|---|---|
| Problem identification | 18-22 | 15.629** | .350 | 3.056* | 2.414* | .281 | .171 |
| | 23-27 | .493 | 15.978 | 2.706* | 2.064* | .069 | .178 |
| | 28-32 | .000 | .000 | 18.685 | .642 | 2.776* | 2885* |
| | 33-37 | .000 | .000 | .147 | 18.043 | 2.134* | 2.243* |
| | 38-42 | .669 | .912 | .000 | .001 | 15.909 | .109 |
| | 43-47 | .788 | .770 | .000 | .000 | .882 | 15.800 |
| Hypothesis formulation | 18-22 | 16.362** | .412 | 1.410* | 1.631* | .380 | .405 |
| | 23-27 | .463 | 15.950 | 1.822* | 2.043* | .032 | .817 |
| | 28-32 | .008 | .000 | 17.772 | .221 | 1.790* | 1.005 |
| | 33-37 | .004 | .000 | .650 | 17.993 | 2.011* | 1.226 |
| | 38-42 | .599 | .963 | .008 | .004 | 15.982 | .785 |
| | 43-47 | .565 | .224 | .120 | .068 | .334 | 16.767 |
| Literature Review | 18-22 | 16.371** | .508 | 1.677* | 1.286* | .317 | .045 |
| | 23-27 | .377 | 15.863 | 2.186* | 1.794* | .137 | .553 |
| | 28-32 | .002 | .000 | 18.049 | .392 | 2.049* | 1.632* |
| | 33-37 | .025 | .001 | .432 | 17.657 | 1.657* | 1.240 |
| | 38-42 | .616 | .847 | .003 | .019 | 16.000 | .417 |
| | 43-47 | .950 | .421 | .014 | .071 | .616 | 16.417 |
| Sampling skills | 18-22 | 15.210** | .301 | 1.823* | 1.340* | .537 | .374 |
| | 23-27 | .597 | 15.511 | 1.522* | 1.039* | .838 | .073 |
| | 28-32 | .001 | .002 | 17.033 | .483 | 2.360* | 1.449* |
| | 33-37 | .019 | .049 | .329 | 16.550 | 1.877* | .967 |
| | 38-42 | .464 | .233 | .001 | .008 | 14.673 | .911 |
| | 43-47 | .600 | .915 | .027 | .155 | .269 | 15.583 |
| Instrument development | 18-22 | 14.448** | 1.049 | 2.552* | 2.231* | .825 | .802 |
| | 23-27 | .070 | 15.496 | 1.504* | 1.182* | .224 | .246 |
| | 28-32 | .000 | .003 | 17.000 | .321 | 1.727* | 1.750* |
| | 33-37 | .000 | .027 | .521 | 16.679 | 1.406* | 1.429* |
| | 38-42 | .268 | .753 | .012 | .048 | 15.273 | .023 |
| | 43-47 | .268 | .721 | .009 | .039 | .978 | 15.250 |
| Statistical skills | 18-22 | 14.467** | .483 | 2.216* | 2.083* | .194 | .150 |
| | 23-27 | .445 | 14.950 | 1.643* | 1.600* | .677 | .633 |
| | 28-32 | .000 | .003 | 16.592 | .042 | 2.320* | 2.276* |
| | 33-37 | 001 | .006 | .938 | 16.550 | 2.277* | 2.233* |
| | 38-42 | .812 | .385 | .002 | .004 | 14.273 | .004 |
| | 43-47 | .850 | .402 | .002 | .003 | .962 | 14.317 |
| Computer application | 18-22 | 13.448** | 1.150 | 2.840* | 2.967* | .443 | 1.202 |
| | 23-27 | .071 | 14.597 | 1.691* | 1.817* | .706 | .053 |
| | 28-32 | .000 | .002 | 16.288 | .126 | 2.397* | 1.638* |
| | 33-37 | .000 | .002 | .819 | 16.414 | 2.523* | 1.764* |
| | 38-42 | .588 | .367 | .002 | .001 | 13.891 | .759 |
| | 43-47 | .131 | .944 | .025 | .020 | .408 | 14.650 |
| Referencing skills | 18-22 | 16.067** | .070 | 1.993* | 1.926* | .079 | 1.067 |
| | 23-27 | .912 | 16.137 | 1.923* | 1.856* | .009 | .997 |
| | 28-32 | .001 | .001 | 18.060 | .067 | 1.914* | .926 |
| | 33-37 | .002 | .002 | .903 | 17.993 | 1.847* | .860 |
| | 38-42 | .923 | .991 | .011 | .018 | 18.146 | .988 |
| | 43-47 | .179 | .189 | .204 | .256 | .281 | 17.133 |
| Report writing skills | 18-22 | 17.029** | .158 | 1.694* | 1.007 | 1.338 | .012 |
| | 23-27 | .790 | 16.871 | 1.852* | 1.165* | 1.180 | .146 |
| | 28-32 | .003 | .000 | 18.723 | .687 | 4.043* | 1.706* |
| | 33-37 | .090 | .035 | .183 | 18.036 | 2.345* | 1.019 |
| | 38-42 | .081 | .107 | .000 | .001 | 15.691 | 1.326 |
| | 43-47 | .987 | .837 | .013 | .151 | .123 | 17.017 |

*Significant at .05 level. P<.05

** Values along main diagonal are group means, it are corresponding p-values

From table 12 and for problem identification skills training need, those 18-22yrs are significantly different from those 28-32yrs, (MD = 3.056, p=.000) and 33-37yrs

(MD = 2.414, p=.000). Similarly, those 23-27yrs were significantly different from students 28-32yrs (MD = 2.706, p=.000) and 33-37yrs (MD = 2.064, p=.000). those 28-32yrs were found to be significantly different from those 38-42yrs (MD = 2.776, p=.000) and 43-47yrs (MD = 2.885, p=.000). Also, those 33-37yrs were significantly different from those 38-42yrs (MD = 2.134, P=.001) and 43-47yrs (MD = 2.243, P=.0000). A careful study of Table 8 show that significant differences revolve around the ages 28-47yrs and the lower age range 18-27yrs. The pattern of significant differences for problem identification were repeated for instrument development, computer application and statistical skills. All other significant differences were as indicated in Table 12.

4.2.4. Hypothesis four

Marital status has no significant influence on students' research skills training need. To test this hypothesis, the procedure used in testing hypothesis three were adopted, with marital status as factor. The nine-sub-variables descriptive statistics are presented in Table 13.

TABLE 13

Descriptive Statistics

| | N | Mean | Std. Deviation | Std. Error |
|---|---|---|---|---|
| Widowed | 136 | 19.0735 | 4.68984 | .40215 |
| ReportWriting Skills | 683 | 17.1127 | 4.97093 | .19021 |
| Married | 213 | 17.2817 | 4.65057 | .31865 |
| Single | 220 | 17.0091 | 4.70207 | .31701 |
| Divorced | 114 | 17.5263 | 4.69835 | .44004 |
| Widowed | 136 | 18.8676 | 4.42017 | .37903 |
| Total | 683 | 17.5505 | 4.67021 | .17870 |

| | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|
| | Lower Bound | Upper Bound | | |
| Widowed | 18.2782 | 19.8689 | 6.00 | 24.00 |
| Report Writing Skills | 16.7393 | 17.4862 | 6.00 | 24.00 |
| Married | 16.6536 | 17.9098 | 6.00 | 24.00 |
| Single | 16.3843 | 17.6339 | 6.00 | 24.00 |
| Divorced | 16.6545 | 18.3981 | 9.00 | 24.00 |
| Widowed | 18.1180 | 19.6172 | 6.00 | 24.00 |
| Total | 17.1996 | 17.9014 | 6.00 | 24.00 |

The results in Table 13show that, for problem identification skills, widowed students were highest in need of training (x = 20.096) followed by those divorced (x=17.719) and the least were single students (x=15.814, see fig. 28). This pattern was maintained for hypothesis formulation (fig. 29), literature review (fig. 30), sampling skills (fig. 31), instrument development (fig. 32), computer application skills (34), referencing (fig. 35) and report writing skills training needs (fig. 36). In terms of statistical skills training needs, those highest in need of training were the widowed (x=16.919) followed by the divorced (x =15.912) and the least were the married students (x = 14.878, see fig. 33). These results suggested that those most in need of training on research skills were those divorced and those widowed. The results of the analysis of variance are presented in Table 14.

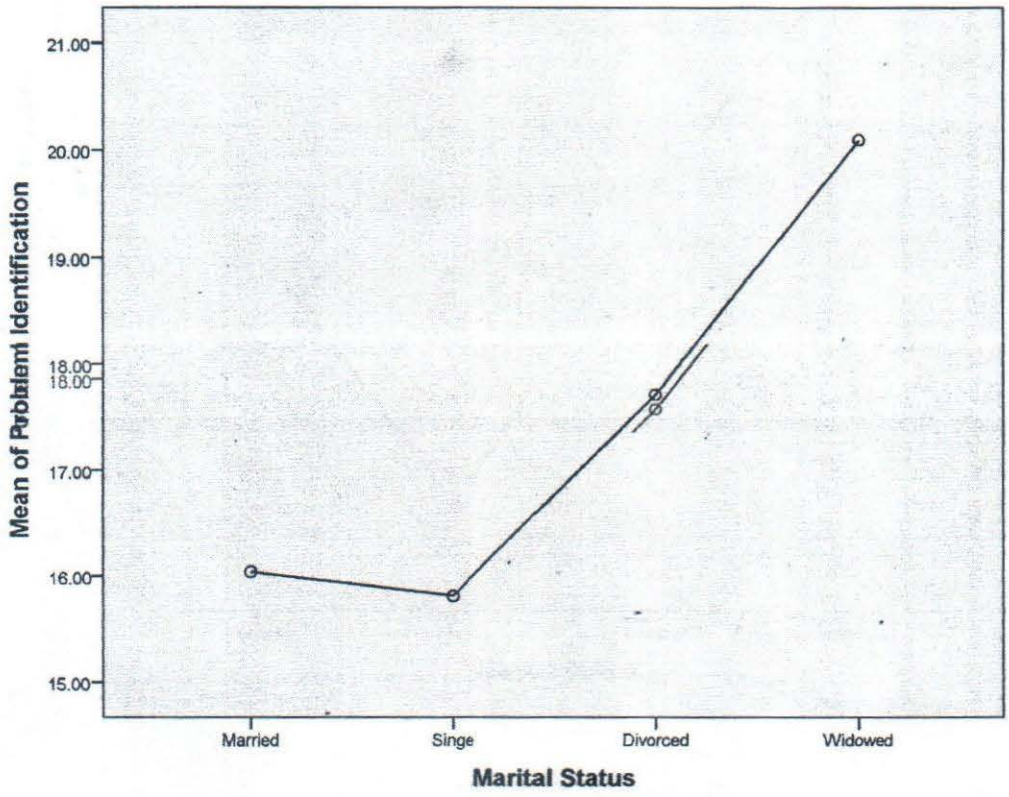


FIG. 19: Means plot of problem identification skillstraining need by marital status

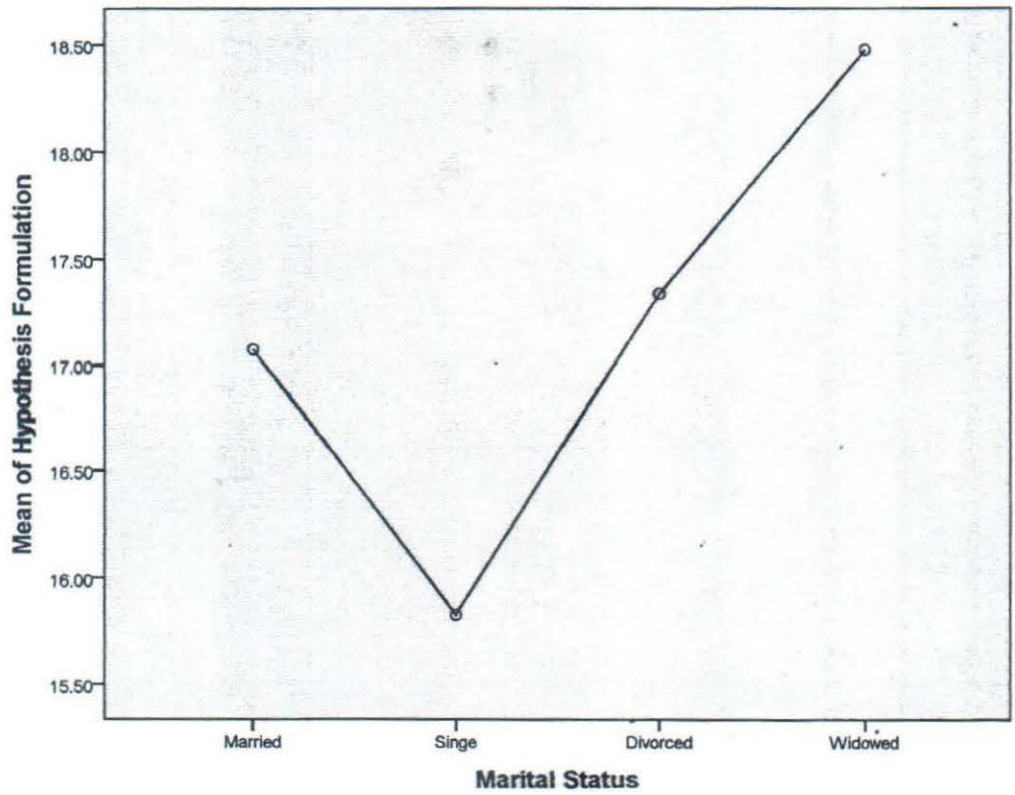


FIG. 20: Means plot of research questions/hypothesis formulation skillstraining need by marital status

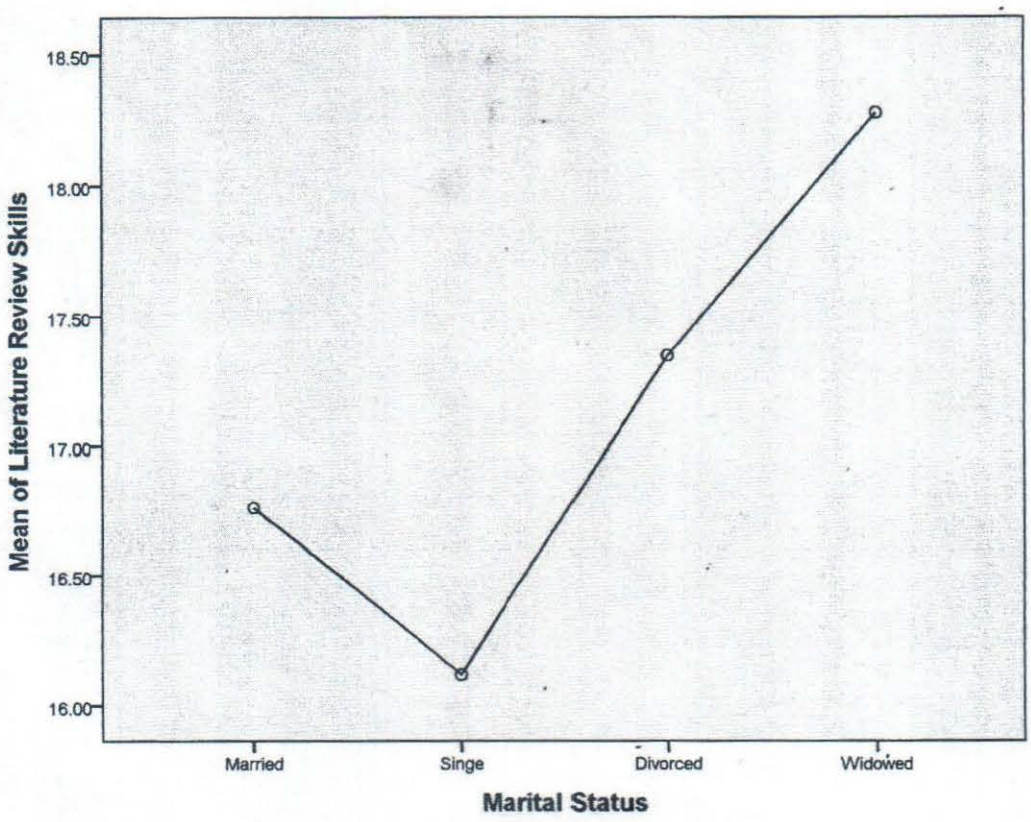


FIG. 21: Means plot of literature review skillstraining need by marital status

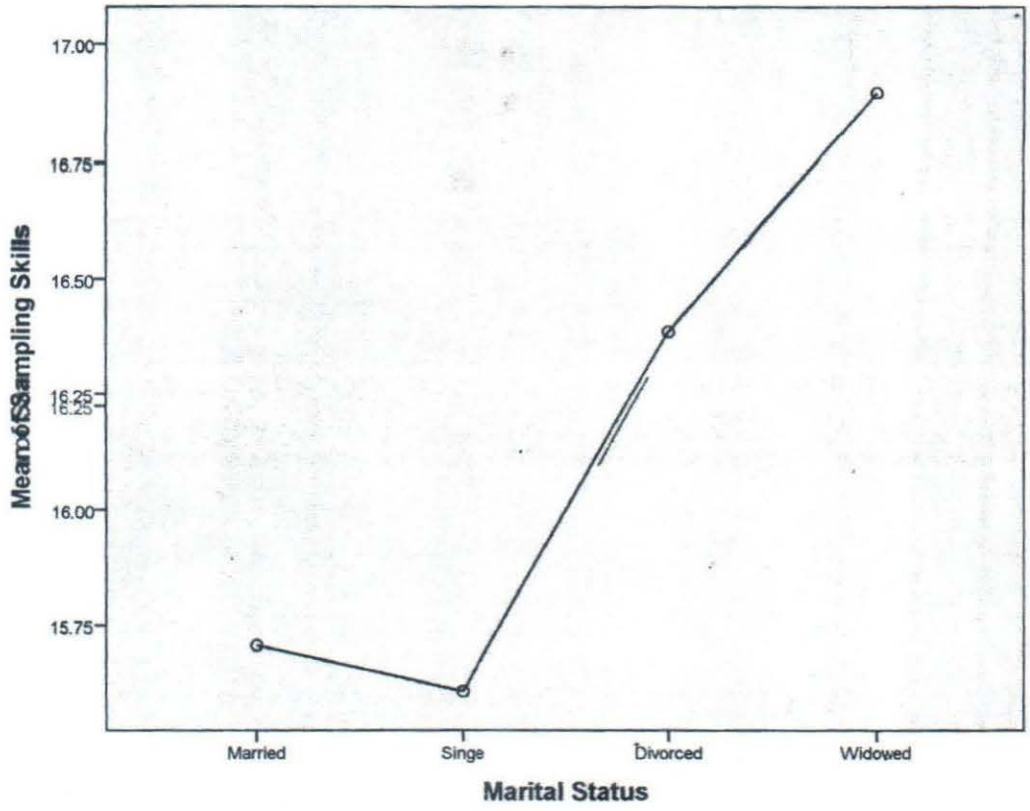


FIG. 22: Means plot of sampling skillstraining need by marital status

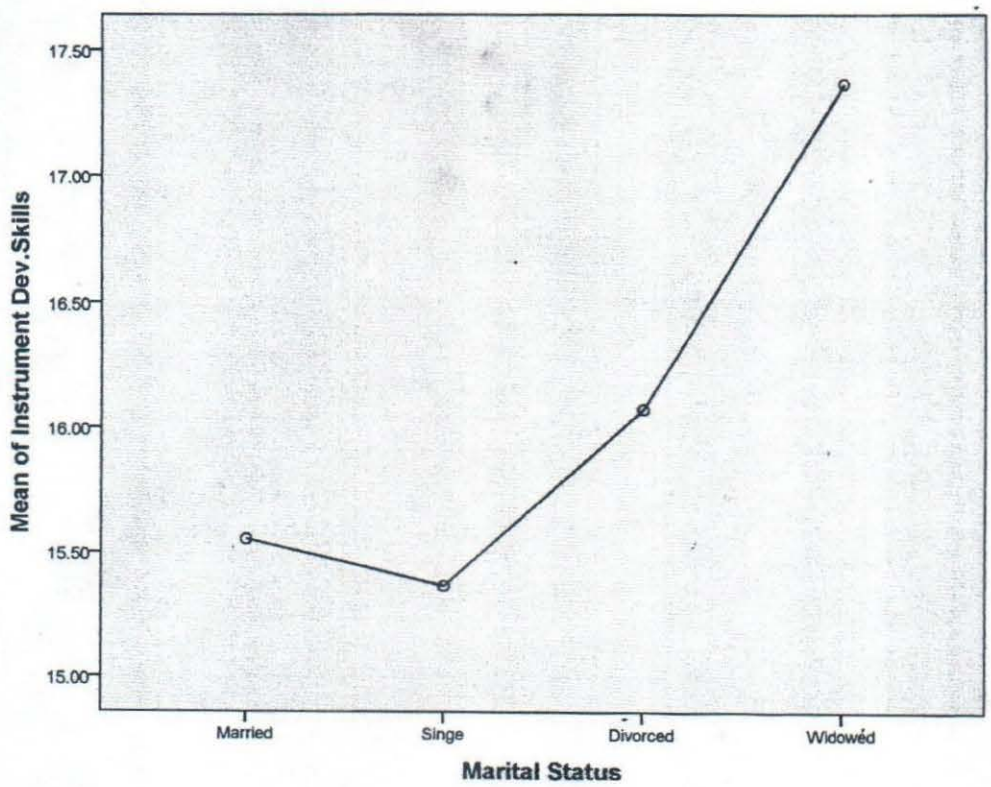


FIG. 23: Means plot of instrument development skills training need by marital status

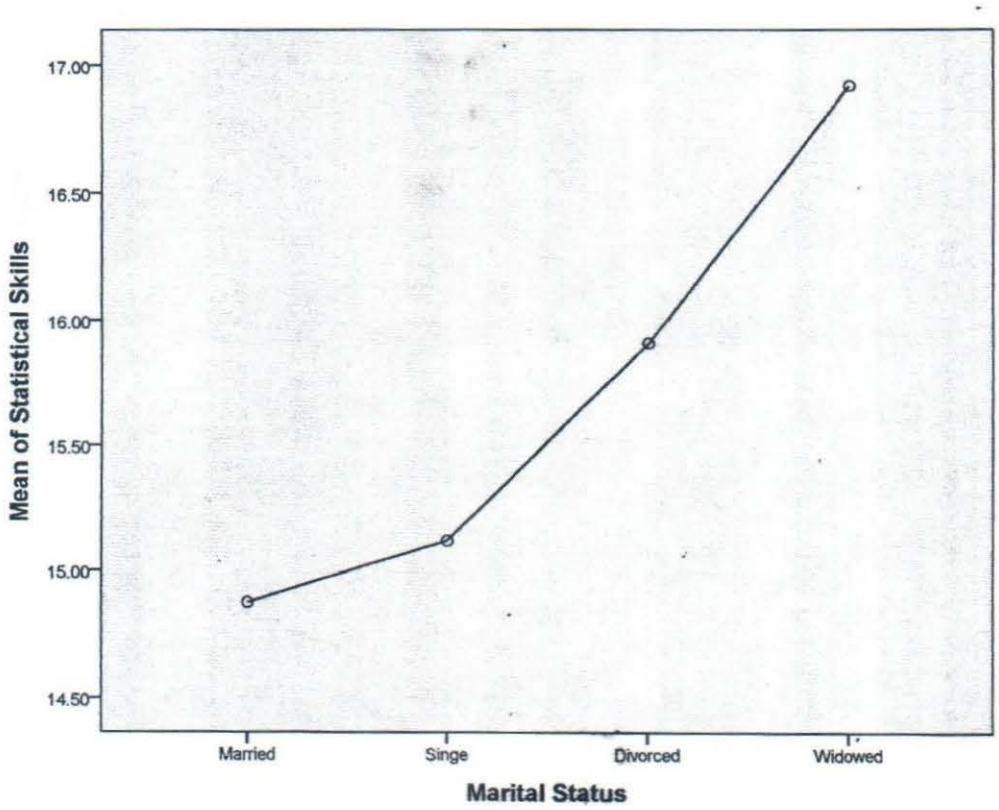


FIG. 24: Means plot of statistical skills training need by marital status

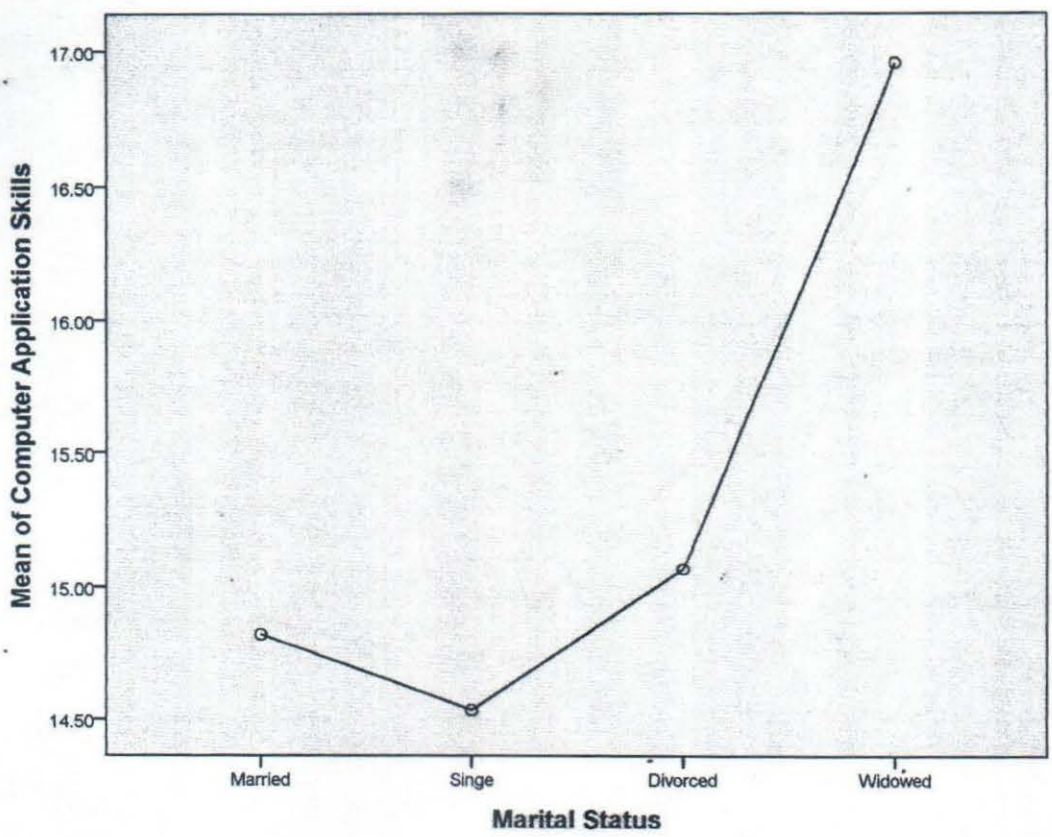


FIG. 25: Means plot of computer application skills training need by marital status

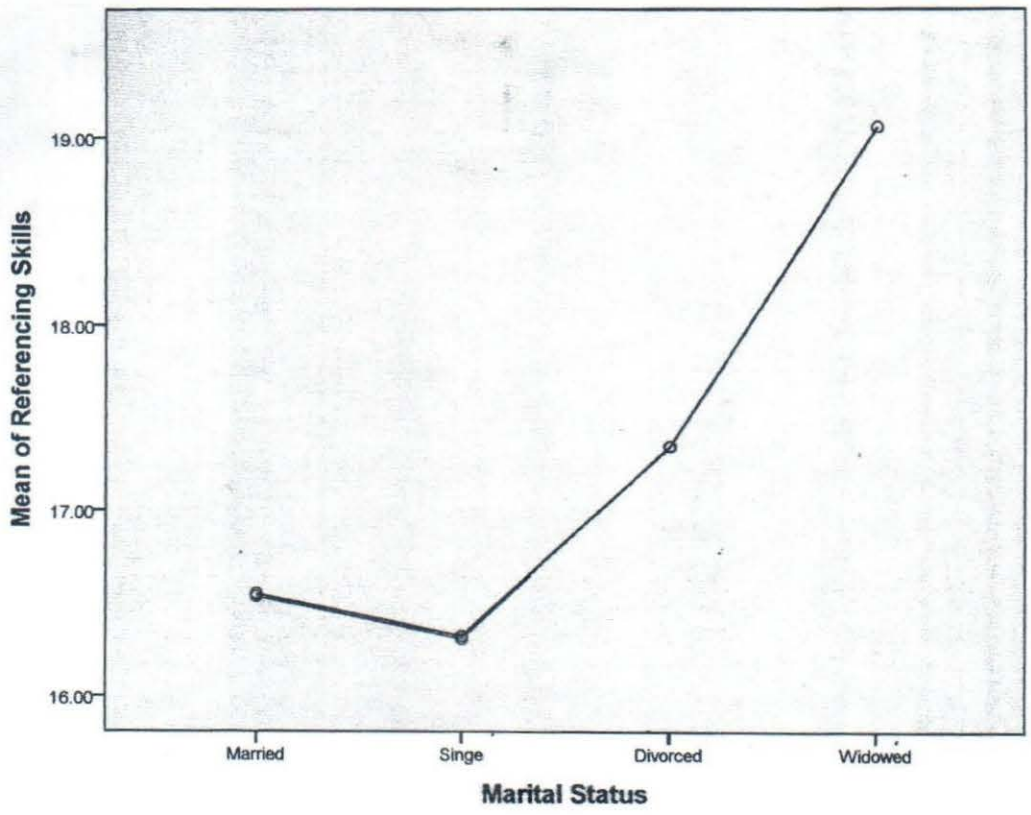


FIG. 26: Means plot of referencing skills need by marital status

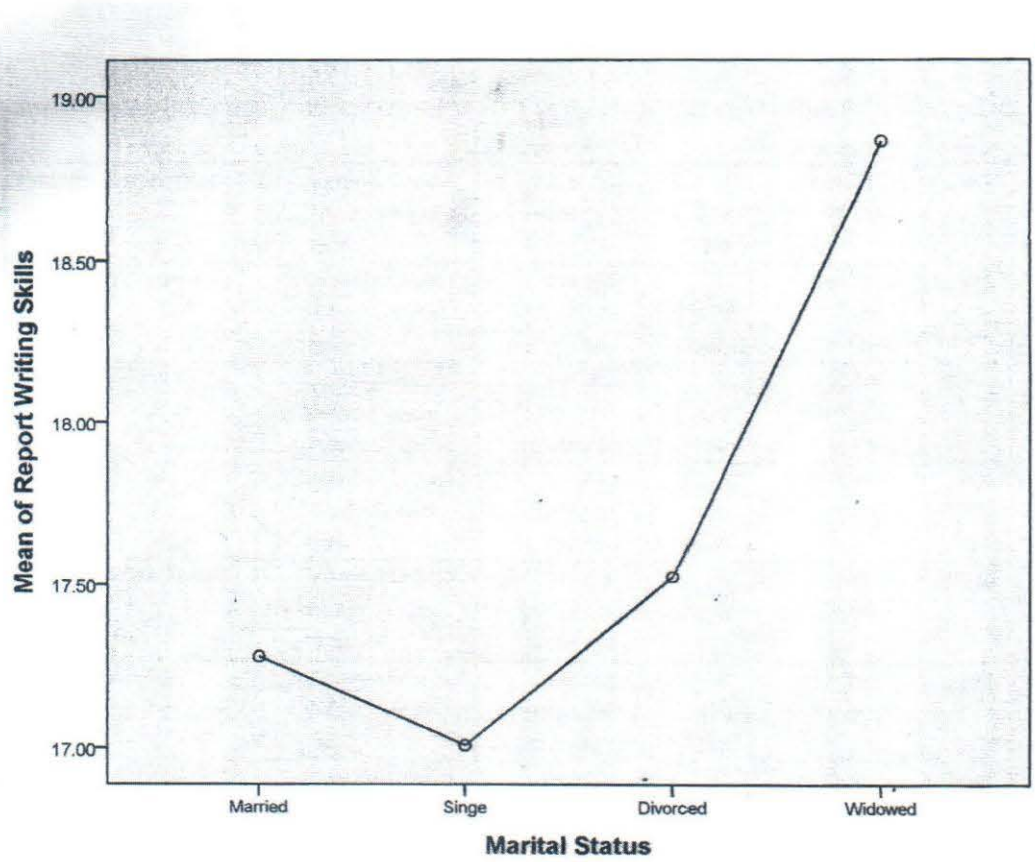


FIG. 27: Means plot of report writing skillls training need by marital status

TABLE 14
One-way ANOVA of research skills need variables by students' marital status

| | | Sum of Squares | df | Mean Square | F | p-value |
|---|---|---|---|---|---|---|
| Problem Identification | Between Groups | 1865.132 | 3 | 621,711 | 42,889 | .000 |
| | Within Groups | 9842754 | 679 | 14.496 | | |
| | Total | 11707.886 | 682 | | | |
| Hypothesis Formulation | Between Groups | 614.168 | 3 | 204.723 | 10.968 | .000 |
| | Within Groups | 12673.826 | 679 | 18.665 | | |
| | Total | 13287.994 | 682 | | | |
| Literature Review Skills | Between Groups | 416.472 | 3 | 138.824 | 6.966 | .000 |
| | Within Groups | 13531.297 | 679 | 19.928 | | |
| | Total | 13947.769 | 682 | | | |
| Sampling Skills | Between Groups | 177.614 | 3 | 59.205 | 3.000 | .030 |
| | Within Groups | 13401.911 | 679 | 19.738 | | |
| | Total | 13579.526 | 682 | | | |
| Instrument Dev. Skills | Between Groups | 383.060 | 3 | 127.687 | 6.316 | .000 |
| | Within Groups | 13727714 | 67S | 20,218 | | |
| | Total | 14110,773 | 682 | | | |
| Statistical Skills | Between Groups | 406125 | 3 | 135.375 | 5.592 | .001 |
| | Within Groups | 16437.746 | 679 | 24.209 | | |
| | Total | 16843.871 | 682 | | | |
| Compuţer Application Skills | Between Groups | 548.606 | 3 | 182.869 | 7.447 | .000 |
| | Within Groups | 16673.104 | 679 | 24.555 | | |
| | Total | 17221.710 | 682 | | | |
| Referencing Skills | Between Groups | 734.271 | 3 | 244.757 | 10.311 | .000 |
| | Within Groups | 16118.048 | 679 | 23.738 | | |
| | Total | 16852.319 | 682 | | | |
| Report Writing Skills | Between Groups | 315.888 | 3 | 105.296 | 4.911 | .002 |
| | Within Groups | 14559.119 | 679 | 21.442 | | |
| | Total | 14875.007 | 682 | | | |

The results in Table 14 show that all the p-values ($.000 \leq p \leq .002$) associated with the computed f-values ($3.000 \leq F \leq 42.889$) are less than .05. Consequently, the null hypothesis was rejected entirely. This means that marital status has significant influence on students' research skills training need.

The results in Table 14 show that all the p-values ($.000 \leq p \leq .002$) associated with the computed f-values ($3.000 \leq F \leq 42.889$) are less than .05. Consequently, the null hypothesis was rejected entirely. This means that marital status has significant influence on students' research skills training need.

In locating the pair of means that is responsible for the observed significant results, LSD test was carried out. The results are presented as Table 15.

**Table 15**
**LSD Multiple (Pair-wise) Comparison of research skills need variables by marital status**

| Research skill | Marital status | Married | Single | Divorced | Widowed |
|---|---|---|---|---|---|
| Problem identification | Married | 15.435** | .229 | 1.677* | 4.053* |
| | Single | .532 | 15.296 | 1.906* | 4.282* |
| | Divorced | .000 | .000 | 17.105 | 2.376* |
| | Widowed | .000 | .000 | .000 | 19.634 |
| Hypothesis formulation | Married | 16.478** | 1.248 | .267 | 1.40651* |
| | Single | .003 | 15.219 | 1.515 | 2.651* |
| | Divorced | .595 | .002 | 16.623 | 1.136* |
| | Widowed | .003 | .000 | 0.39 | 17.810 |
| Literature review | Married | 16.412** | .643 | .586 | 1.514* |
| | Single | .1335 | 15.515 | 1.228 | 2.157* |
| | Divorced | .259 | .017 | 16.570 | .929 |
| | Widowed | .002 | .000 | .102 | 17.559 |
| Sampling | Married | 15.098** | .100 | .677 | 1.188* |
| | Single | .815 | 15.023 | .777 | 1.288* |
| | Divorced | .190 | .130 | 15.603 | .511 |
| | Widowed | .015 | .008 | .0365 | 16.126 |
| Instrument development skills | Married | 15.554** | .186 | .525 | 1.814** |
| | Single | .667 | 15.368 | .711 | 1.999* |
| | Divorced | .315 | .171 | 16.079 | 1.289* |
| | Widowed | .000 | .000 | .024 | 17.368 |
| Statistical skills | Married | 14.878** | .245 | 1.034 | 2.041* |
| | Single | .605 | 15.123 | .790 | 1.796* |
| | Divorced | .070 | .165 | 15.912 | 1.007 |
| | Widowed | .000 | .001 | .108 | 16.919 |
| Computer application skills | Married | 14.822** | .285 | .249 | 2.134* |
| | Single | .550 | 14.536 | .534 | 2.420* |
| | Divorced | .666 | .351 | 15.070 | 1.886* |
| | Widowed | .000 | .000 | .003 | 16.956 |
| Referencing skills | Married | 16.549** | .227 | .802 | 2.524* |
| | Single | .629 | 16.323 | 1.028 | 2.751* |
| | Divorced | .157 | .068 | 17.351 | 1.723* |
| | Widowed | .000 | .000 | .006 | 19.074 |
| Report writing skills | Married | 17.282** | .273 | .245 | 1.586* |
| | Single | .540 | 17.009 | .517 | 1.859* |
| | Divorced | .649 | .333 | 17.526 | 1.341* |
| | Widowed | .002 | .000 | .023 | 18.868 |

*Significant at .05 level, P<.05
** Values along main diagonal are group means above it are mean differences (MD) and below it are corresponding p-values.

The results in Table 15 show that for problem identification skills training need, the divorced were significantly different from the married (MD = 1.677 P = .000) and the single (MD = 1.906, P=.000). the widowed were significantly different from the married (MD = 4.053, P=.000), the single (MD = 4.282, P=.000) and the divorced (MD = 2.376, P=.000).

For research questions/hypothesis formulation skills, the widowed were significantly different from the married (MD = 1.403, P =.003), the single (MD = 2.651, P = .000) and the divorced (MD = 1.136, P = .039). All other paired comparisons were not significant. This pattern was repeated for instrument development, computer application referencing and report writing.

For literature review skills, the widowed were significantly different from the married (MD = 1.514, P=.002) and the single (MD = 2.157, P =.000). All the other paired comparisons were not significant. This pattern was maintained for sampling and statistical skills training need.

4.2.5 Hypothesis five

Students 'academic discipline has no significant influence on their research skills training need.

To test this hypothesis, the procedures used in testing hypothesis three were adopted, with academic discipline as factor. The descriptive statistics of the nine sub-variables of research skills training need, by academic discipline are presented inTable 16.

## TABLE 16

Descriptive statistics of research skills' need variables byacademicdiscipline

| | N | Mean | Std. Deviation | Std. Error | Minimum | Maximum |
|---|---|---|---|---|---|---|
| Problem Identification Education | 175 | 16.697 | 4.094 | .309 | 6.00 | 24.00 |
| Sciences | 136 | 15.081 | 3.714 | .318 | 7.00 | 24.00 |
| Mgt. Sciences | 140 | 17.157 | 3.535 | .299 | 6.00 | 24.00 |
| Arts | 175 | 19.680 | 3.499 | .264 | 8.00 | 24.00 |
| Agric Sciences | 57 | 14.561 | 4.115 | .545 | 9.00 | 23.00 |
| Total | 683 | 17.056 | 4.143 | .159 | 6.00 | 24.00 |
| Hypothesis Formulation Education | 175 | 17.571 | 4.356 | .329 | 6.00 | 24.00 |
| Sciences | 136 | 15.757 | 4.219 | .362 | 6.00 | 24.00 |
| Mgt. Sciences | 140 | 16.764 | 4.219 | .357 | 7.00 | 24.00 |
| Arts | 175 | 18.600 | 4.085 | .309 | 8.00 | 24.00 |
| Agric Sciences | 57 | 13.842 | 4.039 | .535 | 8.00 | 22.00 |
| Total | 683 | 16.997 | 4.414 | .169 | 6.00 | 24.00 |
| Literature Review Skills Education | 175 | 17.223 | 4.523 | .342 | 6.00 | 24.00 |
| Sciences | 136 | 16.360 | 3.927 | .337 | 8.00 | 24.00 |
| Mgt. Sciences | 140 | 16.943 | 4.589 | .388 | 6,00 | 24.00 |
| Arts | 175 | 18.240 | 4.339 | .328 | 6,00 | 24.00 |
| Agric Sciences | 57 | 13.667 | 4.505 | .597 | 6,00 | 24.00 |
| Total | 683 | 16.958 | 4.522 | .173 | 6.00 | 24.00 |
| Sampling Skills Education | 175 | 16.126 | 4.601 | .348 | 6.00 | 24.00 |
| Sciences | 136 | 15.368 | 3.994 | .342 | 6.00 | 24.00 |
| Mgt. Sciences | 140 | 15.936 | 4.367 | .369 | 6.00 | 24.00 |
| Arts | 175 | 16.983 | 4.774 | .361 | 6.00 | 24.00 |
| Agric Sciences | 57 | 14.579 | 3.746 | .496 | 8.00 | 22.00 |
| Total | 683 | 16.026 | 4.462 | .171 | 6.00 | 24.00 |
| Instrument Dev. Skills Education | 175 | 16.131 | 4.437 | .335 | 6.00 | 24.00 |
| Sciences | 136 | 14.971 | 4.319 | .370 | 6.00 | 24.00 |
| Mgt. Sciences | 140 | 15.764 | 4.640 | .392 | 6.00 | 24.00 |
| Arts | 175 | 17.337 | 4.609 | .348 | 6.00 | 24.00 |
| Agric Sciences | 57 | 13.842 | 3.649 | .483 | 8.00 | 23.00 |
| Total | 683 | 15.943 | 4.549 | .174 | 6,00 | 24.00 |
| Statistical Skills Education | 175 | 15.817 | 4.867 | .368 | 6,00 | 24,00 |
| Sciences | 136 | 14.346 | 4.928 | .423 | 6,00 | 24,00 |
| Mgt. Sciences | 140 | 15.343 | 4.838 | .409 | 6.00 | 24.00 |
| Arts | 175 | 16.829 | 5.119 | .387 | 6.00 | 24.00 |
| Agric Sciences | 57 | 14.018 | 4.211 | .558 | 6.00 | 23.00 |
| Total | 683 | 15.536 | 4.969 | .190 | 6.00 | 24.00 |
| Computer Application Skills Education | 175 | 15.280 | 4.806 | .363 | 6.00 | 24.00 |
| Sciences | 136 | 13.802 | 4.726 | .405 | 6.00 | 24.00 |
| Mgt. Sciences | 140 | 14.929 | 5.046 | .426 | 6.00 | 24.00 |
| Arts | 175 | 16.863 | 5.202 | .393 | 6.00 | 24.00 |
| Agric Sciences | 57 | 13.807 | 4.365 | .578 | 6.00 | 24.00 |
| Total | 683 | 15.196 | 5.025 | .192 | 6.00 | 24.00 |
| Referencing Skills Education | 175 | 17.406 | 4.894 | .369 | 6.00 | 24.00 |
| Sciences | 136 | 15.824 | 4.762 | .409 | 6.00 | 24.00 |
| Mgt. Sciences | 140 | 16.786 | 4.841 | .409 | 6.00 | 24.00 |
| Arts | 175 | 18.960 | 4.861 | .367 | 6.00 | 24.00 |
| Agric Sciences | 57 | 14.421 | 4.200 | .556 | 6.00 | 24.00 |
| Total | 683 | 17,113 | 4.971 | .190 | 6.00 | 24.00 |
| Report Writing Skills Education | 175 | 17.989 | 4.417 | .334 | 6.00 | 24.00 |
| Sciences | 136 | 16.575 | 4.3923 | .377 | 6.00 | 24.00 |
| Mgt. Sciences | 140 | 17.636 | 4.619 | .390 | 6.00 | 24.00 |
| Arts | 175 | 18.913 | 4.584 | .346 | 6.00 | 24.00 |
| Agric Sciences | 57 | 14.140 | 4.434 | .587 | 6.00 | 24.00 |
| Total | 683 | 17.551 | 4.670 | .178 | 6.00 | 24.00 |

*significant at .05 level. P<.05

The results in Table 16 and for problem identification skills training need, show that Arts students were most in need of training ($\bar{x}$ = 19.680), followed by management sciences students ($\bar{x}$ = 17.157) and the least were students of agricultural sciences ($\bar{x}$ = 14.561, see fig. 28). This pattern was consistently maintained for research questions/hypothesis formulation (fig. 29), literature review (fig. 30), sampling skills (fig. 31), instrument development (fig. 32), statistical skills (fig. 33), computer application skills (fig. 34), referencing skills (fig. 35) and report writing (fig. 36). This means that arts students are the one most in need of research skills training.

The results of the analysis of variables for the nine sub-variables of research skills training need, by academic discipline, are presented in Table 17. Table 17 results show that all the F-values ($.000 \leq p \leq .002$) associated with the computed F-values ($4.371 \leq F \leq 37.353$) for the nine sub-variables, are less than the chosen level of significance (.05). As a result, the null hypothesis was rejected entirely. This means that students 'academic discipline has significant influence on their research skills training need.

In locating the pair of group means that is responsible for the observed significant results, LSD multiple pair wise comparison was carried out. The results are given in Table 18.

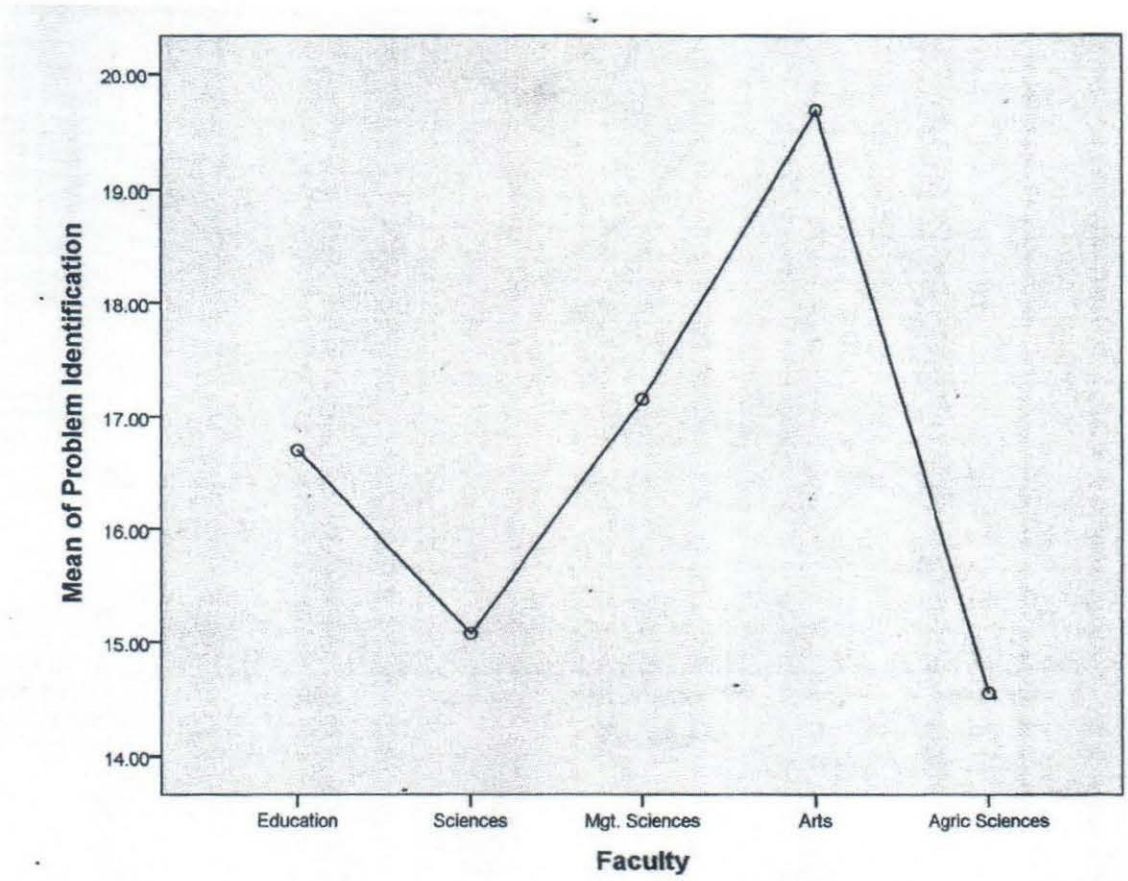


FIG.28: Means plot of problem identification skillstraining need by academic discipline

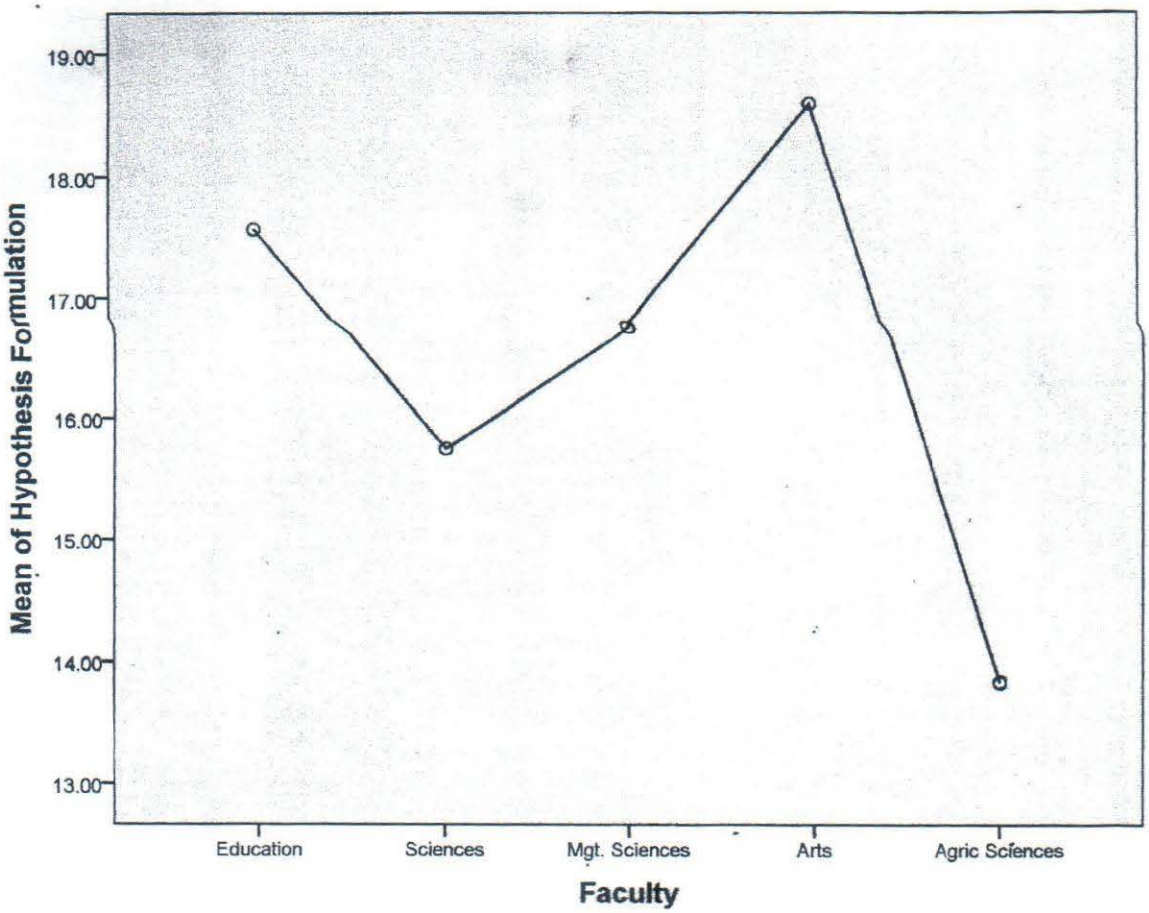


FIG.29: Means plot of research question/hypothesis formulation skillstraining need by academic discipline

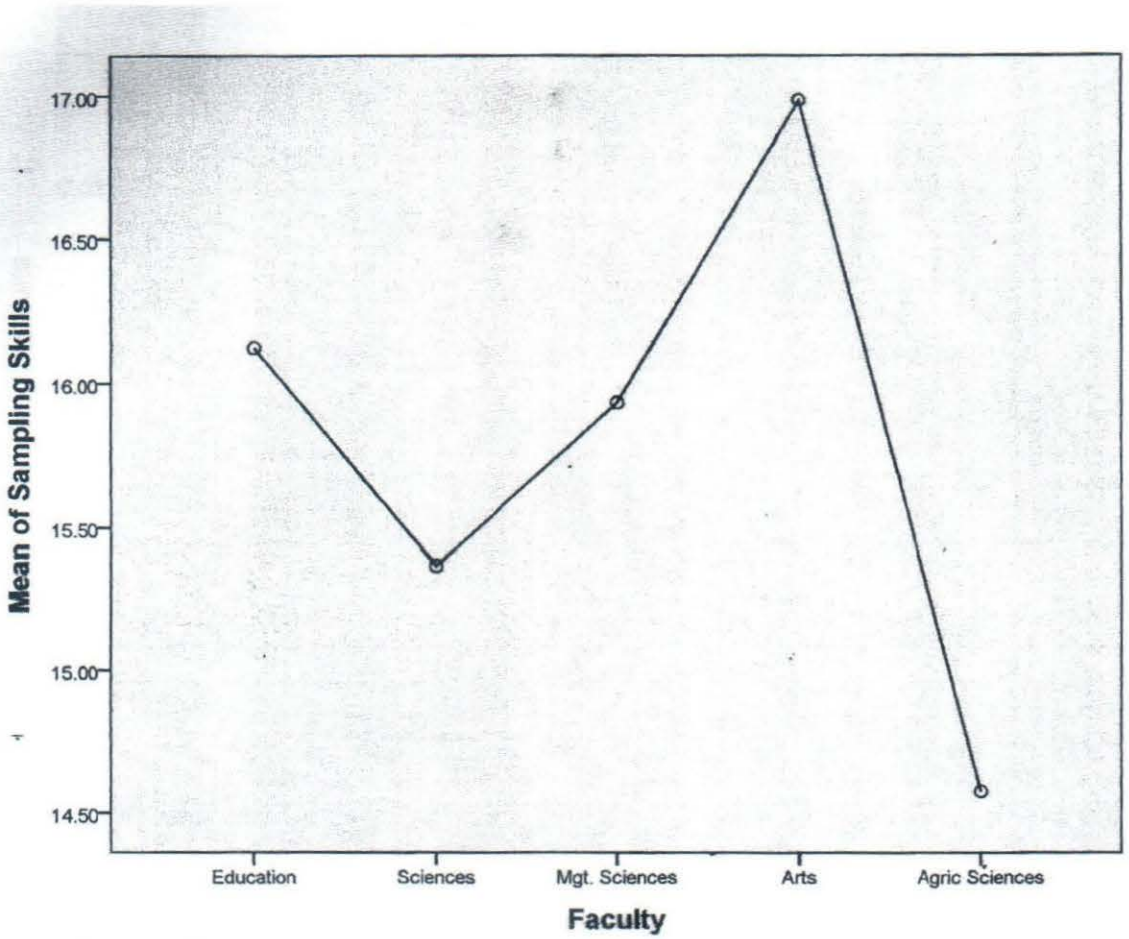


FIG. 31: Means plot of sampling skillstraining need by academic discipline

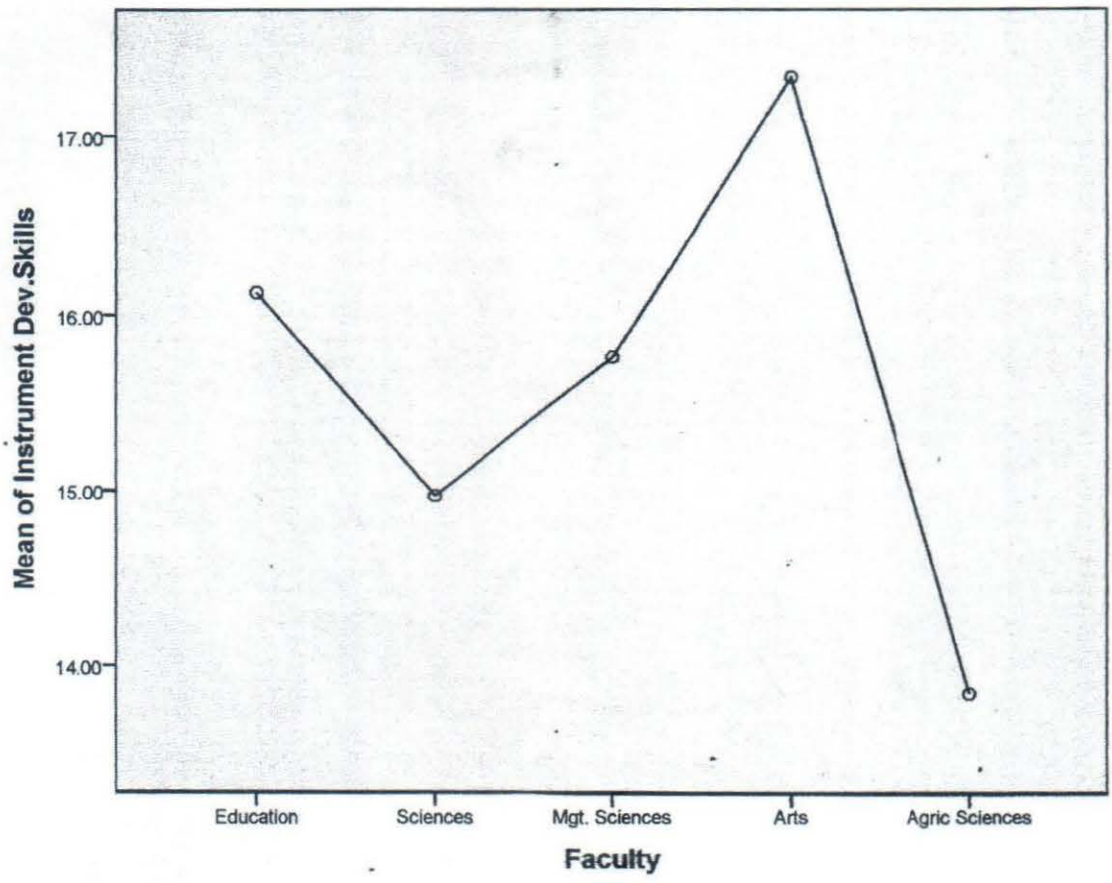


FIG. 32: Means plot of instrument development skillstraining need by academic discipline

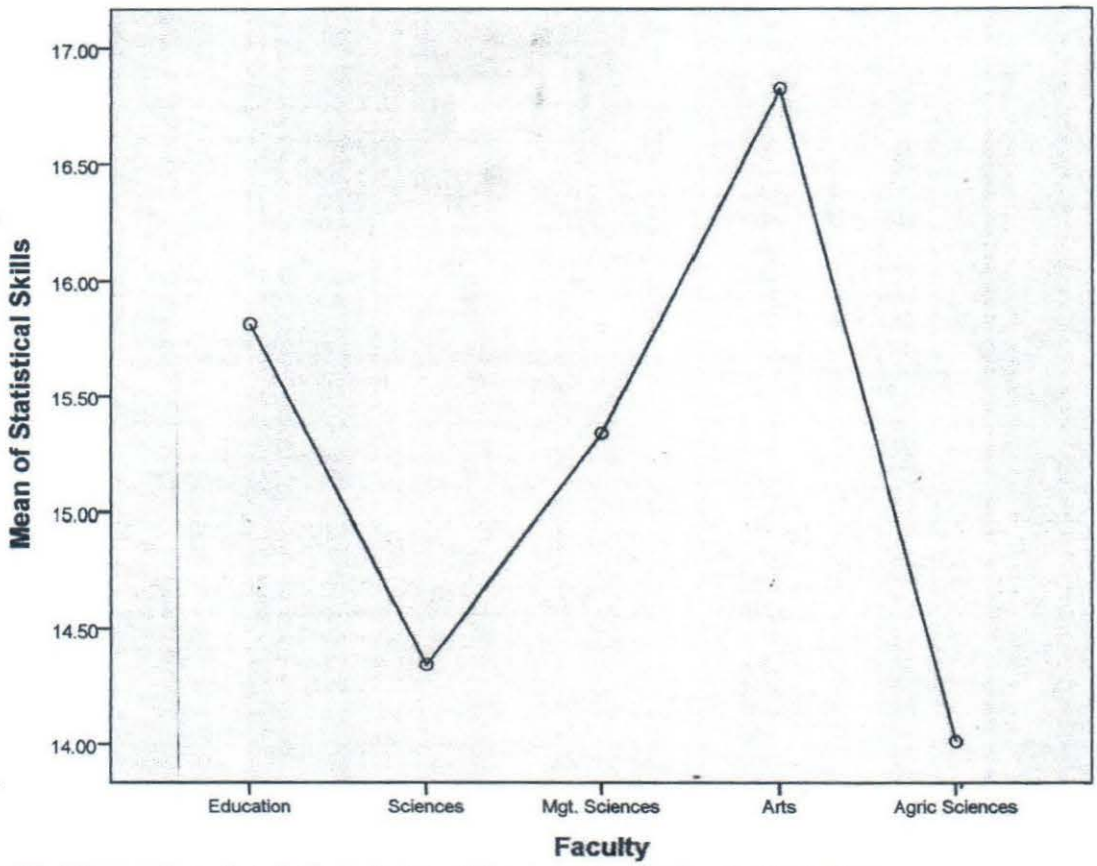


FIG. 33: Means plot of statistical skills training need by academic discipline

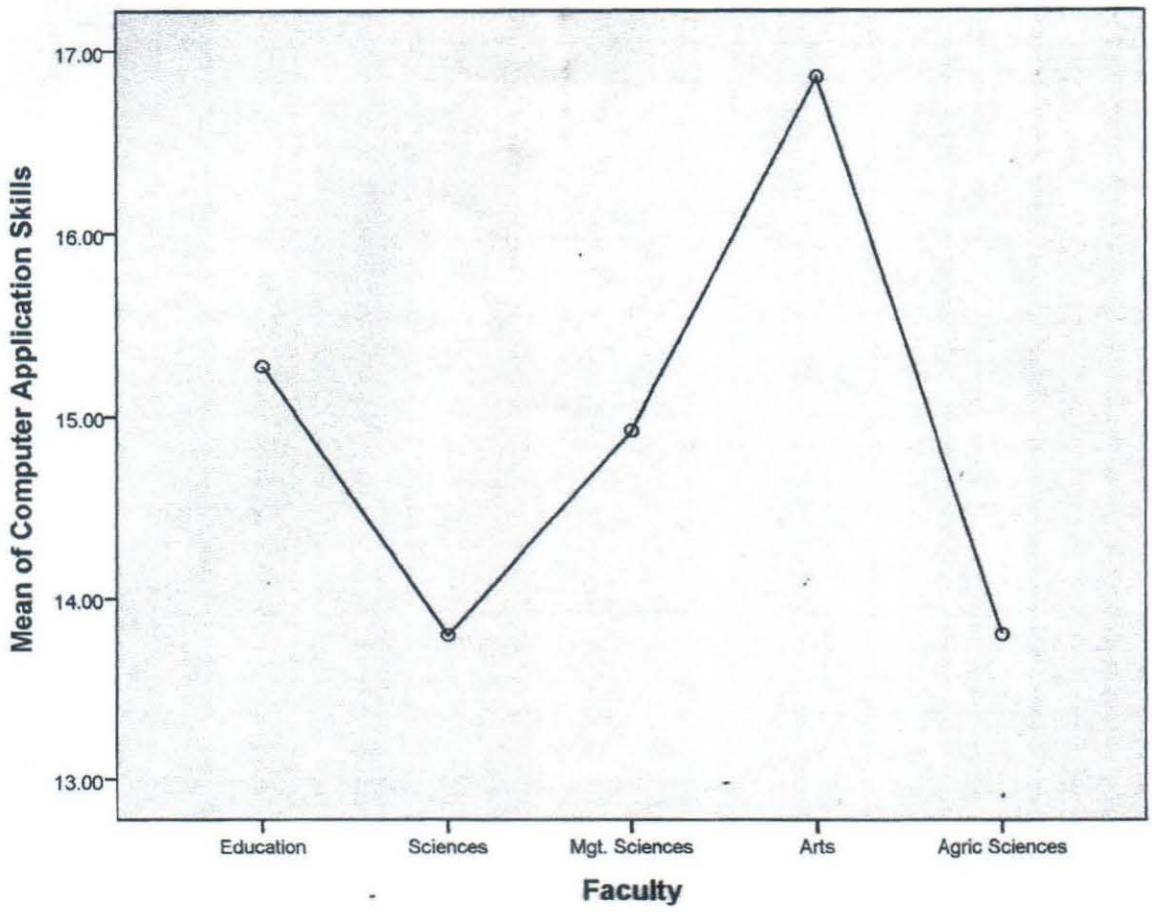


FIG. 34: Means plot of computer application skillstraining need by academic discipline

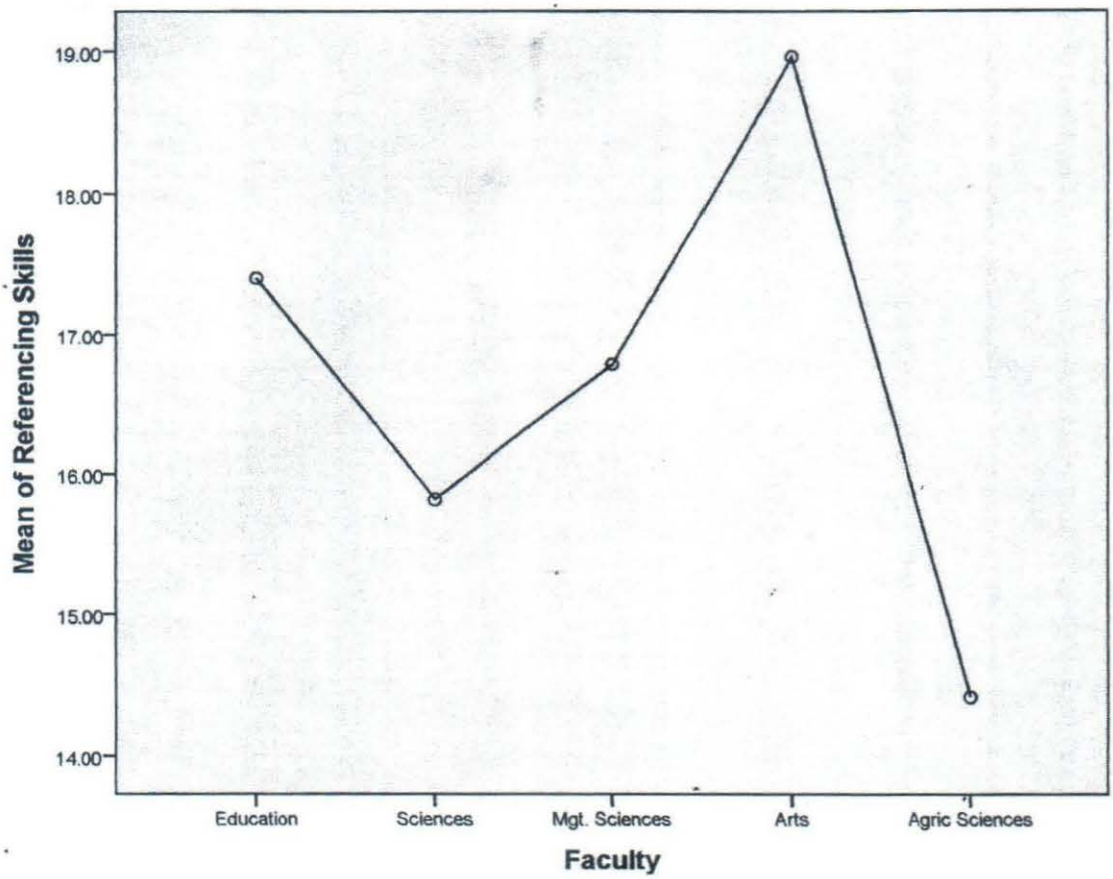


FIG. 35: Means plot of referencing skillstraining need by academic discipline

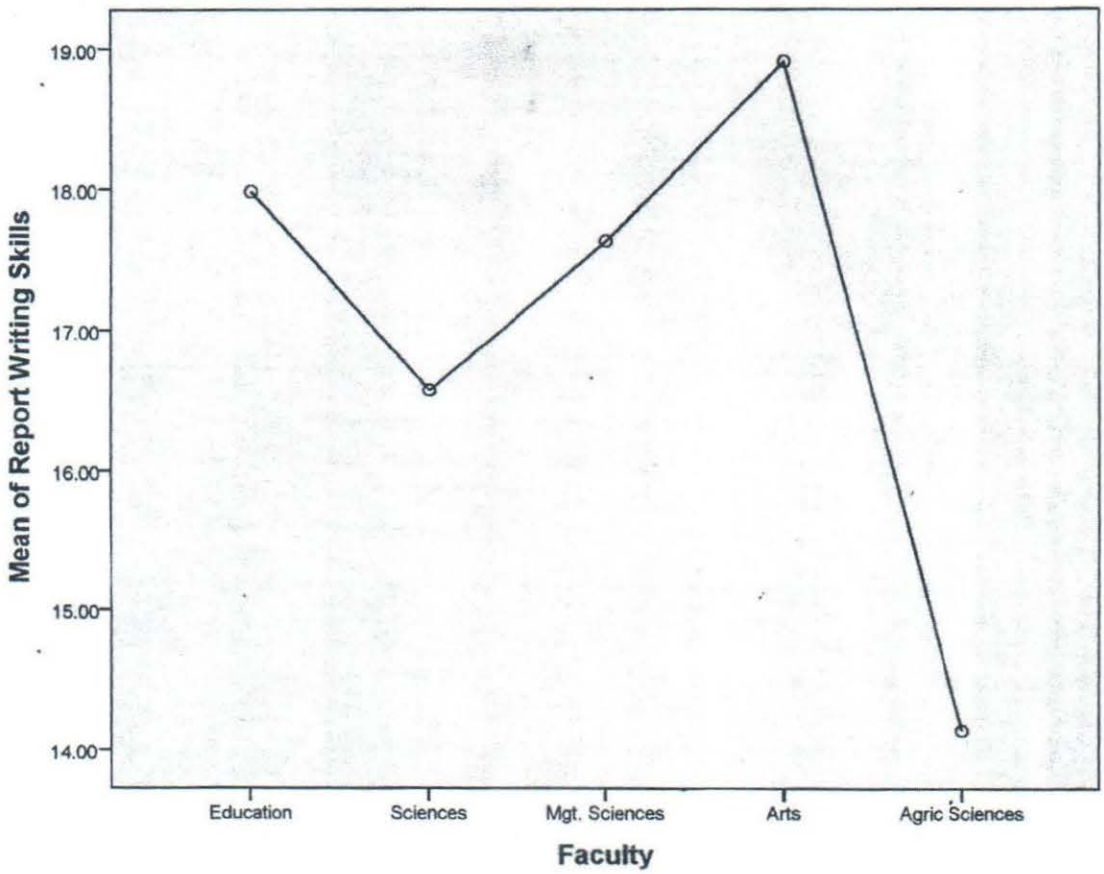


FIG. 36: Means plot of report writing skillstraining need by academic discipline

TABLE 17
One - way ANOVA of research skills training need variables by academic discipline

| | | Sum of Squares | df | Mean Square | F | p-value |
|---|---|---|---|---|---|---|
| Problem Identification | Between | 2114.169 | 4 | 528.542 | 14.150 37.353 | .000 |
| Groups | | 9593.717 | 678 | | | |
| Within Groups | | 11707.886 | 682 | | | |
| Total | | | | | | |
| Hypothesis Formulation | Between | 1291.344 | 4 | 322.836 | 17.694 18.245 | .000 |
| Groups | | 11996.650 | 678 | | | |
| Within Groups | | 13287.994 | 682 | | | |
| Total | | | | | | |
| Literature Review Skills | Between | 965.985 | 4 | 241.496 | 19.147 12.613 | .000 |
| Groups | | 12981.784 | 678 | | | |
| Within Groups | | 13947.769 | 682 | | | |
| Total | | | | | | |
| Sampling Skills | | 341.409 | 4 | 85.352 | 4.371 | .030 |
| Between Groups | | 13238.117 | 678 | 19,525 | | |
| Within Groups | | 13579.526 | 682 | | | |
| Total | | | | | | |
| Instrument Dev. Skills | Between | 731.005 | 4 | 182.751 | 19.734 9.261 | .000 |
| Groups | | 13379.768 | 678 | | | |
| Within Groups | | 14110.773 | 682 | | | |
| Total | | | | | | |
| Statistical Skills | | 635.583 | 4 | 158.896 | 23.906 6.647 | .001 |
| Between Groups | | 16208.288 | 678 | | | |
| Within Groups | | 16843.871 | 682 | | | |
| Total | | | | | | |
| Computer Application Skills | Between Groups | 871.919 | 4 | 217.980 | 24.115 9.039 | .000 |
| Within Groups | | 16349.791 | 678 | | | |
| Total | | 17221.710 | 682 | | | |
| Report Writing Skills | Between | 1152.753 | 4 | 288.188 | 20.239 14.239 | .002 |
| Groups | | 13722.255 | 678 | | | |
| Within Groups | | 14875.007 | 682 | | | |
| Total | | | | | | |
| Referencing Skills | | 1266.174 | 4 | 316.544 | 22.988 13.770 | .000 |
| Between Groups | | 15586.145 | 678 | | | |
| Within Groups | | 16852.319 | 682 | | | |
| Total | | | | | | |

* Significant at .05 level. P < .05

TABLE 18
LSD Multiple (Pairwise) Comparison of Research Skills Variables by Academic Discipline

| Research skills | Academic discipline | Education | Phy. Sciences | Mgt. Sciences | Arts | Agric. Sciences |
|---|---|---|---|---|---|---|
| Problem identification | Education | 16.697** | 1.616* | .460 | 2.983* | 2.136* |
| | Phy. Sciences | .000 | 15.081 | 2.076* | 4.599* | .519 |
| | Mgt. Sciences | .281 | .000 | 17.157 | 2.523* | 2.596* |
| | Arts | .000 | .000 | .000 | 19.680 | 5.119* |
| | Agric. Sciences | .000 | .382 | .000 | .000 | 14.561 |
| Hypothesis formulation | Education | 17.571** | 1.814* | .807 | 1.029* | 3.729* |
| | Phy. Sciences | .000 | 15.757 | 1.007* | 2.843* | 1.915* |
| | Mgt. Sciences | .091 | .047 | 16.764 | 1.836* | 2.922* |
| | Arts | .022 | .000 | .000 | 18.600 | 4.758* |
| | Agric. Sciences | .000 | .004 | .000 | .000 | 13.842 |
| Literature Review | Education | 17.223** | .063 | .280 | 1.017* | 3.556* |
| | Phy. Sciences | .085 | 16.360 | .583 | 1.880* | 2.694* |
| | Mgt. Sciences | .573 | .289 | 16.943 | 1.297* | 3.276* |
| | Arts | .030 | .000 | .009 | 18.240 | 4.573* |
| | Agric. Sciences | .000 | .000 | .000 | .000 | 13.667 |
| Sampling skills | Education | 16.126** | .758 | .190 | .857 | 1.547* |
| | Phy. Sciences | .134 | 15.368 | .568 | 1.615* | .789 |
| | Mgt. Sciences | .705 | .286 | 15.936 | 1.047* | 1.357 |
| | Arts | .070 | .001 | .037 | 16.983 | 2.404* |
| | Agric. Sciences | .022 | .258 | .051 | .000 | 14.579 |
| Instrument development | Education | 16.131** | 1.161* | .367 | 1.206* | 14.579 |
| | Phy. Sciences | .023 | 14.971 | .794 | 2.367* | 2.289* |
| | Mgt. Sciences | .466 | .138 | 15.764 | 1.573* | 1.128 |
| | Arts | .011 | .000 | .002 | 17.337 | 1.922* |
| | Agric. Sciences | .001 | .108 | .006 | .000 | 3.495* |
| | | | | | | 13.842 |
| Statistical skills | Education | 15.817** | 1.472* | .474 | 1.011 | 1.800* |
| | Phy. Sciences | .009 | 14.346 | .997 | 2.483* | .328 |
| | Mgt. Sciences | 393 | .091 | 15.343 | 1.486* | 1.325 |
| | Arts | .053 | .000 | .008 | 16.829 | 2.811* |
| | Agric. Sciences | .016 | .671 | .085 | .000 | 14.018 |
| Computer application | Education | 15.280** | 1.479* | .351 | 1.583* | 1.473 |
| | Phy. Sciences | .009 | 13.801 | 1.127 | 3.061* | .006 |
| | Mgt. Sciences | .528 | .057 | 14.929 | 1.934* | 1.122 |
| | Arts | .003 | .000 | .001 | 16.863 | 3.056* |
| | Agric. Sciences | .050 | .994 | .147 | .000 | 13.807 |
| Referencing skills | Education | 17.406** | 1.582* | .620 | 1.554* | 2.985* |
| | Phy. Sciences | .004 | 15.824 | .962 | 3.136* | 1.402 |
| | Mgt. Sciences | .255 | .096 | 16.786 | 2.174* | 2.365* |
| | Arts | .003 | .000 | .000 | 18.960 | 4.539* |
| | Agric. Sciences | .000 | .064 | .002 | .000 | 14.421 |
| Report writing skills | Education | 17.989** | 1.415* | .353 | .926 | 3.848* |
| | Phy. Sciences | .006 | 16.574 | 1.062 | 2.341* | 2.433* |
| | Mgt. Sciences | .489 | .050 | 17.636 | 1.279* | 3.495* |
| | Arts | .055 | .000 | .012 | 18.914 | 4.774* |
| | Agric. Sciences | .000 | .001 | .000 | .000 | 14.140 |

*Significant at .05 level. P<.05
**Values along main diagonal are group means, above it are mean differences (MD) and below it are corresponding p-values

From Table 18 and for problem identification skills, the differences between Education and Management Sciences students as well as the difference between Physical Science and Agric. Science students were not significant. All other paired comparisons were significant ($1.616 \leq MD \leq 5.119$, $p=.000$). For research questions and hypothesis formulation skills, only the differences between Management science and Education students ($MD = .807$, $p=.091$) was not significant. All other paired comparisons were significant ($1.007 \leq MD \leq 4.758$, $.000 \leq p \leq .047$).

All the other paired comparisons that were significant were as indicated in the table (Table 15). Agricultural science students were significantly different from all others in 30 out of the 36 comparisons, followed by Arts students (25 out of 36) and physical sciences (also 25 out of 36) comparisons. There was no sub-variable that all the paired comparisons were all significant just as there was none that all the paired comparisons were not significant.

4.2.6 Hypothesis six

There is no significant academic program-based difference in students' research skills training need of graduate students.

To test this hypothesis, independent sample t-test was applied, with program as independent variable and each of the nine-sub-variables of research skills training need, as dependent variables. The results are presented in Table 19.

TABLE 19
Independent sample t-test for influence of academic programme on research skills need

| Research skills | Academic programme | N | Mean | Std. dev. | Std. error | Mean diff. | t-value | p-value |
|---|---|---|---|---|---|---|---|---|
| Problem identification | Ph.D | 296 | 16.635 | 4.230 | .246 | .742 | 2.327* | .020 |
| | Masters | 387 | 17.377 | 4.052 | .206 | | | |
| | Total | 683 | 17.056 | 4.143 | .159 | | | |
| Hypothesis formulation | Ph.D | 296 | 17.063 | 4.491 | .261 | .124 | .365 | .715 |
| | Masters | 387 | 16.943 | 4.360 | .222 | | | |
| | Total | 683 | 16.977 | 4.414 | .169 | | | |
| Literature Review | Ph.D | Ph.D | 296 | 4.594 | .267 | .026 | .076 | .940 |
| | Masters | Masters | 387 | 4.472 | .227 | | | |
| | Total | Total | 683 | 4.522 | .173 | | | |
| Sampling skills | Ph.D | 296 | 16.115 | 4.511 | .262 | .156 | .453 | .651 |
| | Masters | 387 | 15.959 | 4.429 | .225 | | | |
| | Total | 683 | 16.026 | 4.462 | .171 | | | |
| Instrument development | Ph.D | 296 | 15.740 | 4.641 | .270 | .516 | 1.347 | .179 |
| | Masters | 387 | 16.098 | 4.477 | .228 | | | |
| | Total | 683 | 15.943 | 4.549 | .174 | | | |
| Statistical skills | Ph.D | 296 | 15.243 | 5.384 | .313 | .516 | 1.347 | .779 |
| | Masters | 387 | 15.760 | 4.623 | .297 | | | |
| | Total | 683 | 15.536 | 4.970 | .190 | | | |
| Computer application | Ph.D | 296 | 15.112 | 5.111 | .297 | .150 | .385 | .700 |
| | Masters | 387 | 15.261 | 4.963 | .252 | | | |
| | Total | 683 | 15.196 | 5.025 | 192 | | | |
| Referencing skills | Ph.D | 296 | 17.091 | 5.057 | .294 | .038 | .099 | .921 |
| | Masters | 387 | 17.129 | 4.910 | .250 | | | |
| | Total | 683 | 17.113 | 4.971 | .190 | | | |
| Report writing skills | Ph.D | 296 | 17.463 | 4.691 | .273 | .155 | .429 | .668 |
| | Masters | 387 | 17.618 | 4.659 | .237 | | | |
| | Total | 683 | 17.551 | 4.670 | .179 | | | |

*Significant at .05 level. P<.05

From Table 19 and for problem identification skills need, masters students need more training (x = 17.377) than Ph.D students (x = 16.635, see fig. 37). This pattern was also observed in literature review skills (fig. 39), instrument development skills (fig. 41), statistical skills (fig.42), computer application skills (fig. 43), referencing skills (fig. 44) and report writing (fig.45). For hypothesis formulation skills, Ph.D students need training (x = 17.068) more than Masters students (x = 16.943, see fig.38). The same pattern was observed for sampling skills.

The p-value (.020) associated with the computed t-value (2.327) for problem identification skills was less than .05. The other p-values ($.179 \leq P \leq .940$) associated with the computed t-values ($.076 \leq t \leq 1.347$) were all greater than .05. Thus the null hypothesis was rejected for problem identification skills but retained for the remaining eight research skills. This means that academic program has significant influence on problem identification skills training need but no significant influence on hypothesis formulation, literature review, sampling, instrument development, statistical tools, computer application, referencing and report writing skills training needs.

4.2.7 Hypothesis seven

Method of study has no significant influence on research skills training, need of graduate students.

To test this hypothesis, independent sample t-test was applied, with method of study (full time/part time) as independent variable and each of the nine sub-variables of research skills training need, as dependent variable. The results are presented in Table 20.

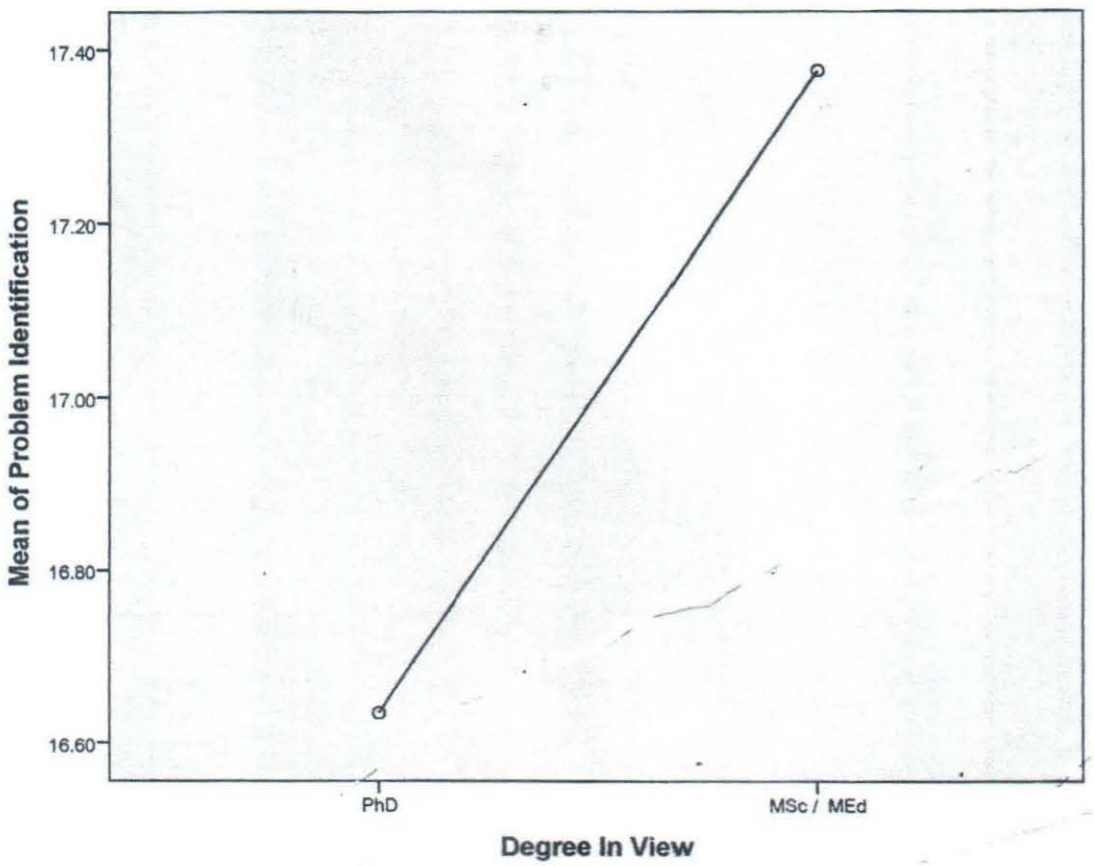


FIG.37: Means plot of problem identification skillstraining need by academic programme

TABLE 20

Independent sample t-test for influence of method of study on research skills need

| Research skills | Academic programme | N | Mean | Std. dev. | Std. error | Mean diff. | t-value | p-value |
|---|---|---|---|---|---|---|---|---|
| Problem identification | Full time | 545 | 17.600 | 4.017 | .172 | | | |
| | Part time | 138 | 14.906 | 3.943 | .336 | 2.694 | 7.064* | .000 |
| | Total | 683 | 17.056 | 4.143 | .159 | | | |
| Hypothesis formulation | Full time | 545 | 17.319 | 4.311 | .185 | | | |
| | Part time | 138 | 15.725 | 4.600 | .391 | 1.595 | 3.829* | .000 |
| | Total | 683 | 16.997 | 4.414 | .169 | | | |
| Literature Review | Full time | 545 | 17.173 | 4.480 | .192 | | | |
| | Part time | 138 | 16.109 | 4.604 | .392 | 1.064 | 2.478* | .013 |
| | Total | 683 | 16.9 | 4.522 | .173 | | | |
| Sampling skills | Full time | 545 | 16.251 | 4.420 | .189 | 1.114 | 2.630* | 009 |
| | Part time | 138 | 15.138 | 4.534 | .386 | | | |
| | Total | 683 | 16.026 | 4.462 | .171 | | | |
| Instrument development | Full time | 545 | 16.231 | 4.515 | .193 | 1.427 | 3.316* | .001 |
| | Part time | 138 | 14.804 | 4.517 | .385 | | | |
| | Total | 683 | 15.943 | 4.549 | .174 | | | |
| Statistical skills | Full time | 545 | 15.761 | 4.819 | .206 | 1.117 | 2.366* | .018 |
| | Part time | 138 | 15.645 | 5.453 | .464 | | | |
| | Total | 683 | 15.536 | 4.969 | .190 | | | |
| Computer application | Full time | 545 | 15.483 | 4.958 | .212 | 1.417 | 2.977* | .003 |
| | Part time | 138 | 14.065 | 5.145 | .437 | | | |
| | Total | 683 | 15.196 | 5.025 | .192 | | | |
| Referencing skills | Full time | 545 | 17.371 | 4.961 | .213 | .276 | 2.707* | .007 |
| | Part time | 138 | 16.094 | 4.896 | .417 | | | |
| | Total | 683 | 17.113 | 4.970 | .190 | | | |
| Report writing skills | Full time | 545 | 17.833 | 4.701 | .201 | 1.398 | 3.162* | .002 |
| | Part time | 138 | 16.435 | 4.390 | .374 | | | |
| | Total | 683 | 17.551 | 4.670 | .179 | | | |

*Significant at .05 level. P<.05

From Table 20 and for problem identification, full time students were more in need of training (x = 17.600) than part time students (x = 14.906, see fig. 46). This pattern was also observed in hypothesis formulation (fig. 47), literature review (fig. 48), sampling skills (fig. 49), instrument development (fig. 50), statistical skills (fig. 51), computer application (fig. 52), referencing (fig. 53) and report writing (fig. 54). These results show that full time students were more in need of research skills training than part time students.

The p-values ($.000 \leq P \leq .018$) associated with the computed t-values ($2.366 \leq t \leq .7.064$) for all the sub-variables are less than the chosen level of significance (.05). Thus, the null hypothesis was entirely rejected. This means that method of study has significant influence on research skills training need of graduate students.

4.2.8 Hypothesis eight

Ownership of school attended does not significantly influence the research skills' trai ning need of graduate students. To test this hypothesis ddescriptive statistics of study variables were computed by institution attended and tested for significance using inde pendent t-test, with ownership of school attended as independent variable and each of the research skills' training need variable as the dependent variable. The results are presented in Table21and figures 55-63.

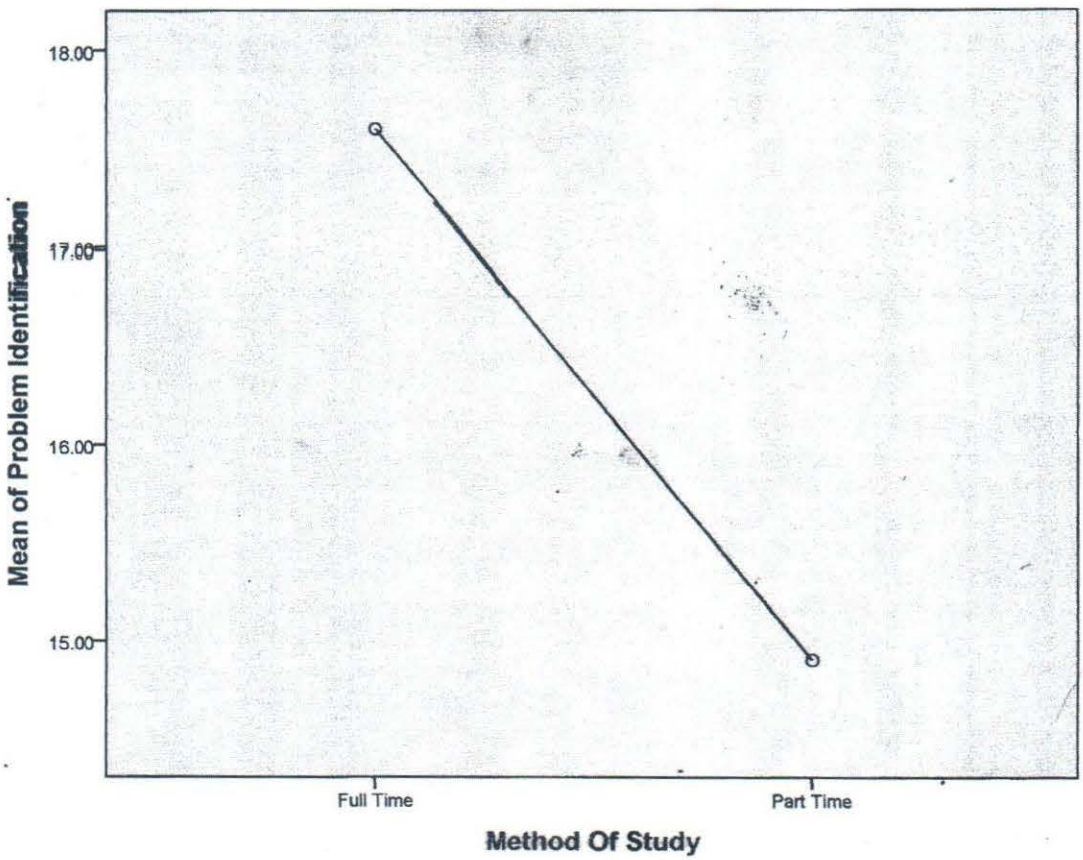


Fig. 38: Means plot of problem identification skillstraining need by method of study

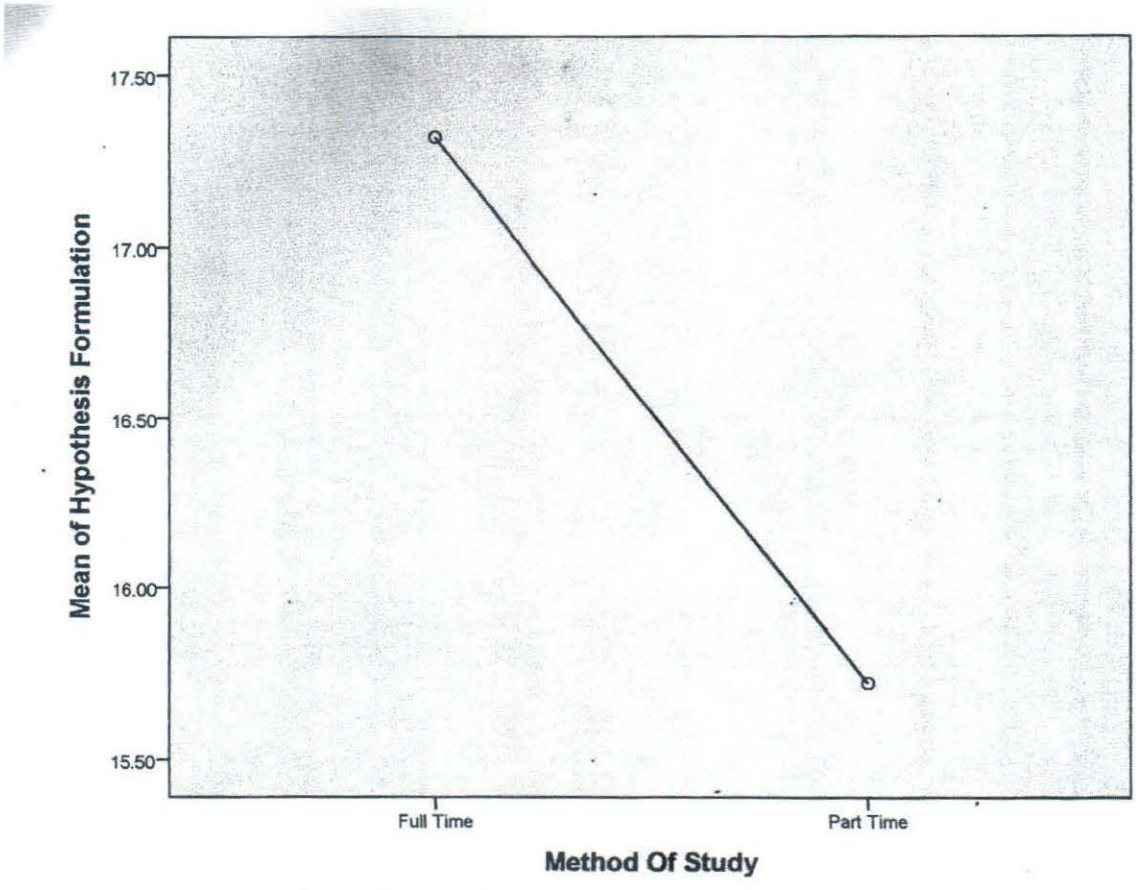


FIG. 39: Means plot of research questions/hypothesis formulation skillstraining need by method of study

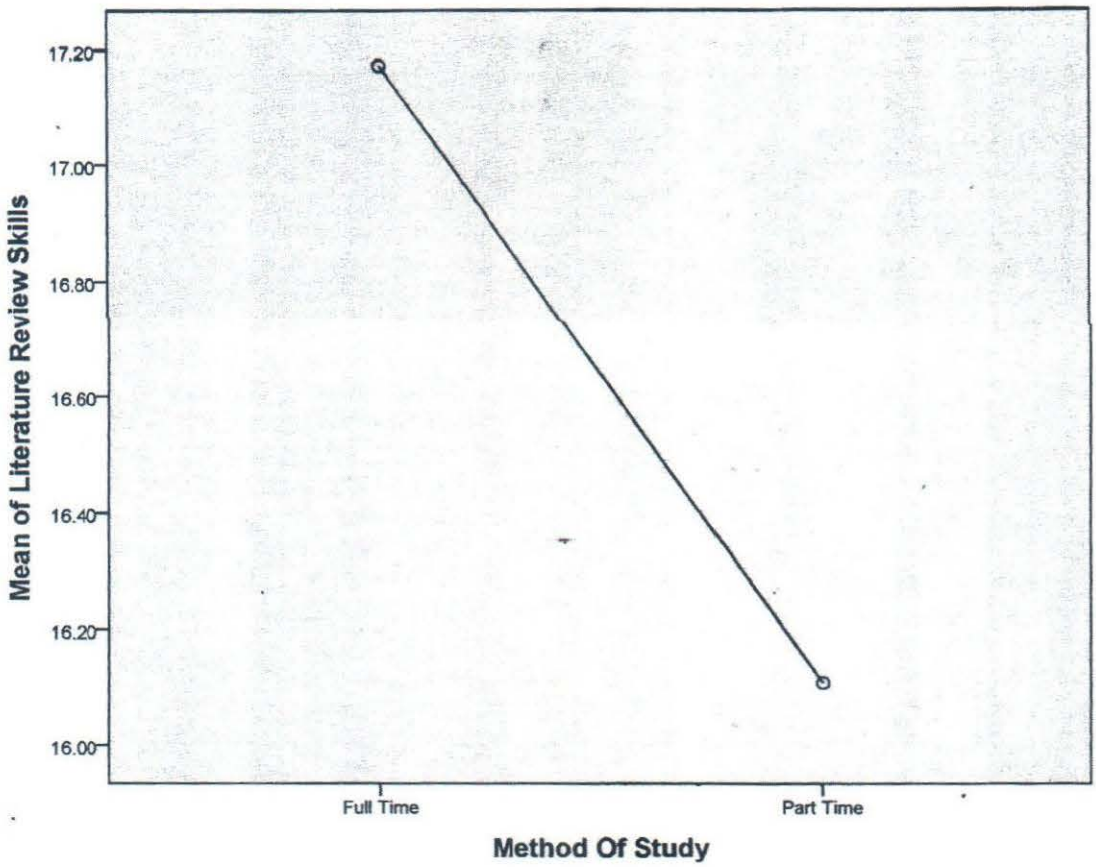


**FIG.40: Means plot of literature review skills**training **need by method of study**

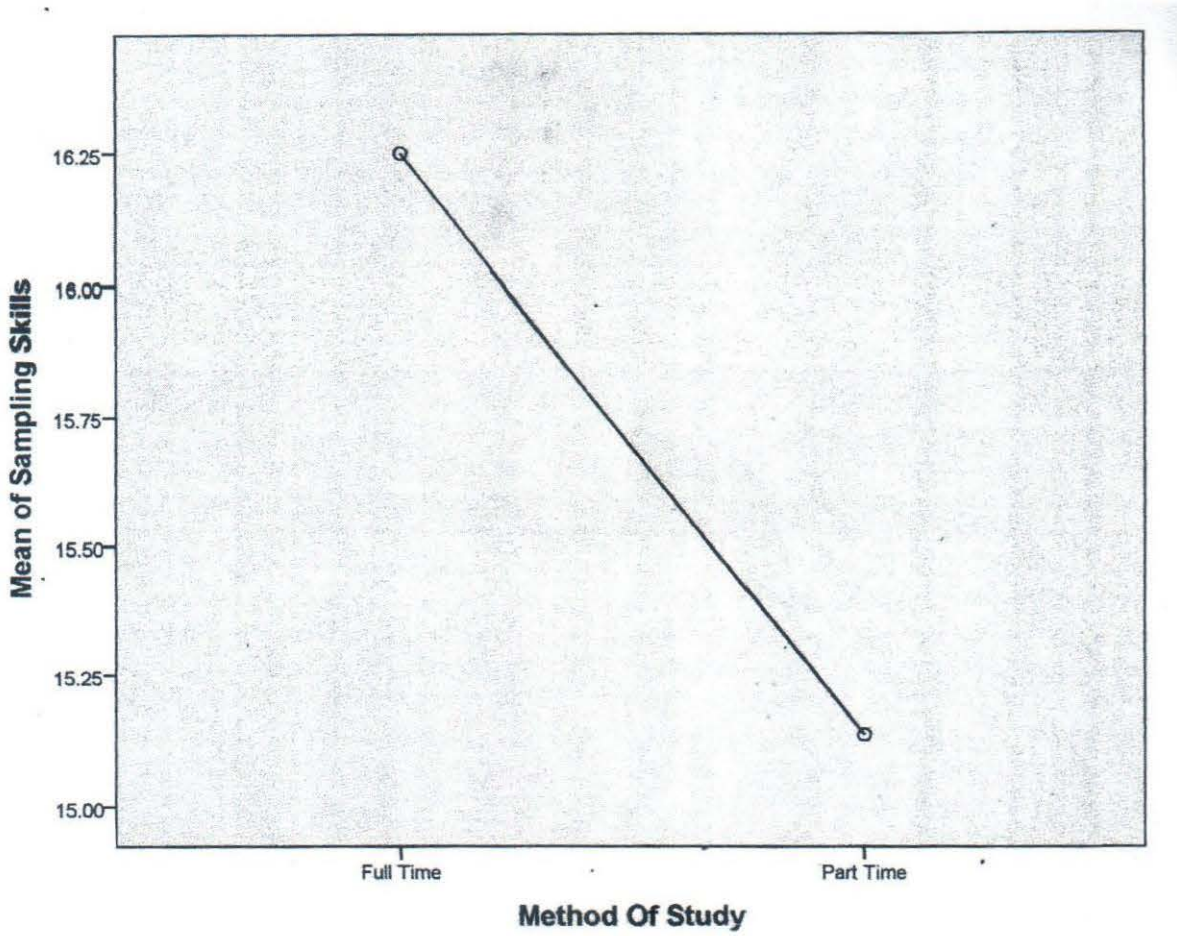


FIG. 41: Means plot of sampling skills training need by method of study

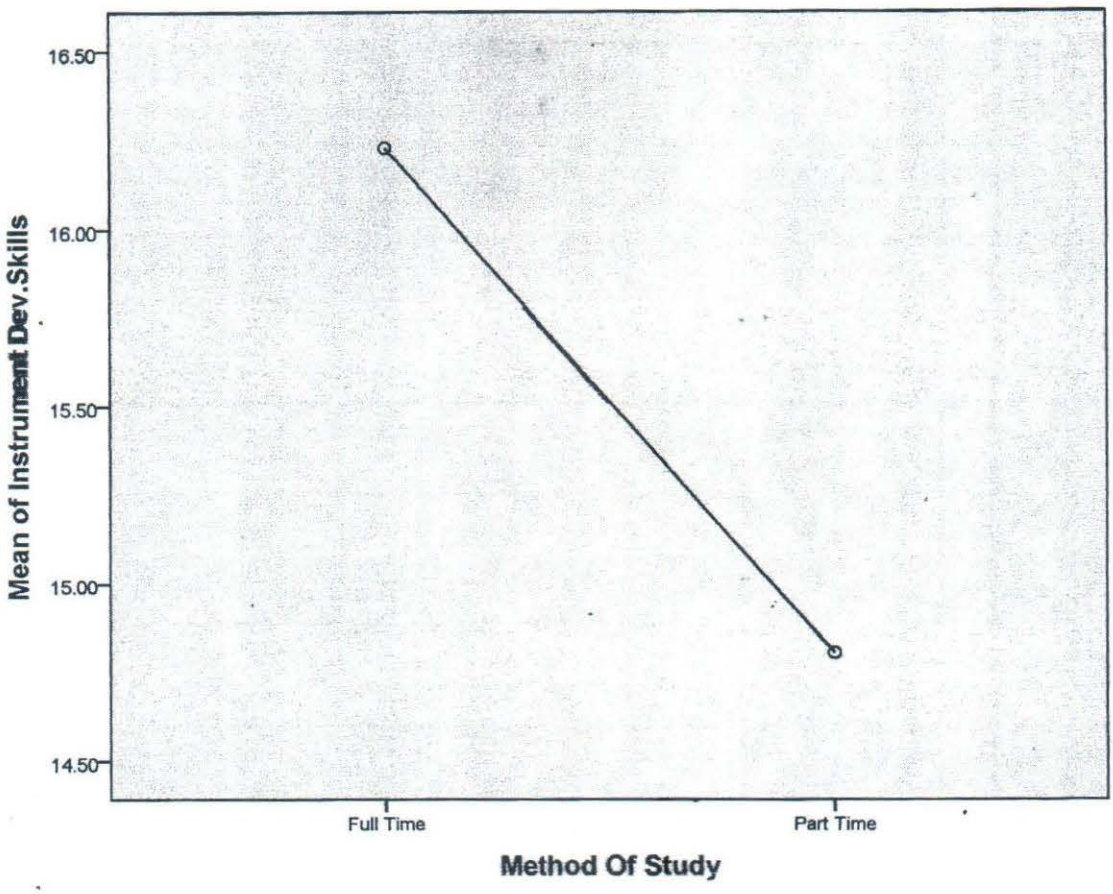


FIG. 42: Means plot of instrument development skillstraining need by method of study

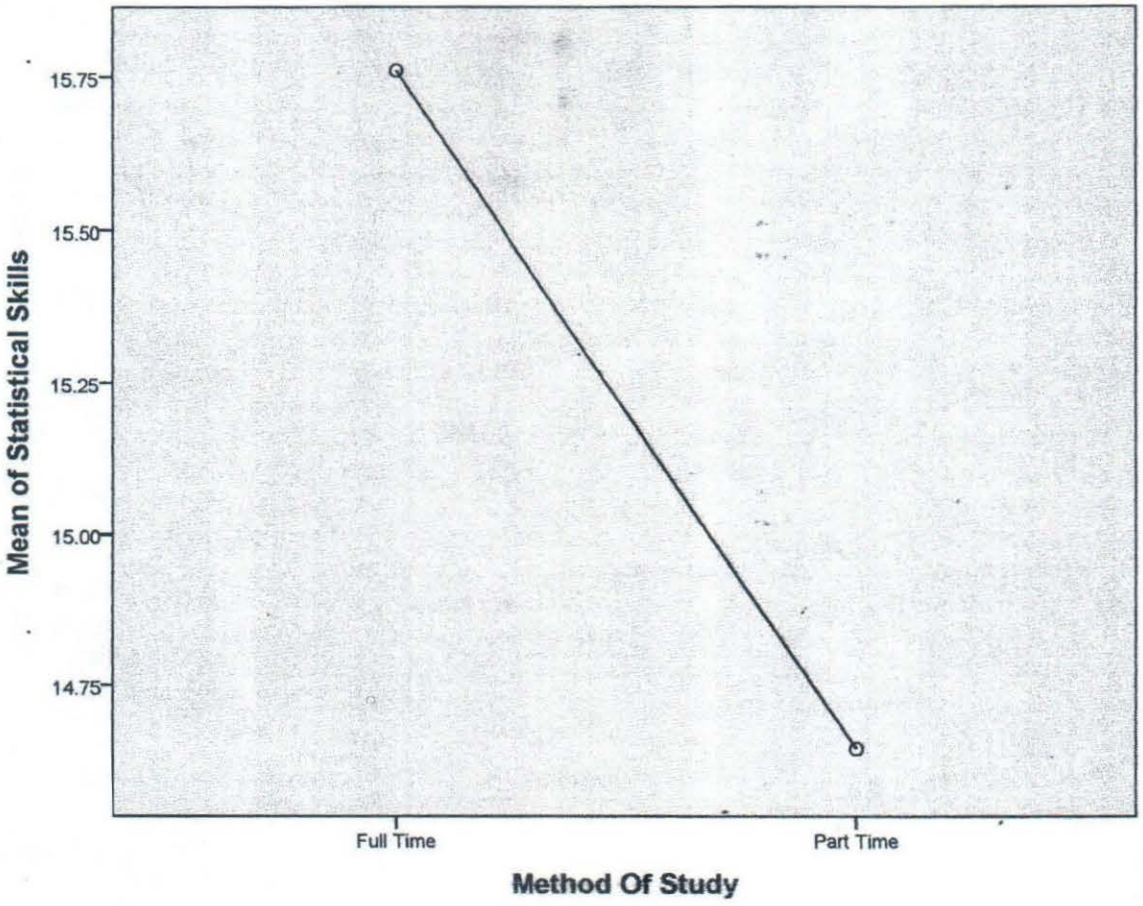


FIG. 43: Means plot of statistical skills training need by method of study

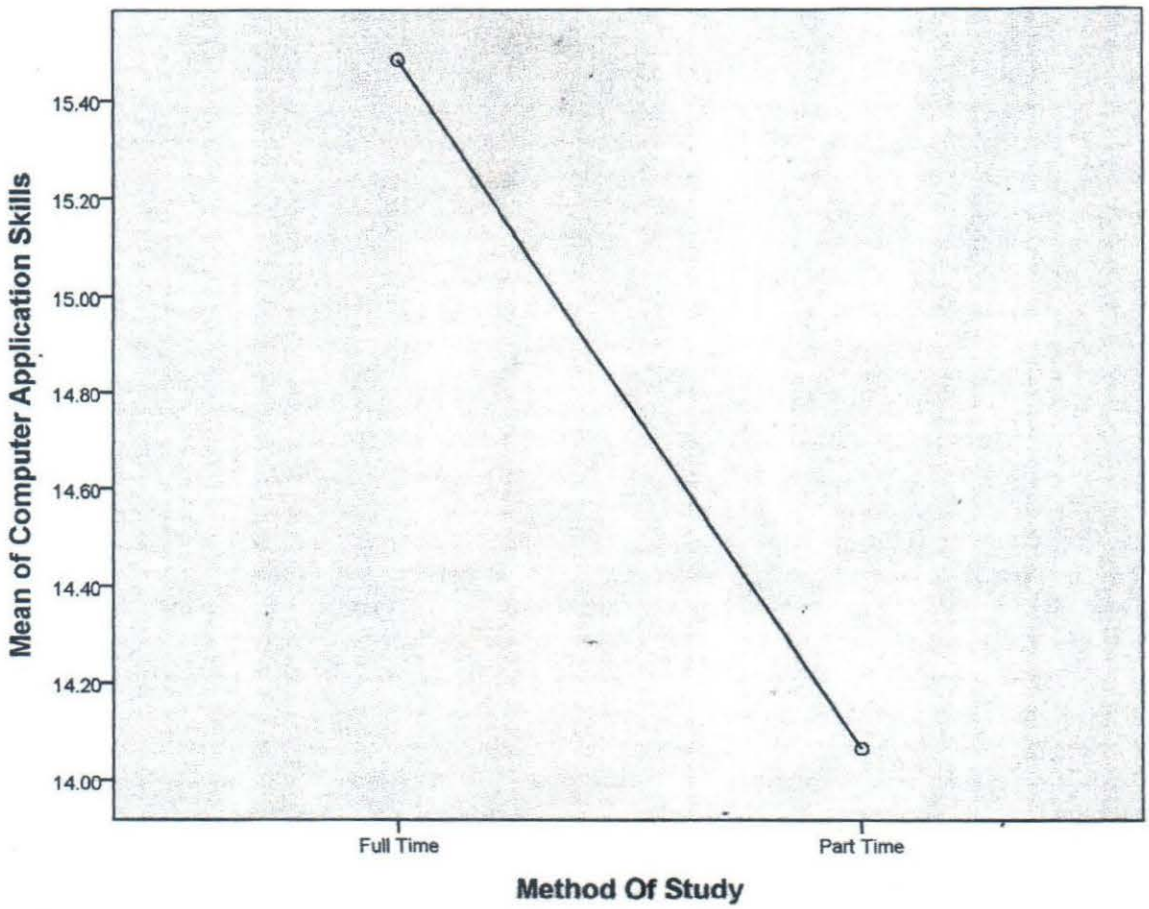


FIG. 44 Means plot of computer application skills training need by method of study

TABLE 21

Independent sample t-test for the influence of ownership of school attended on graduate students' research skills' training needs

| Research skill | School attended | N | Mean | Std. Deviation | Std. Error | Mean difference | t-value | p-value |
|---|---|---|---|---|---|---|---|---|
| Problem Identification | Federal | 520 | 16.939 | 4.137 | .181 | | | |
| | State | 163 | 17.429 | 4.153 | .325 | .490 | 1.321 | .187 |
| | Total | 683 | 17.056 | 4.143 | .159 | | | |
| Hypothesis Formulation | Federal | 520 | 17.050 | 4.319 | .189 | | | |
| | State | 163 | 16.828 | 4.714 | .369 | .222 | .559 | .576 |
| | Total | 683 | 16.997 | 4.414 | .169 | | | |
| Literature Review Skills | Federal | 520 | 17.075 | 4.389 | .193 | | | |
| | State | 163 | 16.583 | 4.918 | .385 | .492 | 1.123 | .226 |
| | Total | 683 | 16.956 | 4.522 | .173 | | | |
| Sampling Skills | Federal | 520 | 16.040 | 4.392 | .193 | | | |
| | State | 163 | 15.982 | 4.692 | .368 | .058 | .148 | .883 |
| | Total | 683 | 16.026 | 4.462 | .171 | | | |
| Instrument Dev. Skills | Federal | 520 | 15.925 | 4.464 | .196 | | | |
| | State | 163 | 16.000 | 4.824 | .378 | .075 | .184 | .854 |
| | Total | 683 | 15.943 | 4.549 | .174 | | | |
| Statistical Skills | Federal | 520 | 15.473 | 4.966 | .218 | | | |
| | State | 163 | 15.736 | 4.992 | .391 | .263 | .590 | .556 |
| | Total | 683 | 15.536 | 4.969 | .190 | | | |
| Computer Application Skills | Federal | 520 | 15.044 | 4.983 | .219 | | | |
| | State | 163 | 15.681 | 5.143 | .403 | .637 | 1.412 | .158 |
| | Total | 683 | 15.196 | 5.025 | .192 | | | |
| Referencing Skills | Federal | 520 | 17.081 | 4.861 | .213 | | | |
| | State | 163 | 17.215 | 5.320 | .417 | .134 | .300 | .764 |
| | Total | 683 | 17.113 | 4.971 | .190 | | | |
| Report Writing Skills | Federal | 520" | 17.512 | 4.566 | .200 | | | |
| | State | 163 | 17.675 | 4.999 | .392 | .163 | .390 | .697 |
| | Total | 683 | 17.551 | 4.670 | .179 | | | |

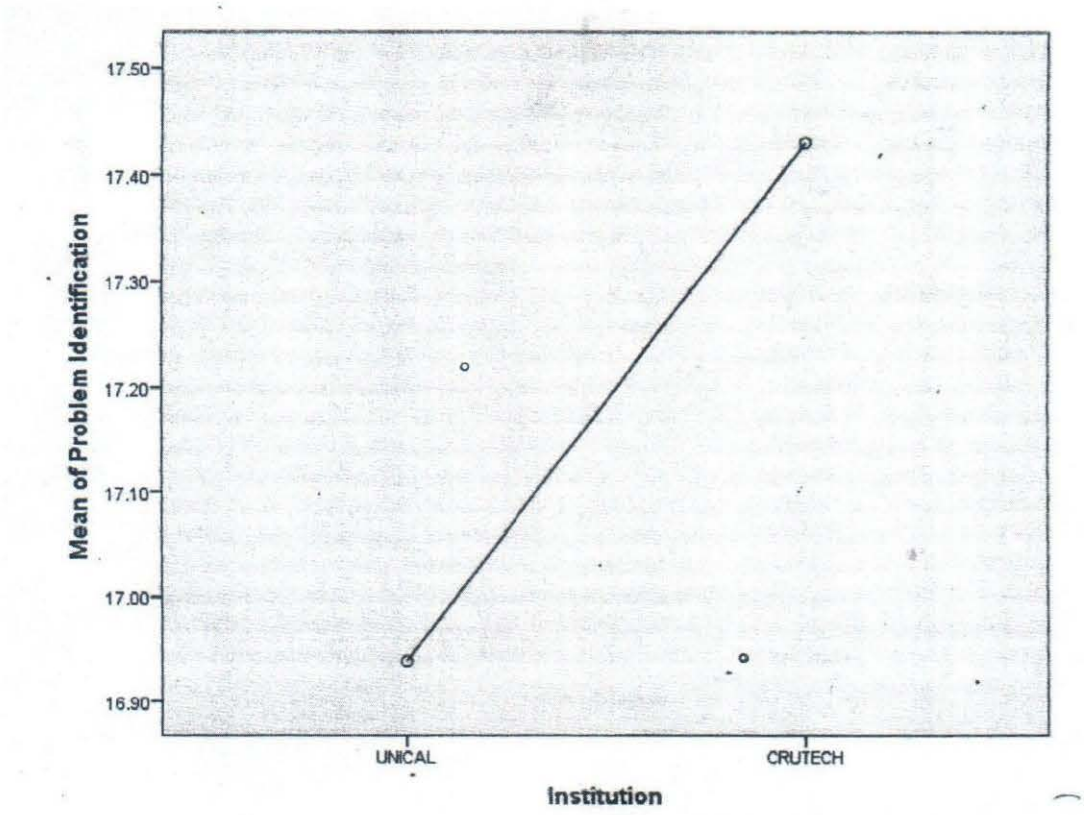


FIG. 45: Means Plot of Problem Identificationskills training needs byownership of Institution

The results in Table 21 and for problem identification, CRUTECH (state school) students need more training (x=17.429) than UNICAL (federal school) students (x=16.939). this same pattern was observed for instrument development (fig. 59), statistical skills (fig. 60), computer ≦application (fig. 61), referencing skills (fig. 62) and report writing (fig.63). for hypothesis formulation, UNICAL(federal school)students need more training (x=17.050) than CRUTECH(state school) students (x=16.828). this same pattern was observed for literature review skills (fig. 57) and sampling skills (fig.58). These differences were then tested for significance and the results are presented inTable21..

The results in Table 21 also show that all the p-values(.158≦p≦.883) associated with the computed t-values (.148≦t≦

1.412) were observed be greater than. 05. Thus then null hypothesi not rejected. This means that ownership of school attended does not significantly influence the research skills' training needs of graduate students.

## 4.3 Discussion of findings

The findings as presented here have provided valuable insight into some of research training needs variables. The discussion of these findings is presented in this section based on each of the seven hypotheses formulated for the study.

### 4.3.1 The level of research skills training needand the expected level

The finding of this research hypothesis showed that there is significant need for training on all the sub-variables of research skills.

The sub-variables of research skills by graduate students include;

i. Problem identification skills

ii. Research questions/hypothesis formulation skill

iii. Literature review skill

iv. Sampling technique skill

v. Instrumentation development skill

vi. Use of statistical tool skill

vii. Computer application in data analysis skill

viii. Referencing skill and

ix. Report writing skill

In relation to the need for training on all the sub-variables of skills, the finding is in line with Isangedighi (2004), who stated that the major skills and steps in conducting research are; identification of research problem, literature review, specifying the purpose of research, determine specific research questions, specification of conceptual framework – usually a set of hypotheses, choice of methodology (for collection), data collection, analysis and interpreting the data, reporting and evaluating research and communicating the research finding and possibly, recommendation. The author also state that research comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stuck of knowledge to devise new application in various research undertaking.

The implication of this finding is that the significant need for training on all the sub-variable of research skills among graduate students maybe because of the university authority and NUC emphasison improving research skill among graduate students. The organisation of research seminars, conference, ICT training within the period of this study might influence area of specific needs on graduate students' research skills.

This study also agrees with the study by Akpan (2001) who is of the opinion that the meaningfulness and reliability of self-correction in research is possible

through replication. No research could be replicated successfully if it is not valid. The measure of the extent to which any research work is considered valid is the extent to which the researcher follows the research process in arriving at its findings. It is a confidence-building measure that the findings are valid, reliable and could also be replicated. The research process could also be described as the due process of research work. According to him any educational research that does not follow this due process is questionable and sometimes is not acceptable for publication in academic journals.

4.3.2 Students gender and research skills training need

The finding revealed that there are gender-based differences in the research skill training need but these differences are not significant. This finding is in agreement with Sommer (2009) who in his study showed that males are better able to retain new quantitative information than females when tested for immediate recall. That is to say, male students may remember techniques and research skills techniques taught far better than what female students can, in the context of this study. This finding appeared directional in that with respect to sub-variables of research skills, females are more in need of training than males, Females $x = 17.439$ and males $x = 16.656$. With exception to sampling technique skills males need training ($x=16.231$) more than females ($x=15.831$). This finding may be shocking because math and difficult techniques is often considered to be a domain in which boys are higher achiever but these differences are not significant.

4.3.3 Students age and research skills training needs

The results show that the p-values (.000) associated with the computed r-values ($4.579 \leq f \leq 14.988$) are all less than .05. Hence the null hypothesis was entirely rejected. This means that students age has a significant influence on their research skills training need. A careful study of the finding in Table 8; show that significant

differences revolve around the ages 28-47 years and the lower age range 18-27 years. The finding ofthis study is in line with the study carried out by Zhang (2003) which indicated that second generation youths out-perform third generation counterparts. The study also showed that at each grade level, second generation youths had higher scores than third-generation youths. It then implies that the students 'age has a significant influence on their research skills training need. This finding help us to believed that significant difference revolved around individual ages, as age 28-47 years shows a higher mean different than ages 18-27 years. This finding lends credence to the study by Lasode and Awotetu (2013) who in their study indicated that there is significant relationship between age and research skills application of graduate students and NCE students. This finding is consistent with previous studies of Naderi, Abdullah & Kumar (2009) which revealed that there was significant relationship between age and students research skills training needs. This means age was a correlate of student's research skills training needs influencing the appropriateness with which the students apply research.

4.3.4 Students' marital status and their research skills training needs

The finding of the results in table 14 and 15 show that marital status has significant influence on student's research skills training needs, but these results suggest that those most in need of training on research skills were divorced and widowed. This finding disagreed with the study by Lasode and Awotetu (2013) who in their study indicated that married women/men combining work with family responsibilities and school obligations lead to stress among married couples especially the female married students. The present study may be may be more focus to those most in need of training on research skills not those who are stress in carrying out their family responsibilities than those (divorced and widowed) who are traumatic and

distressed due to separation or death of one couple in the family. The finding of this study may be amazing and shocking as most of the literature reviewed linchpins on the married and singles. This finding also leads credence to the null hypothesis formulation that said: marital status has no significant influence on students' research skills training need.

4.3.5 Students' academic discipline and their research skills training needs

The finding in table 16 show that students' academic discipline has significant influence on their research skills training needs. The finding specifically show that Arts students were most in need of training (x = 19.680), followed by management sciences students (x = 17.157) and the least were students of agricultural sciences (x = 14.561). The finding is in agreement with the study by Ali (2009) who is of the view that, in view of graduate student's area of discipline, staff seem to agree that subject specificity would be valuable for workshops such as identifying key research paper and writing the research paper, where it would be important to address different tools or styles depending on the discipline and that it could be difficult to teach on searching and selecting data bases if the staff were in several different disciplines. Also, study by Oluseijo (2013) agrees with the present finding that faculty of education equips its graduating students with research skills more than any other faculty. In other words, the finding seems to create a variation and ranking in terms of research skills training needs across the various disciplines.

4.3.6 Academic programme based difference in student research skills training need

The finding show that academic programme has significant influence on problem identification skills training need, but no significant influence on hypothesis formulation, literature review, sampling, instrument development, statistical tools, computer application, referencing and report writing skills training needs. In other

finding is in agreement with Andersen, (2019) who indicated that withstudents part-time status, there is more flexibility with your schedule. After all, it's a lot easier to pick two classes that don't overlap 'than to try and work in five. An open schedule that allows you to work more while moving through your college career. It is also most possible to pay off tuition costs as you go when you study part-time because you have the time to work. But for full-time students, they spent more time in class during a semester than a part-time student. This finding is also in line with the finding of Jim (2019), who in his study found out that being a part-time student might be a good option for those who have already begun pursuing a career and are on their way to becoming financially independent. You can also take care of any family responsibilities while simultaneously working towards a degree.

4.4.8. Ownership of institution and students' research skills' training needs.

The results showed that ownership of institution attended does not significantly influence the research skills' training needs of students, were not expected or anticipat ed. Federal institutions are believed to be better funded, staffed, and managed than st ate institutions. As such, it was expected that these differences, will be extended to the quality of their graduate students. This is not what the results showed.

Supprisingly, there were research skills for which federal university students need ed more training than those from state university research questions / hypothesis form ulation, literature review and sampling techniques. On the other hand, state university graduate students were more in need of training on problem identification, instrument development, statistical analysis, computer application, referencing and report writing research skills than graduate students of federal institutions. These non significant results do not agree with expectations based on the results of the study by Asimetat (2005) as well as the ranking of universities done by NUC and Webometrics (2019).

students are about the same. There should also be no discrimination when granting waivers to students from other institutions.

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

The chapter is presented under the following sub heading:

(i) Summary of the study

(ii) Conclusion

(iii) Recommendations

(iv) Suggestions for Further Research

## 5.1 Summary of the study

The purpose of this study was to determine there search skills training needs among graduate studentsin Universities in Cross River State, Nigeria. Research skills training need was worked at from perspective of problem identification skill, research question/ hypothesis formulation skills, literature review skill, sampling technique skill, use of statistical tool skill, computer application in data analysis skill, referencing skill and report writing skill.

To achieve the purpose, eight research questions were formulated to give focus to this study. These research question were subsequently converted into eight null hypotheses to give and properly direct the investigation. Literature review was carried accordingly as applied to variable of the study. The survey research design was adopted for the study. The population of the study consists of 1139 of graduatestudents of the two universities in cross river state. The stratified random sampling was adopted with gender, age, marital status, academic discipline, program of study, method of study and ownership of school attended as bases for stratification. The sample size was 683 post graduate students, proportionally draws from the two (UNICAL & CRUTECH). The sample fraction was 1.77, approximately 2.

The instrument use for data collection was a questionnaire titled training needs assessment survey questionnaire (TNASQ). Constructed by the by the researcher. The questionnaire was validated through the scrutiny of three experts in educational measurement and evaluation. A trial test was conducted to test the reliability coefficient estimate ranged from 0.70 to 0.85. With the help of two research assistants 683 copies of the questionnaire were distributed. It total of 683 copies appropriately completed and returned giving a return rate of 100%. Data collected were coded and analyzed using sample population t-test, independent sample t-test, one-way (ANOVA) and associated Fisher LSD multiple comparism where applicable. The result from the data analyzed revealed that:

(1) The level of research skills training need is significantly higher than the expected level of the sub-variables considered except computer application that is not significantly higher.

(2) Gender difference in research skills training need is significant for only problem identification skills training need. The differences in the remaining sub-variables is not significant.

(3) Age has significant influence on graduate student's research skills training need for all the sub-variables considered in this study.

(4) Marital status has significant influence on graduate students' research skills training needs for all the sub-variables considered in this study.

(5) Academic discipline has significant influence on graduate students' research skills training need for the nine sub-variables considered in this study.

(6) Academic programme has significant influence on problem identification skills training need, but the influences on the remaining eight sub-variables are not significant.

(7) Method of study (full time/part time) has significant influence on research skills training need for the nine sub-variables considered in this study.

(8) Problem identification, referencing and report writing skills are the skills that training need are highest.

(9) Problem identification skills training need is the only sub-variable of research skills influence by gender, age, marital status, academic discipline, academic programme and method of study.

## 5.2 Conclusion

On the basis of these findings, firstly, it was conducted that the level of research skills training need is significantly higher than the expected level for the sub-variables considered except computer application that is not significantly higher. This implies that if graduate students are frequently exposed to research seminars, research workshops and publications, their needs towards research skills will reduced thereby helping them to effectively and efficiently apply research skills.

Secondly, it was concluded that gender difference in research skills training need is significant for only problem identification skills training needs. The differences in the remaining sub-variables are not significant. This implies that whether a graduate student is a male or female, it does not significantly matter when it comes to their research skills training needs. Thirdly, it was concluded that method of study (full time/part time) has significant influence on research skills training for the nine sub-variables considered in this study. This implies that if parity of academic workload is giving to both full time and part time students, there will be improvement of research skills.

## 5.3 Recommendations

The following recommendations were made based on the findings of this study:

1. Training of research skills needs programme should be instituted by the university authorities where research skills needs of students are addressed thereby helping graduates students to achieve quality research.
2. Each academic discipline of universities should develop or get enrolled and involved students in research skills training programme which could become a pre-requisite for graduation.
3. Age of students should be carefully considered during admission into post graduate programme.
4. School counselors should be employ in every department to help especially the divorced and widowed who may be traumatic due to separation or lost of love ones.
5. Parity of credit hours should be given to both full-time and part-time post graduate students to ensure that equity prevailed in their academic programme.
6. Both male and female should be exposed to the same academic environment where their research skills needs are addressed.
7. Both masters and Ph.D students should be exposed to an academic environment where quality research is carryout for publications.

## 5.4 Suggestions for further research

The following areas for further research are suggested.

1. A study of this nature should be conducted in entire South-South, South-East and South-West Geo-Political Zone for effective generalization of results.
2. The replication of this study with either the same variables in other universities is suggested.
3. A related study should be carried out covering the university system, which produces the facilitators for research skills training needs.

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**QUESTIONNAIRE**
**RESEARCHSKILLS TRAINING NEEDS ASSESSMENT AMONG GRADUATE**
**STUDENTS IN UNIVERSITIES IN CROSS RIVER STATE, NIGERIA**

Dear Respondent,

The purpose of this questionnaire is to gather information on the research practices needs of the graduate students in the appropriate applications of research procedures; to investigate the contributions of attitudinal dimensions in educational research and statistics to research practices needs of graduate students in the appropriate applications of research procedures; and to determine the extent to which students characteristics in term of gender and discipline contribute to research practices needs of graduate students in appropriate applications of research procedure in the Universities of Cross River State. Kindly and freely express your opinion/level of agreement as desired by ticking (√) or filling the space provided. There are no right or wrong answers. All the information collected is for research purpose and will be treated with utmost confidentiality. God bless you for taking part in this study.

**Bitong, Anthony Aranrie**
*(Researcher)*

## TRAINING NEEDS' ASSESSMENT SURVEY QUESTIONNAIRE (TNASQ)

### PART A: PERSONAL DATA

Instruction: Tick (√) appropriate response only.

1. Age: 18 -22[ ], 23-27 [ ],28 -32[ ], 33-37[ ],38-42 [ ],43-47[ ] 48 & above
2. Institution: UNICAL [ ] CRUTECH [ ]
3. Faculty: Education [ ], Science [ ], Management Science [ ] Art [ ], Agricultural Science [ ]
4. Gender: Male [ ], Female [ ]
5. Degree in-view: Ph.D [ ], M.Sc/M.Ed [ . ]
6. Method of study: Full time [ ], Part time [ ]
7. Marital status: Married [ ], Single [ ]

### PART B

Instruction: Please indicate by ticking (√) on which of the following topics/skills you require training or help to appropriately function in carrying out quality research. The graduation is as follows:

**1 - Do not require training**

**2 - Require training**

**3 - Strongly require training**

**4 - Very strongly require training**

| S/N | Statement | Relevance | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| | **Research practices needs** | | | | |
| | **$N_1$**Problem identification skill | | | | |
| 1. | Distinguishing more clearly on researchable and non- researchable topics. | | | | |
| 2. | Generating research topics from the society problem. | | | | |
| 3. | Phrasing the research title appropriately | | | | |
| 4. | Setting problems specification | | | | |
| 5. | Phrasing a general problem to specific problem for research purpose | | | | |
| 6. | Generating sub-problems from major research problem | | | | |
| | **$N_2$**Research questions/ hypotheses formulation skill | | | | |
| 7. | Clearly formulating research questions that lead to the formulation of research hypotheses | | | | |
| 8. | Stating research questions that show the relation between dependent and independent variables | | | | |
| 9. | Clearly formulating research questions from the purpose of the | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 48 | Referencing articles from the internet | | | | |
| | **N9** Report writing skill | | | | |
| 49 | Writing background to the study | | | | |
| 50 | Writing methodology | | | | |
| 51 | Discussing the findings of the study | | | | |
| 52 | Drawing conclusion based on research findings | | | | |
| 53 | Making recommendations | | | | |
| 54 | Writing abstract | | | | |

Thank you for responding to this questionnaire.