TOPIC

ANALYSIS OF SENIOR SECONDARY SCHOOL TEACHERS ATTITUDE TO SCIENCE PRACTICALS.

BY

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THIS DISSERTATION IS SUBMITTED IN PARTIAL FULFILMENT FOR THE AWARD OF A POST GRADUATE DIPLOMA IN COMPUTER SCIENCE OF THE FEDERAL UNIVERSITY OF TECHNOLOGY MINNA NIGER STATE.

MARCH 1994.

ACKNOWLEDGEMENT

My profound gratitude goes to the Almighty God and to everyone who is directly and indirectly connected with the completion of this work, most especially the following:

My supervisor, Mr Adamu Abdullahi for his guidiance, patience and contributions towards my work, Mr Sadiq of the Department of Maths & Computer Sc. for his excellent supervision and guidiance throughout the project work, my former H.O.D. Mr T.Bamkefa and my present H.O.D. Dr.Adeboye.

My special thanks to my loving parents Mr & Mrs Falade, my sisters and brother in-law for their care in financing me and praying for my success.

Finally, I wish to express my appreciation to the following:

Mr Afolabi Osho, Miss Kehinde Shodipe, Miss Sussan Mbrey, Mr & Mrs J.T.Yisa, Madam Rebecca Yisa, Maj.J.D.Ushure, Lt.A.A.Adesope and Mr Adeyika Alofe.

May the Almighty God bless you all.

Falade A.O. (Miss)

DEDICATION

This project is dedicated to the memory of my Late Brother -ILESANMI FALADE.

CERTIFICATION

I certify that this work was carried out by FALADE ADENIKE OLUDUNNI of the Post Graduate School, Department of Mathematics & Computer Science, Federal University of Technology Minna, Niger State.

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ABSTRACT

The technology of computer is on the threshold of transforming our culture .Cheap and powerful processors will soon be as familiar to most of us as wordprocessors. This emerging transformation is the result, in large part, of the advances made in silicon-chip technology since the 1950s, which have reduced the costs of computer processing of information greatly. It is in the context of this that we found out that there is virtually any field or area of specialization that computer science is not applicable.

It is in this respect that this study was developed to extend computer use into research work in the area of science education.

The purpose of this study was to analyse and derive results from the investigations carried out on the attitude of science teachers towards science practicals in the Senior Secondary Schools using Computer Applications Program.

In doing this,some research questions are developed to which the study addressed itself.These are:-

1)what is the attitude of secondary school science teachers towards science practicals?

2)Are female secondary school teachers different from their male counterparts?

Collection of data for the work was by questionnaire administered to science teachers in some Senior Secondary Schools to gather their responses to the questions.

To generate answers to the questions, frequency counts, means, variance and t-test for independent variables were used. The results would reveal the type of attitude that science teachers has generally towards science practical work. It will also show if there are differences in the attitude of the male teachers and the female teachers.

Therefore, the use of a computer program over the manual statistical method to collate and analyse responses will serve the following purposes:

1. Provides a highly reliable result;
2. Gives room for a short period of time;
3. Serve any user that can operate on the computer in performing attitudinal test on the same subject.

CHAPTER I

INTRODUCTION

Background to the study:

The role of science in a jet-age such as ours is obvious. The level of development of a country is often determined by its scientific and technological development. Science is not only a body of knowledge but also a way of doing things. Scientific methods are widely acclaimed in all spheres of life and people are encouraged to develop the scientific attitude in all their life pursuits.

The history of science teaching in Nigerian schools show that it was with the foundation of the C.M.S. Grammar School Lagos in 1859 that the injection of rudiments of science into the school curriculum started in Nigeria(Fafunwa,1967). Science teaching in most Nigerian school then was far from being systematized until the beginning of 1930s when appriopriate uniform science curriculum was developed (Abdullahi,1982).

The place of science in the School curriculum:

The importance of science in development has been clearly stated by Fafunwa (1967) when he remarked "It is by introducing science as a compulsory subject at both elementary and secondary level as well as by conducting a mass science education campaign among adults that Africa will be able to move rapidly from the static role of an actor in the breath-taking scientific age".

Science education had been very unpopular before the incoming of the colonial masters into West Africa and particularly into Nigeria.Even after the incoming of the colonial masters, it remained unpopular because of lack of fund, lack of trained science teachers and lastly for the fact that the missionaries were not interested in functional science teaching.

During the colonial period, the syllabus,scheeme of work and methods of teachig used were programmed to meet the requirement and aspirations of the British rather than the Nigerian. Emphasis on science instruction during this period was on rote learning of the unrelated laws, definitions and concepts.

In 1957, science teachers all over Nigeria met to popularise science and this led to the inauguration of Science Teachers Association of Nigeria (STAN). The STAN is mainly concerned with the teaching of science through inquiry and discovery approach while students investigate and experiment on their own.

Science education objectives from the early 1960s according to Ogunniyi (1986) include :-

1. development of the spirit of inquiry ;
2 understanding or holding valid views of the nature of science i.e its tentative and revisionary character ;
3. teaching of problem-solving processes using scientific techniques, viz : observation, measurement, formulating

and testing of hypothesis, experimentation, drawing valid conclusions etc ;

4. imparting scientific literacy ;
5. development of manipulative skills and scientific attitudes;
6. understanding the interaction between science and the society ;
7. transformation of the environment ;
8. production of citizens who are better consumers of scientific production ;
9. production of individuals who are capable of participating in socially useful and productive activities; and
10. accelerating the development of potential scientific and technological manpower .

By the 1970s, science had become recognised not only as an academic discipline for scientists alone but also as an important tool of industry, medicine and domestic comfort.

Presently science education is fast becoming popular to the extent that it is surpassing the resources and facilities available for science teaching. One of the major objectives of he Federal Government in establishing Secondary education as stated in the National Policy was to equip students to live effectively in our modern age of science and technology. As a result, almost all the secondary schools in Nigeria gave science education priority over other subjects.

Importance of practical work in Science Education :-

Practical work is regarded as a very important aspect of science education. According to Ausubel 1963, practical work

gives the students appreciation of the spirit and method of science, it promotes problem solving analytic and generalization ability and it provides students with some understanding of the nature of science.

According to Ndu (1980), the objectives of practical work include :-

1. training the mind in understanding of the world around ;
2. acquisition of appropriate skills and abilities both mental and physical to make the learner an equipment of his society ;
3. equiping students to live effectively in our modern age science and technology to build up a self strong reliant nation ;
4. inculcation in the pupil the spirit of inquiry and scientific mode of thinking ;
5. exposure of the pupils to scientific experiences that could ultimately help them in developing scientific attitudes and skills ;
6. to help develop manipulative skills in the laboratory and develop proficiency in making reports of observations and conclusions ; and
7. to promote long term memory in students .

One important factor in a science practical class is the teacher. As a result of individual differences in personality and behaviour, teachers display varying attitudes towards science practical work. A teacher´s attitude in turn affect his/her commitment and dedication to this practical aspect of

science. This will in turn have an effect on the students he/she is teaching which can either be negative or positive. Therefore this has a part to play in the future of the student's life. Thus the teacher's attitude towards practical work will be the point of focus in this research work.

Significance of the study :

This study was considered necessary because practical work is important in science education. In realizing the objectives of practicals in science education, the teacher's attitude towards practical is very important. This determines to an extent his/her behaviour in practical classes and the effectiveness of his/her lesson.

The results of this study is therefore expected to help in improving the status of science practicals and prove the science teacher on her job.

Research questions :

(a) What is the attitude of Senior Secondary School science teachers toward science practicals ?

(b) Are the female secondary school teachers different from their male counterparts in their attitude towards science practicals ?

CHAPTER II

LITERATURE REVIEW

II.1 The rudiment of science:

The rudiment of science was Nature Study that involved the teacher and his pupils "learning about the environment in a form of outdoor observation of plants, animals and non-living objects" (Bajah 1982).

Later, Nature-study was "no longer consistent with the psychology, philosophy and methodology of time" for the social and economic realities of the period, thus a change was imminent (Bajah 1982). The change was felt in Nigeria with the introduction of General science in the secondary school. Later the branches of science- Biology, Chemistry and Physics were introduced for the last three years of secondary school in the 1950s.

II.2 Importance of science practical experiences.

Science being an inquiry subject makes the use of laboratory important in the teaching of science subjects .

Pella (1969) defines laboratory as a place, a room or building which contains materials or apparatus in which scientists can perform an experiment. He then related laboratory with exercise and thus defined laboratory exercise as an instructional procedure in which cause and effect, nature of property of any object or phenomenon is determined by individual experience generally under conditions.

In teaching science in Nigeria secondary schools and colleges, Asenuga (1983) noted that if any science subject should be taught well, it should be taught practically.

Whereas most activities are concieved in order to provide practice in designing operation and interpreting experiments, (experiments are operations or procedure for the purpose of testing a supposition, confirming what is already known , and discovering something unknown). Nonetheless ,Collete (1973) observed that "most of the experiment done by students are part of their laboratory work, and most of their laboratory work involve experimentation.

The values of the laboratory experience may depend upon the position assumed by the teacher for according to Pella (1969) ,the teacher may assume either two opposed positions between the two extremes. At one extreme, the teacher assumed a position of the dispenser of knowledge with the laboratory serving the function of drill or verification . At the other extreme, the teacher assummed the position of a guide to learning and laboratory as a place where knowledge is discovered.

Woodburn and Obourn (1965) identified four criteria by which the value of laboratory can be determined .

(a) The manner of which students encounter laboratory work.

(b) Whether the laboratory excercise is really needed to accomplish what it purports to teach .

(c) Whether the laboratory excercise is adequately or inadequately reported .

(d) How closely the laboratory exercise is meshed with the textbooks and other learning activities .

Rogers (1953) noted that "the emphasis needs to be on doing simple things and trying to extract results honestly, not following the cookery book instruction with servile care or verifying what the book says".

Ajayi (1963) in his contribution to this made it known that as early as 1859, Nigeria claimed the availability of some mechanical instruments to illustriate the science.

Anderson (1975) in his write up summarises the goodness of practical work as :

(a) to help the students grow both in appreciation of the orderliness of scientific knowledge and also in understanding the tentative nature of scientific theories and models.

(b) to help students appreciate, and in fact emulate the role of scientists.

(c) to foaster science enquiry skills that can be transferd to the other spheres of problem solving .

II.3 Attitude of teachers.

Stressing the importance of teachers, Finocchario (1971) asserts that the teacher is the most important in the teaching process . Teachers come into contact with and help to educate more children than any other group of people . Such an influence as theirs on future generations must not be

overlooked or underestimated . On the same view , Bradshow (1970), mentioned four attitudes of an effective teacher namely:

(a) the knowledge of the subject mater;

(b) provision of well planned and organised lessons;

(c) interest in teaching; and

(d) the willingness to help students.

"Yet one of the commonest errors observed in secondary schools is teachers omission of some practicals and their (activites and practice of skills) in their teaching"(Ango and Sila 1986).

Lagoke and Jegede (1986) on attitude of secondary school biology teachers in Kaduna State to ecological fieldwork discovered that teachers has a negative attitude towards the use of field in the teaching of ecology and the qualifications and number of years of teaching experience did not prove influential on the attitude of the teachers.

Still on laboratory, Alli(1983) researched into the effect of laboratory classes on motivation and level of achievement in Physics in Nigerian Secondary Schools. The subjects of his study were 720 randomly sampled fourth year students in twelve states. His findings showed that students in group one taught by both lecture and laboratory classes attained a better post test mean score of 81.80 while those students in group two taught by lecture alone had a lower achievement and the post test mean score of 60.90 . He also found out that group one students made more gains in section

II of the post test than group two students . The test of significance between these two post test mean scores showed that the difference in performance on the post test between the groups was significant at the 0.05 level of confidence . He thus concluded that the differences in performance shown by the two groups of students of his study was not due to chance , but it was an outcome of the teaching-learning experiences they were exposed to.

Nneji (1988) carried out a study on the influence of instructional styles on the pupils attitude and achievement in integrated science using the Science Teaching Observational Schedule (STOS) and the administration of cognitive and attitude tests on a sample of six integrated science teachers and their 220 form two students. He discovered that, students that were exposed to pupil centered instructional styles were significantly superior to those students that were exposed to teacher centered instructional styles in their attitude ,but not significantly so in their cognitive achievement at 0.05 level. He then argued that, "though the cognitive achievement of the students is not significantly better in pupil-centered classes than the teacher -centered instructional classes, the pupil centered instructional styles should still be used predominantly,in order to attain the objectives of integrated science education".

Hence it is believed that favourable attitude of science teacher may influence to a considerable extent the acquisition of knowledge in science .

II.4 The place of Computers in Technology.

According to Edward (1979), "The computer is an achievement of high technology . It is one of the possible wayward devices of which we speak . In just three decades, it has moved from a mysterious electronic marvel, hidden here and there in mathematical laboratories, to a workday machine which simly cannot be avoided by anyone having even the most casual contact with the major institutions of our society".

Computers have come to be the standard tools of the exact sciences -physics, chemistry and to some extent biology. Ever since Charles Babbage conceived of the idea of an automatic computer, controlled by a sequence of instructions, the extent to which inteligence is imparted to a computer by its human designers and programmers has been a vexed question. Some scientists spent much of the latter parts of their career grappling with the problem of machine inteligence and a small and sometimes groups has kept the flame burning up to the present (Peter 1986).

The central questions which have been attacked are :

(a) How intelligent is a computer ? and

(b) To what practical uses can the intelligence of a computer be ?

It was to this end that Edward (1979) defined a computer as an electronic device capable of following an intelectual map (program) by which it can perform arithmetic and logic operations.

II.5 Benefits and Purpose of Computer Applications Programs in Information and Data Processing.

Data processing is the procedure of transforming data into desired output while Information processing , a special case of data processing ,is the procedure of transforming data into informations which can be used to make better decisions (Ralph M.Star,Jr.1986).

Data is the raw material or input to any data processing system , while information is the output that can be used by people in decision making .

Data processing can be divided into input, processing and output. Processing can be further developed into classifying, sorting, summarizing, reproducing, calculating, storing and controlling.

The use of computer application programs in data processing are:-

1.Speed.

The most obvious benefit using a computer is speed. The computer can perform calculations and data processing more quickly than alternative methods (manual) can. The work that might have taken the human months, or even years to complete manually may be accomplished in hours or at most days by computer. For example ,some computers can do hundreds or thousands or even millions of arithmetic operations per sec.

2.Accuracy.

If the computer is properly programmed and provided with accurate data , it will do the intended job with a very high degree of accuracy. The computer does exactly what the

program tells it to do. In addition the computer program does not get bored or fatigued ,thus avoiding the errors human might well make under the same circumstances.

3.Reliability.

The computer can work almost twenty-four hours a day(with a little time out for equipment check-out and maintenance), everyday of the year, and still operate reliably. Modern electronic computers perform at high levels of reliability and equipment failures are very few.

4.Retention.

The computer can store and search massive files of data and programs. The content of the file does not fade or get lost, and it can be used many times.

5.Economy.

The advantage of speed and accuracy can often be translated into dollar savings realized. Usually the unit cost of processing data or doing computation by computers is considerably lower than by alternative means (i.e. manual or mechanical methods). There are also other advantages - for instance, more prompt billing can result in improved cash collections. Accurate records can reduce the frequency of bad decisions that were because of unreliable or unavailable information.

6.Wide Applicability.

A computer can be used to solve a wide variety of problems that arise in science and business. The boundary of what the computer can accomplish are limited only by the ability and inauguration of its users. (Edward Tomski 1979).

CHAPTER III

RESEARCH PROCEDURE AND METHODOLOGY

This chapter describes the subjects sampled, research instrument, sampling procedure, scoring techniques and method of data analysis of the research work.

3.1Subjects:

Sixty class teachers were randomly selected from three local government areas in Ogun State with twenty teachers from each local government area.Twenty -two (22) subjects were female science teachers while thirty-eight (38) were male science teachers.

3.2Research Instrument:

The data for this project were collected by the use of a questionnaire named 'Teachers questionnaire'.

A questionnaire is an instrument used to collect information in written form about various aspects of an investigation from a large number of persons during fact finding. It includes statements in question form requiring responses from subjects.

The questionnaire was designed to solicit responses from the teachers of the selected secondary schools on their attitudes towards science practicals.

The questionnaire comprises of two sections. Section A deals with some information about the teacher in term of sex and highest academic qualification , and name of school. Section B comprises of some statements on attitude of teaches towards science practicals.

Drafts of the questionnaire were presented to two secondary school teachers for modifications and criticisms. Some modifications were made based on the criticisms. The final draft of the questionnaire is attached as Appendix I.

3.3Sampling procedure:

The questionnaire were administered by personal contact with the teachers through the assistance of the heads of schools (Principal/V.principal) involved in this project. There was an excellent return by the teachers, for all the questionnaires given to them were collected back.

3.4Scoring techniques:

Scoring of results was based on the following ratings; strongly agree (5 points), agree(4 points), undecided(3 points), disagree (2 points) and strongly disagree(1 point) for all positive statements and the reverse for the negative statements which were seven(7) in the questionnaire. Sex was rated "1" if male, and "2" if female.

3.5Method of data analysis:

The analysis of data involve the use of a standard computer applications software package that is designed to give statistical analysis of data sets. The package is by name SPSS/PC+.

3.5.1 Computer applications software packages.

These are generally programs written with a view to solving some problems. They may appear in standard packages i.e programs written before hand usually by experts with some

form of flexibility built in. They may also be written by a user or a programmer for a specific application of local use.

3.5.2 SPSS/PC+ - A statistical package.

Statistical packages are designed to give statistical analysis of data sets .Though some functions for statistical analysis may be available in integrated packages such as a spreadsheet package (an integrated package is one that has other additional facilities or functions with its major specific function) but the facilities of a purpose built statistical package are likely to be more wide-ranged.The data has first to be presented to the package either by creating it directly for the statistical package achieved in the manner of creating of file in a file management package or spreadsheet or it may be transfered from another system to the statistical package for statistical analysis which is capable of understanding files presented to it in standard ASCII Codes.

Basic statistic functions present in some general purpose packages inalude calculating the :

(a) average ;

(b) sum ;

(c) total number of occurences; and

(d) standard deviation of a set of numbers.

Some statistical packages have more advanced features , an example of such is the SPSS/PC+ where various tests on comparisons of dependent and independent variables can be achieved .This includes

(a) percentiles ;

(b) simple and multiple regression ;

(c) analysis of variance between expected and observed ;

(d) a plot with logarithmic scaling (to give a different view of the data);and

(f) various tests of the data against various standards such as ;

1. Student ´s T, 2.Chi-squared distributions,

3. Variance tests, etc.

CHAPTER IV

ANALYSIS OF DATA

In order to provide answers to the research questions addressed by this study, a text editor wordprocessor (wordstar) was used to create a data file for the responses as shown in Table I.

TABLE I

Subject	Scores
1	5 4 4 3 3 5 2 1 5 4 5 1 5 4 5 2 4 2 5 4 1
2	5 5 5 4 2 5 5 5 3 4 5 5 5 4 5 3 4 4 5 4 1
3	4 5 5 1 2 4 5 5 5 4 5 5 5 4 4 1 4 4 5 5 1
4	4 5 5 5 1 4 4 5 5 5 4 4 5 4 5 4 5 4 5 5 1
5	4 5 2 5 5 4 4 4 4 5 5 4 4 5 3 5 4 4 4 5 1
6	4 4 5 5 3 4 5 5 4 5 5 4 4 5 4 5 4 1 5 5 1
7	5 5 5 5 4 4 2 3 4 5 4 4 4 4 4 5 5 1 5 4 1
8	5 5 3 4 4 5 2 2 5 5 4 5 4 5 4 4 5 4 4 5 1
9	2 5 5 4 4 5 5 1 5 5 5 5 4 5 4 4 5 2 4 3 1
10	4 5 5 4 2 4 3 5 5 3 4 5 1 4 5 4 4 4 4 2 1
11	4 4 5 5 2 2 4 4 5 5 4 4 4 3 4 5 4 4 4 5 1
12	4 5 5 1 2 4 4 4 4 4 4 5 4 4 5 5 4 4 4 5 1
13	5 5 1 2 1 1 4 5 4 4 4 4 4 5 5 5 1 4 4 2 1
14	5 4 5 3 1 1 4 4 4 4 5 4 4 5 5 4 4 5 4 2 1
15	5 5 5 4 2 3 4 4 5 5 3 4 4 5 5 5 4 5 4 4 1
16	5 5 5 4 2 5 5 4 4 4 4 4 4 5 5 2 5 4 5 4 1
17	5 4 5 4 2 2 5 4 4 4 5 3 4 5 4 3 3 4 5 4 1
18	5 4 5 5 2 2 3 5 5 4 5 4 4 4 5 5 4 4 1 4 1
19	5 4 5 5 2 5 3 5 4 4 5 4 5 4 5 5 5 4 4 5 1
20	5 5 4 4 1 2 2 4 5 4 5 4 5 4 5 4 4 4 4 5 1
21	4 5 5 4 2 2 4 5 5 4 4 4 5 5 5 4 4 4 4 5 1
22	5 5 4 5 2 5 4 3 5 4 4 4 5 5 4 4 5 2 4 3 1
23	4 5 4 5 4 4 5 2 5 5 4 5 5 4 4 4 5 2 5 4 1
24	5 5 5 5 2 4 5 1 5 5 5 4 5 5 4 4 3 4 2 2 1
25	5 5 2 5 2 4 5 3 4 5 5 4 4 5 5 5 5 5 5 2 1
26	5 5 5 4 2 3 5 3 5 4 3 4 4 5 4 2 5 5 4 4 1
27	4 5 4 5 4 4 5 5 4 5 4 5 4 5 4 2 4 2 4 4 1
28	5 5 4 2 4 4 5 4 4 5 5 3 4 4 4 4 4 4 4 5 1
29	5 5 4 3 2 4 4 5 4 5 5 4 4 5 5 5 4 4 4 5 1
30	5 5 5 4 2 4 4 5 5 5 5 4 5 5 5 5 4 4 4 5 1
31	5 5 4 2 5 4 4 4 5 4 5 4 4 5 5 4 4 4 4 4 1
32	5 5 3 4 5 4 4 3 3 4 4 4 5 5 5 4 4 4 4 2 1
33	5 4 5 4 4 4 4 5 5 4 5 4 4 3 5 5 4 5 5 5 1
34	5 5 5 5 4 5 4 5 4 4 5 4 5 5 4 4 5 5 4 4 1
35	5 5 4 4 4 5 4 4 4 5 4 3 4 5 4 5 4 5 4 4 1
36	5 5 4 2 2 2 4 4 5 4 5 4 4 5 5 4 4 4 5 4 1
37	5 5 4 5 4 5 4 3 5 4 4 5 4 5 5 4 4 4 5 5 1
38	5 5 1 3 2 4 5 2 5 4 5 4 4 5 4 5 4 5 4 1 1

Table 1 (Cont.)

Statement	scores
39	4 5 5 5 5 2 4 3 5 5 4 5 4 2 4 4 5 5 5 4 2
40	5 5 5 5 3 1 4 4 4 5 5 2 3 4 5 4 5 2 3 4 2
41	5 5 4 4 1 4 5 4 5 4 5 4 4 4 5 4 5 2 5 2 2
42	5 4 4 2 1 4 4 2 5 5 5 4 4 4 5 4 4 4 4 5 2
43	5 5 5 5 4 4 5 4 4 4 5 5 4 5 4 2 5 5 5 5 2
44	4 5 5 3 4 2 2 4 4 4 5 5 5 5 4 4 4 4 4 4 2
45	4 5 4 5 4 4 3 4 4 4 4 4 5 5 4 4 2 4 4 4 2
46	5 5 5 5 5 5 4 4 5 5 4 3 5 5 1 4 4 5 2 4 2
47	5 5 5 5 3 4 4 4 4 5 5 5 4 5 5 5 5 5 4 4 2
48	5 5 5 5 2 4 4 4 3 5 4 5 4 5 4 5 4 5 5 3 2
49	5 4 5 4 3 5 3 4 4 5 5 5 4 5 4 2 5 4 5 2 2
50	5 5 5 2 3 2 2 4 5 5 4 4 4 4 5 4 4 3 5 5 2
51	5 5 4 5 1 3 5 4 5 5 5 5 5 4 5 4 4 4 4 5 2
52	5 5 5 5 4 2 4 4 3 5 5 5 4 4 5 4 4 2 4 5 2
53	5 5 5 4 4 4 4 2 4 5 4 3 4 5 5 4 5 5 5 4 2
54	5 5 5 5 3 2 4 4 4 1 5 5 4 3 4 4 5 4 4 4 2
55	5 5 4 5 2 4 4 4 4 5 5 4 5 5 5 4 4 5 5 4 2
56	4 5 5 5 2 4 4 3 5 5 4 5 5 1 5 4 5 5 5 5 2
57	5 5 5 5 4 4 4 4 4 4 4 5 4 5 4 5 5 4 3 5 2
58	5 5 2 5 2 5 4 4 4 5 5 4 5 4 3 5 5 4 4 4 2
59	5 4 4 5 2 2 4 4 5 5 4 5 5 4 5 3 5 4 5 4 2
60	5 4 5 5 2 2 3 3 5 5 5 4 5 2 4 2 5 4 5 5 2.

Using the SPSS/PC+ commands, an output program was written to define the variables and specify the procedure to be used in the analysis as shown in table II.

Table II

```
set listing = 'Ques.out'.
data list file = 'Ques.dat' /inte 1 lear 3 scie 5 wast 7 requ 9 peri 11
                  scar 13 cont 15 stud 17 make 19
                  deve 21 skil 23 thin 25 befo 27
                  hand 29 acti 31 enco 33 tgui 35
                  alwa 37 lect 39 sex 41 .
variable labels /inte 'Science practical  an integral part.'
                 lear 'important part of students learning.'
                 scie 'included in all science exams.'
                 wast 'pract. wastes time.'
                 requ 'requires too much effort.'
                 peri 'up to 2hrs  pract. periods a week.'
                 scar 'reduction due to scarcity of materials.'
                 cont 'reduction due to wide course content.'
                 stud 'motivates students to learn science subjects.'
                 make 'makes science learning interesting.'
                 deve 'help develop scientific thinking.'
                 skil 'help develop problem solving skills.'
```

Table II (Cont.)

```
thin 'students must be made to think.'
befo 'Teachers should teach the students before pract.'
hand 'students should have the knowledge of handling.'
acti 'Teachers must be active participants.'
enco 'Teachers to encourage and help students.'
tgui 'guide on observation and inferences are not essentia
alwa 'not important for teachers to supervise the students
lect 'Lecture and demonstration for practicals.'
sex  'sex'.
DESCRIPTIVES /VARIABLES all.
T-TEST /GROUPS sex(1,2) /VARIABLES all.
MEANS /VARIABLES all BY sex.
```

RESULTS:

To answer question one of the research questions, the "means" of the descriptive variables was found as shown in table III.

Mean Total = 83.28

Average Mean Total = 4.164

The average mean total shows the attitudinal responses of science teachers as "4" which represents a positive attitude towards science practicals.

To answer question two of the research questions , "T-Tests for groups was used to analyse the responses of the female and male teachers and their individual means were calculated and summed up as shown in tables IV and V.

From the tables ,there was no significant difference in the attitude of the female and male teachers.

Table III

DESCRIPTIVES /VARIABLES all.

Number of Valid Observations (Listwise) = 60

Variable	Mean	Std Dev	Minimum	Maximum	N
INTE	4.72	.56	2	5	60
LEAR	4.80	.40	4	5	60
SCIE	4.37	1.01	1	5	60
WAST	4.12	1.14	1	5	60
REQU	2.78	1.21	1	5	60
PERI	3.58	1.20	1	5	60
SCAR	3.97	.88	2	5	60
CONT	3.77	1.06	1	5	60
STUD	4.43	.62	3	5	60
MAKE	4.47	.70	1	5	60
DEVE	4.53	.57	3	5	60
SKIL	4.18	.79	1	5	60
THIN	4.30	.67	1	5	60
BEFO	4.40	.87	1	5	60
HAND	4.45	.72	1	5	60
ACTI	3.98	1.00	1	5	60
ENCO	4.28	.76	1	5	60
TGUI	3.88	1.06	1	5	60
ALWA	4.25	.82	1	5	60
LECT	4.02	1.07	1	5	60
SEX	1.37	.49	1	2	60

TABLE IV

MEANS /VARIABLES all BY sex.

SUMMARY

Statement	Variable	Value	Label	Mean	Std Dev	Cases
1	SEX	1		4.6579	.6271	38
	SEX	2		4.8182	.3948	22
2	SEX	1		4.7895	.4132	38
	SEX	2		4.8182	.3948	22
3	SEX	1		4.2368	1.1255	38
	SEX	2		4.5909	.7341	22
4	SEX	1		3.8947	1.1807	38
	SEX	2		4.5000	.9636	22
5	SEX	1		2.7105	1.2060	38
	SEX	2		2.9091	1.2309	22
6	SEX	1		3.7368	1.1783	38
	SEX	2		3.3182	1.2105	22
7	SEX	1		4.0526	.9285	38
	SEX	2		3.8182	.7950	22
8	SEX	1		3.8158	1.2489	38
	SEX	2		3.6818	.6463	22
9	SEX	1		4.5000	.6040	38
	SEX	2		4.3182	.6463	22
10	SEX	1		4.3947	.5472	38
	SEX	2		4.5909	.9081	22
11	SEX	1		4.5000	.6040	38
	SEX	2		4.5909	.5032	22
12	SEX	1		4.0789	.7491	38
	SEX	2		4.3636	.8477	22
13	SEX	1		4.2632	.7235	38
	SEX	2		4.3636	.5811	22
14	SEX	1		4.5789	.5987	38
	SEX	2		4.0909	1.1509	22
15	SEX	1		4.5263	.5569	38
	SEX	2		4.3182	.9455	22

Table IV (cont.)

16	SEX	1	4.0526	1.0641	38
	SEX	2	3.8636	.8888	22
17	SEX	1	4.1579	.7543	38
	SEX	2	4.5000	.7400	22
18	SEX	1	3.7895	1.0944	38
	SEX	2	4.0455	.9989	22
19	SEX	1	4.2105	.8107	38
	SEX	2	4.3182	.8387	22
20	SEX	1	3.9474	1.1613	38
	SEX	2	4.1364	.8888	22

Total Cases = 60

TABLE V

T-TEST /GROUPS sex(1,2) /VARIABLES all.

GROUP	NUMBER	MEAN	STANDARD DEVIATION	DEGREE OF FREEDOM	T-VALUE	SIGNIFICA LEVEL
1. MALE	38	4.1447	0.8548	58	0.16	0.05
2. FEMALE	22	4.4198	0.8190	"		"

CHAPTER V

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Discussion of results:

The findings in this study have shown that the science teachers highly tend towards being positive in their attitude towards practicals as shown in table III. The mean of the total average rating of their responses was 4.164(i.e Agree). Out of all the positive statements in the questionnaire, less than fifty responses was in agrement to statement 6 with an average mean of 3.58 while of the seven negative attitudinal statements, less than 40 responses was in disagreement to statement 5 with an average mean of 2.78.

About 80% of the subjects strongly agreed that practical work is an integral part of science and an important part of students learning in all science subjects.

The subjects also supported the fact that practical work makes science learning interesting, develops scientific thinking and problem solving skills and motivates students to learn science subjects. Majority of the subjects agreed that there should be up to two hours of practical periods in a week to cover the required amount of practical work because they knew that practical work require some time for good results to be achieved though many subjects agreed to the notion that science practical wastes time and require too much effort. But some disagreed with the statement arguing that the curriculum for the senior secondary school classes

is too wide to allow for as much as two hours of practicals in a week, though it is of high level of importance .

No teacher agreed that lecture and demonstration can make up for practicals. On supervision, guidiance on observation and giving of inferences, the teachers generally claimed that they are essential in practical classes.

Table IV & V revealed that the attitude of male teachers is not significantly different from that of the female teachers.This may be as aresult of both teaching groups having recieved similar training as science teachers.

Conclusion.

The principal goal of this thesis is to show the effectiveness of a computer software in carrying out analysis of data notwithstanding the volume of the data to be analysed. The questionnaire used was based on what the general attitude should be from science teachers, thus, this can be used to perform attitude tests on science teachers from one location to the other. It is very important to note that the statistical package (SPSS/PC+) used is not the only suitable package for this type of analysis, but it is found most appropriate at this particular time.

Subsequently, other packages are being developed that can fit more into this kind of position but the most important thing is to get the appropriate result at the minimum available time and speed.

Recommendations:

Based on the findings in this study, the following recommendations are made:

The government is implored to give enough grant to schools in equiping laboratories with practical equipments, chemicals and reagents and restore science allowances to teachers. This might help to sustain the teacher's positive attitude to work and even improve it.

Mass production of scientific or technological toys, do-it-yourself science kits, equipment spare parts and simple teaching equipments in the technical colleges, colleges of technology and schools of engineering can also support the provision of materials for practical work. It will also improve the quality of science teaching in schools.

Organising science teachers workshop will help the teachers to buttress themselves up on the new developments taking place in the science industry.

APPENDIX

TEACHER´S QUESTIONNAIRE

The purpose of this questionnaire is to find out the attitudes of teachers towards sciene practicals.Every given information will be treated confidentially.

SECTION A

1. Name of school: _____

2. Teacher´s sex: _____

3. Highest academic qualification:_____

_____

SECTION B

You are provided with the underlisted statements wiht five options .

SA = Strongly Agree

A = Agree

U = Undecided

D = Disagree

SD = Strongly Disagree

Please tick (/)the appropriate column.

	SA	A	U	D	SD
1. Science practical is an integral part of science education.					
2. Practical work is an important part of student learning in sciences.					
3. Practical work should be include in all science examinations.					

	SA	A	U	D	SD
4. Science practical wastes time.					
5. Scince practical requires too much effort.					
6. There should be up to two hours practical periods in a week.					
7. There should be reduction in practical work due to scarcity of materials.					
8. There should be reduction in practical work due to the wideness of the course content.					
9. Practical work motivates students to learn science subjects.					
10. Practical work makes science learning interesting .					
11. Practical work helps to develop scientific thinking.					
12. Practical work helps to develop problem solving skills.					
13. Students must be made to think when coducting experiments.					
14. Teachers should have taught the students a particular topic attempting the practical work.					
15. Teachers should make sure the students have the knowledge of handling and use of apparatus during practical work.					

	SA	A	U	D	SD
16. Teachers must be active participants during the practical class.					
17. Teachers should encourage and help students during practical work.					
18. Teacher's guiodiance on observation and giving of inferences are not essential in a practlcal class.					
19. It is not necessarily important for teachers to always supervise the students work during practicals.					
20. Lecture and demonstration can make up for practicals.					

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