APPRAISAL OF MAINTENANCE CULTURE OF BUILDING STRUCTURE IN IBRAHIM BADAMASI BABANGIDA SPECIALIST HOSPITAL, MINNA

BY

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CERTIFICATION

I Suleiman Ibrahim, Matriculation Number: 2007/1/27298BT an undergraduate student of Industrial and Technology Education Department wishes to certify that the work embodied in this research project is original and has not been submitted in any part or full for any other Diploma or Degree programmes of this or any other University.

…….. **…….**

Name **Sign-Date**

APPROVAL PAGE

This research project has been read and approved as meeting the requirements for the award of B.Tech in Industrial and Technology Education with option in Building Technology Education. School of Science and Science Education, Federal University of Technology Minna

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Supervisor	**Signature & Date**
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External Examiner	**Signature & Date**

DEDICATION

This project work is dedicated to Almighty Allah beside whom there is non but Him. My beloved Father late Suleiman Muhammad and my lovely mother Hajiya Zainab Suleiman lastly to my caring wife Amina Ibrahim Abdullahi

ACKNOWLEDGMENT

I wish to express my great gratitude to the Almighty God (Subhanahu wata'ala) for keeping me alive, and the opportunity He gave me throughout my course of study successfully.

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TABLE OF CONTENTS

CHAPTER III

METHODOLOGY

CHAPTER IV

PRESENTATION OF ANALYSIS OF DATA

CHAPTER V

SUMMARY, CONCLUTION AND RECOMMENDATIONS

LIST OF TABLES

Abstract

This study was carried out to appraise the maintenance culture of building structure in Ibrahim Badamasi Babangida specialist hospital. Specifically, this study determined:- adequacy of the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital, the quality of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital and the problems hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital. Three research questions were answered and two null hypotheses were formulated and tested at 0.05 level of significant to guide the study. Some related literatures were reviewed, among which are: The concept of maintenance, type of maintenance, techniques of succeeding total quality management in building structure, strategies for standardizing appropriate maintenance culture in building for maximum performance. The descriptive survey approach was used and the target population for this study was made up of Management staff and technicians within the hospital. Thirty-six (36) item-questionnaires were used as instruments for data collection which were analyzed according to research questions. The data collected from the respondents was analyzed using mean, standard deviation and T- test statistics. The findings among others include: every year there is budget for maintenance, delay of salary and incentive, Technical staff co-operate in carrying out their duties and responsibility, improper inventory record keeping for equipment and tools. It was recommended that the government should endeavor to release fund as at when due to the hospital management board in order to facilitate the repair of the fault which are reported; there should be constant maintenance of equipment there should be available of spare part in the workshop to keep maintenance work effective and improve performance of the facility at maximum; planned preventive maintenance should be ensure functionally, and should, be fully implemented instead of corrective maintenance which lead to high cost.

CHAPTER 1

INTRODUCTION

Background of the study

By the nature of creation there is virtually nothing man-made that is indestructible, but the usefulness of many such items can be extended by carrying out repair at regular intervals through an activity known as maintenance. White (1979) defined maintenance as the "work undertaken to restore every facility to an acceptable standard at an acceptable cost". The use and exposure to environmental conditions subjects machines, buildings and other service facilities to deterioration. The process of deterioration if unchecked, culminate in rendering these facilities unserviceable and brings them to a standstill. Firms and organization, therefore has no choice but to attend to them from time to time, to repair and recondition them so as to prolong their usefulness to the extent, they are economically and physically possible to do so.

Maintenance is also defined in British Standard (B.S) 3811 1984 as the combination of all technical and associated administrative action intended to retain an item in or restore it to a state in which it can perform its required function. To retain, implies that defect are allowed to occur before they are corrected (Bamisile, 2004) the objective of all the type of maintenance is to keep system going at an acceptable level. In order to keep a building in an acceptable condition, failures must be precluded, this implies that exhibit symptoms of failure have to be identified and renewed before failure occurs. This process is referred to as preventive maintenance. It depend primarily on the ability to predict the life span of all the building component, on the other hand, where failure occurs, then any work done to the building to restore it, to the initial state or an acceptable condition constitute corrective maintenance.

Maintenance is made responsible, for provision of a condition, of machines, buildings, and services that will permit uninterrupted implementation of plans requiring their use. Theoretically, maintenance should aim at keeping the machines and other facilities in a condition that allows them to be used without any interruption and at their maximum profit making capacity. (Adegoke, 2003).However, as adequate care is being taken to ensure the reconditioning of the machine and building facilities back to their original state, a level at which it will be able to perform the intended use, however cognizance should be taken of the fact that, if it has to be done; it should be at minimum cost, with improved output, emphasis placed on employee involvement and empowerment, continuous improvement, cutting across the entire organization, and with every responsibility for quality of work output. (Wahab, 1987 and Iyagba, 2005).

Quality, as a measure of excellence is subjective, that is, it depends on the perspective at which individual views it. It could be explained as the totality of features and characteristics of a product or service that bears on its stated ability or implied needs and to be generally acceptable. (Lam 2000). The acceptability of a product or a service will depend on its ability to function satisfactorily over a period of time, and it is this aspect of performance which is given the name reliability or quality assurance. Quality assurance has the aim of getting things right first time, and to provide platform upon which consistent improvement could be based. It is broadly termed as the prevention of problems undermining quality through planned and systematic activities. These include the establishment of a good quality management system and the assessment of its adequacy, the auditing of the operation of the system, and the review of the system itself. Therefore, from the standpoint of quality assurance, every step taken in the reconditioning of a system back to its best state is important, ensuring that the right thing is being done promptly and at a reasonable cost, without unnecessary waste of effort and resources.

According to Olawunmi (1992), the consequence of neglecting the aspect of management of quality in the maintenance of facilities, machines, and buildings, has resulted in the increase in maintenance cost and low building performance, wasted energy and effort, inadequate client's management of maintenance example Lack of communication regarding maintenance issue, Inadequate resources allowed for adequate maintenance, capital cost overriding life-cycle-cost, very complex service system with low reliability and lack of sufficient instrumentation for easy monitoring.

The totality of features and characteristics of a product or building service that bears on its ability to meet a stated or implied need. It recognizes that customers' needs can be defined in terms of safety, usability, availability, compatibility with other products, reliability, and maintainability: overall cost (including purchase price, maintenance cost and product life), total quality management in building construction can be seen as a change in management style that aims to continuously increase value to customers by designing and continuously improving organizational processes and system. Improved building policies and programmes are a major component of achieving the goal of adequate shelter for all. It is clear that the total supply of building is in elastic in the long run and the only way to sustain the hospital building at a particular period is through repair and maintenance. It is also important to ensure efficient and equitable system for management and maintenance of the existing housing hospital. This project, therefore, focus attention on strategies for appraising the maintenance culture of building structure in Ibrahim Badamasi Babangida Hospital.

Statement of the problem

The necessity for maintenance in any type of building structure has generally been over looked by all management concerned and as a result, there has been an increase in number of retrogression and drawback all over the building structure. This increment made capital allocation for work inadequate for maintenance purpose while involvement keep in increasingly day in day out. Therefore, we have to repair, replace, check and watch to keep the investment at high value as practicable as year back (Stafford, 2003). There is a lot of determination in regard to the above statement, the researcher intend to appraise the maintenance culture of building structure in Ibrahim Badamasi Specialist Hospital Minna.

Therefore, the dilapidation and collapse of building structures in Nigeria has remained unsolved. Hence, becomes a disturbing issue in the development of the nation's economy.

Purpose of the study

The main purpose of the study was to appraise the maintenance culture of building structure in Ibrahim Badamasi Babangida Specialist Hospital Minna, specifically the study sought to determine the: -

1. Adequacy of the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital
2. The general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital
3. Problem hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital

Significance of the study

The findings of this research will be of immense benefit to the students, building contractors, engineers and technicians in the construction industries.

The student will benefit from the facilities provided by maintenance culture in Ibrahim Badamasi Babangida Specialist Hospital Minna for manpower development. The building contractors will also benefit from the research work by meeting up with the building regulations so as to give the building structure in Ibrahim Badamasi Babangida Specialist Hospital a long life-span.

The building engineers and technicians will also benefit from the research work in the construction industries as it provide techniques of enhancing the strategies of maintenance culture in building construction through the management and control human and material resources that are available in Ibrahim Badamasi Babangida specialist hospital for effective maintenance.

Scope of the study

The scope of this study is delimited to the adequacy of the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital, the general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital and the problems hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital

Research question

The study provided to answer the following research question: -

1. How adequate is the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital?
2. What are the general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital?
3. What are the problems hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital?

Assumption of the study

It is assumed that the management staff and technicians of Ibrahim Badamasi Babangida Specialist hospital will be sufficient to obtain relevant data necessary for answering the research questions, and that the respondents are considered proper to provide valid information that given an authentic data for this research work.

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance.

HO_1 There is no significant difference between the mean responses of the management staff and technicians on the adequacy of fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital

HO_2 There is no significant difference between the mean responses of the management staff and technicians on the quality of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The study was reviewed under the following sub headings;

1. The concept of maintenance
2. Type of maintenance
3. Condition survey of physical facilities and equipment
4. Techniques of succeeding total quality management in building structure.
5. Strategies for standardizing appropriate maintenance culture in building for maximum performance.
6. Summary of related literature.

The Concept of Maintenance

The word maintenance entails more than what a layman view could focus. There are many professional views about the phenomenon, which have been trying to bring the adequate meaning and significant of maintenance into limelight. In the light of the above attempt shall now be made to analyze the various views expressed by the notable scholars as regard to maintenance. Maintenance could be defined as the work undertaken to restore facility to an acceptable standard and at a minimum cost and also getting personnel involve in the process and as well ensure their empowerment for quality work output. (Iyagba, 2005 and Wahab, 1987).

The British committee on maintenance of building (1972) recommended the following definition as work undertaken in order to keep, restore, or improve every facility; i.e every part of the building, its service and surrounding to a currently accepted standard and to sustain the utility advantage of the facility.

Maintenance is the action associated with equipment repair after it broken. Maintenance should be action taken to prevent a device or component from failing or repair normal equipment

degradation experienced with the operation of the device to keep it in proper working order. Rex (2004), defines maintenance as synonymous with controlling the condition so that its pattern lies within a specified region. However the main purpose of maintenance is meant to retain or preserve the value of investment and present a good appearance.

Types of Maintenance

Wahab (1987) identified some types of construction maintenance, they are as follows: -

i. Normalized maintenance
ii. Desirable improved standard
iii. Poor workmanship

Normalized Maintenance: - This refers to the maintenance work that have to be carried out as a result of mistake in design. Mistake n design may take either of the following technical errors as a result of inappropriate technical construction details or materials.

(a) Error of layout in relation to size, arrangement and just a position of working spaces.

Desirable Improved Standard: - This refers to maintenance work that have to be carried out as a result of the pattern of use which could not have been foreseen at the time of initial design.

Poor Workmanship: - This refers to maintenance that has to be carried out as a result of poor workmanship by the contractors as:

a. Incompetence
b. Lack of supervision

Regional Lee (1981) in his book entitled building maintenance and management noted that building standard 3811 (1984) identified different types of property maintenance as follow: -

1. Planned maintenance
2. Preventive maintenance
3. Corrective or breakdown maintenance

4. Unplanned maintenance

Planned Maintenance

This is the maintenance work that is already predetermined. Maintenance repair must usually fall within the established budget; maintenance plan is usually drown up for the up keep of the property. Maintenance plan decides finally the work to be carried out and the cost f such work.

Preventive Maintenance

This type of maintenance work is usually carried out at a predetermined interval with the intention of reducing the possibility of any item not meeting the acceptable standard. It is necessary to visit the property regularly so as to be able to note any defect in the past like: foundation, walls, floors, doors, external works, windows, plumbing, drainage, electrical services, roofs and others.

Preventive maintenance aims at keeping every part of the building in effective running order and to detect possible fault from the building before it become a serious problem.

Corrective or Breakdown Maintenance

This type of maintenance work usually as a result of malfunction or total breakdown is noted and reported for repair work. This type of maintenance occurs when there is total failure of the property.

Unplanned Maintenance

Unplanned maintenance is work carried out as a result of sudden breakdown of item or component of the facility.

Condition Survey of Physical Facilities and Equipment's

Before any meaningful and effective maintenance can be carried out, there will be need to carry out the conditioned survey of physical facilities and equipment. The information needed is to have the physical specification of the facilities or equipment and their current condition, and what would be needed to rehabilitate them if they can be resuscitated and put back into use.

The Scope of Work of the Condition Survey

The scope of work covers the condition survey of both physical facilities and equipment in the organization. A detailed report is needed on the condition of the facilities and equipment e.g if they are working, absolute but repairable, incomplete or abandoned, or not working and should be scrapped. A detailed report of the cost repair or rehabilitation of the facilities, equipment and systems that will bring them up to the standard required for providing good quality education. The scope of the survey covers the following. Roof, external walls and doors, offices, laboratories among others.

Techniques of Succeeding Total Quality Management In Building Structures

Bowker (2001), states that quality control and safety during structure quality control and safety represent increasingly important concern for project manager.

The most important decisions regarding the quality of a competed facilities are made during the design and planning stages rather than during structure. It is during these preliminary stages that component configuration, material specification and functional performance are decided. Quality control during construction consist largely of insuring conformance to this original design and planning decisions.

Wyder (2005) describe function and techniques useful in the process of project management. This part present techniques and requirement during project planning, including risk assessment, cost estimation, forecasting and economic evaluation. It is during this planning and design phase in which major cost servings may be obtained during the eventual structure and

operation phases. It also addresses programming and financing issues, such as contracting and bidding for services, financing, organizing communication and insuring effective use of information. Numerous software programs could be used for the purpose of spread sheet use of equitation solving programs, Gupta (2001).

While conformance to existing design decisions the primary focus of quality control there are exceptions to this rule. First unforeseen circumstances, incorrect design decisions or changes desired by an owner in the facility function may require re-evaluation of design decision during the course structures. While these changes may be motivated by the concern for quality, they represent occasions for re-design with all the attendant objective and constraints with the attention to conformance as the measure of quality during the structure process, the specification of quality requirement should be clear and verifiable, so that all parties in the project can understand the requirements for conformance.

Safety during the structure project is also influenced in large part by decisions made during the planning and design process. Some designs or structures plans are inherently difficult and dangerous to implement where as other, comparable plans may considerably reduce the possibility of accident. For example, clear separation to traffic from structures zones during road way rehabilitation can greatly reduce the possibility of accidental collisions. Beyond these design decision, safety largely depends upon education, vigilance and co-operation during the structure process.

Safe and quality structure is a concern of the project manager in overall change of the project in addition to the concerns of personal, cost, time and management issues. Inspectors and quality assurance personal will be involved in a project to represent variety of different organization. Each of the parties directly concerned with the project may have their own quality and safety inspectors. Including the owner, the engineer/architect, and the various contractor

firms, these inspectors may be contractors from specialized quality assurance organizations. In addition to on site inspector samples of materials will commonly be tested by specialized laboratories to insure compliance inspectors with regulatory equipment will also be involved common examples are inspectors for the local governments building department for environmental agencies, and for occupational health and safety agencies Schwartz (2004).

Craftsmen are assessed by the quality of their performance: clean tools produce a clean job as maxim goes. The block layer should exercise great care of his tool. Since he often works in the open and is subject to weather conditions such as frequent rain tools made of metal can easily spoil through rusting. Taking good care of tools prolongs their life span and makes work easier and more efficient.

Strategies for Standardizing Appropriate Maintenance In Building For Maximum Performance

The clear establishment of the scope of work should immediately indicate the nature of the contract that is, whether it is a contract for the provision of goods and their installation, or an engineering contract (possibly geared toward service), and the specific (e.g priced contract with activity schedule, priced contract with bill of quantities, cost reimbursable contract e.t.c). it may be true that simpler maintenance tasks (such as tree pruning or servitude clearance) can easily be catered for in a standard form combat with a bill of quantities, but this is certainly not the case with complex equipment (i.e transformer maintenance).

The contract should consent on the following: -

1. Safety device should not be removed with permit
2. Constant maintenance of transformer and other equipment
3. Maintenance and operators personnel should be motivated.
4. Adequate information and communication technology

5. Allocation of financial risk, as the situation demands

6. Clearly indicate work procedures.

***Access*:** One of the most challenging issues is the ability of service provider in providing planned and timeout access adequate duration to the site of work. Inadequate and uncoordinated access render all attempt at effective project management practically impossible, negatively affect morale, introduces errors in scope interpretation, affects quality of workmanship and raises cost for all parties concerned that is service-provider, contractor and the constant.

Responsible person: It is beneficial to instruct the contractor to obtain responsible person status for several of its employees, by having the appropriate person's complete modules of the occupational health and safety act high voltage regulates. This permits an authorized person from the service-provider to handover equipment for safe maintenance to the contractor, there by partially alleviating the problem of provision of access to the work site. Another advantage is that this process forces rigid adherence to a permit-based regarding access to work that is solid and legal record-keeping.

Work procedures: There is often temptation to instruct a contractor to follow the entrenched work procedures of the service-provider. This should be avoided where it is clear that the contractor is clearly competent and experienced, with a good track record (it is suggested that this should always be the case, yet consultants and service-providers must be aware that the skills shortage is not limited to the service provider).

Clerk of works: The use of a clerk of works, independent and impartial, affiliated to the consultant through a contract of independent contractor is invaluable in controlling scheduling, auditing of required work, the quality of the works and the evaluation and certificate of payment claim from the contractor.

Short term contract: Maintenance contracts of less than two years in duration are feasible time to set up the work and obtain all relevant approvals and access to site can be of the order of six to nine month.

The discussion on risks and realities emphasizes the immediate need for maintenance, the lack of in house personnel with relevant skill and experience to perform it, and several other risks associated with such maintenance. A clear need for appropriate assistance from contractor and consult and can be readily be deduced. The challenge in appointing contractors and consultant to assist service-providers with proactive maintenance (and to a lesser extent, reactive and emergency maintenance) is significant. It is recommended that the appointment of contractors and consultant should be carefully considered, in order to achieve that.

i. Adequate training and re-training for the maintenance and operators personnel.
ii. Report any defective tools, equipment and machines to supervisor.
iii. Proper procurement processes are followed throughout all contracts administered and executed, at all times.
iv. Consultants do not, in essence become employees of the service-provider-but remain as agent and relatively unfettered in the exercise of their right and duties.
v. The service-provider allocate appropriate internal resources to assist the consultant in project management
vi. The service-provider allocates appropriate to permit the contractor to exercise its brief effectively and economically.

Summary of Related Literature

The literature review revealed that the maintenance culture has played a very significant role in the socio-economic and technological development of every nation and has become an important entity to the existence of man in building construction; the reviewed literature revealed the concept of maintenance more than what a layman could focus, the types of maintenance and the condition survey of physical facilities and equipment.

The literature review further revealed the techniques of succeeding total quality management in building structure that seeks to realign the mission, culture and working practices of an organization by means of pursuing continued quality improvement and the strategies for standardizing appropriate maintenance culture in building for maximum performance.

CHAPTER III

METHODOLOGY

This chapter described the procedure used in the course of the study. Thus, the research design, area of the study, population of the study, the sampling size and technique, instrument for data collection, validation of instrument, administration of instrument, method of data analysis as well as the decision rules would be covered.

Research Design

In carrying out this study, the descriptive survey approach was used, where questionnaires are used to determine the opinion of the respondents on the issue under investigation. Yalams and Ndomi (1999) define survey research as the gathering of information about a large number of people or objects by studying a representative sample of the entire group through the use of questionnaires. In support of this, Nworgu, (1991) stated that research design is a plan or blue print which specifies how data relating to a given problem should be collected and analyze. Therefore, the survey research was considered suitable since the study will seek information from a sample that was drawn from a population using a questionnaire.

Area of the Study

The study was conducted in Ibrahim Badamasi Specialist Hospital, Minna, Niger State.

Population of the study

The target population for this study was made up of 37 technicians and 6 management staff giving the total of fourty three (43) personnel which will give them equal chance of being

selected into the sample. Since, the population is small, no sampling was used. Hence the whole population was used.

Instrument for Data Collection

The instrument used for data collection was a structured questionnaire developed by the researcher for this study. It consisted of two (2) parts in which the first indicate the introductory part of the respondents and the second part is divided into three sections A, B and C. All items are to be responded to by indicating the appropriate respondent's best perception using four point rating scales which include strongly agreed (4 point), agreed (3 point), strongly disagreed (2 point) and disagreed (1 point). Section A contains (20) items which deals with the current states of appraisal of maintenance culture in building structures in Ibrahim Badamasi Babangida Specialist Hospital. Section B also contains (15) items which deals with the problems hindering appraisal of maintenance culture in building structures in Ibrahim Badamasi Babangida Specialist Hospital. Section C contains (16) items which deals with the techniques of enhancing appraisal of maintenance culture of building structures in Ibrahim Badamasi Babangida Specialist Hospital.

Validation of Instrument

The instrument for the data collection was designed by the researcher and were validated by (3) Lecturers, two (2) from Industrial and Technology Education Department in Building Technology option and the other from the department of Building Technology all of Federal University of Technology, Minna, to ascertain the appropriateness of questionnaire items before administering it to respondents.

Administration of the Instrument

The instrument for the study was administered to the respondents by the researcher through the help of one research assistant from the hospital which was later collected through the research assistant by the researcher after appropriately completed by the respondents.

Method of Data Analysis

The analysis of data for the research questions and hypothesis were analysed using the mean and t-test. The mean was used to determine the degree of acceptance or rejection in research questions, while t- test was used to test the hypotheses of two groups of respondents.

Decision Rule

The mean of 2.50 was used as decision point for every questionnaire item. Consequently, any item with mean responses of 2.50 and above was considered to be agreed and any item with a mean response of 2.49 and below was equally considered not agreed in Section A, B, and C respectively. Also the t- test was used to test the hypothesis at 0.05 level of significant to compare the mean response of the groups. A critical value of ±1.96 was selected based on the 29 degree of freedom at 0.05 level of significant. Therefore, any item with t- calculated value less than the t- critical was regarded as not significant. While any item with t-calculated value equal or greater than the critical was regarded as significant.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter deals with the presentation and analysis of data with respect to the research questions and hypothesis formulated for the study.

Research Question I

How adequate is the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital?

Table 4.1: Mean responses of the respondents on the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital

$N_1 = 6$, $N_2 = 26$

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_t$	REMARK
1.	Every year there is budget for maintenance.	2.88	3.17	3.03	Agreed
2.	Fund budgeted for maintenance is adequate.	1.81	2.17	1.99	Disagreed
3.	Workers are well motivated.	1.73	2.33	2.03	Disagreed
4.	There is proper security of facilities in the maintenance department.	3.35	3.67	3.51	Agreed
5.	Lack of government interest in the area of building maintenance in the hospital.	2.88	3.40	3.14	Agreed
6.	There is fund for continuous educational program on the maintenance of building structure by the technicians.	2.08	1.60	1.84	Disagreed
7.	No long-term arrangements are made for the supply of essential part for replacement.	2.50	3.00	2.75	Agreed
8.	Delay of salary and incentive.	2.19	3.20	2.70	Agreed
9.	There is adequate management of financial resources.	2.73	2.17	2.45	Disagreed
10.	There is proper audit of fund in the maintenance department.	3.08	3.20	3.14	Agreed
11	The workshop is free from any negative conflict.	2.69	3.00	2.85	Agreed

Key: N_1= Management staff, N_2= Technicians, $\bar{X}_1$= Mean of response of Management staff, ,$\bar{X}_2$ = Mean of response of Technicians, $\bar{X}_t$ = Average mean responses of the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital.

The data presented on table 4.1 revealed that the mean values of item 1,4,5,7,8,10 and 11 are above the cut-off point. Therefore, all the respondents agreed that the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital is inadequate. Therefore, item 2,3,6,and 9 disagreed.

Research Question II

How is the quality of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital?

Table 4.2: Mean responses of the respondents on the quality of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital

N_1 = 6, N_2 = 26

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_t$	Remark
1.	Experience technical staffs are employed in maintenance department.	3.00	3.83	3.42	Agreed
2.	Most of the maintenance staffs are degree holder.	2.15	2.50	2.33	Disagreed
3.	Most of the maintenance staffs are HND holder.	2.54	3.17	2.86	Agreed
4.	Technical staff co-operate in carrying out their duties and responsibility.	3.12	4.00	3.56	Agreed
5.	Inadequate tools for technical staff to carry out their duties.	2.81	2.67	2.74	Agreed
6.	There is adequate practical working being under taken by the technician.	2.58	3.83	3.21	Agreed
7.	Lack of adequate planning carry out by the technical staff in the maintenance department.	2.27	1.67	1.97	Disagreed
8.	Poor relationship between the management staff and technical staff.	2.15	2.83	2.49	Disagreed
9.	Improper inventor for equipment and tools.	2.27	2.67	2.47	Disagreed
10.	Inadequate number of qualified technicians to carry out maintenance work.	2.35	1.20	1.78	Disagreed
11.	There are quality staffs.	2.38	3.25	2.85	Agreed
12.	Ineffective maintenance strategies by the technical staff	2.81	1.83	2.32	Disagreed

Key: N_1= Management staff, N_2= Technicians, $\bar{X}_1$= Mean of response of Management staff, ,$\bar{X}_2$ = Mean of response of Technicians, $\bar{X}_t$ = Average mean responses of the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital.

The data presented on table 4.2 revealed that the mean values of item 1,3,4,5,6 and 11 are above the cut-off point. Therefore, all the respondents agreed that the general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital are inferiority. Therefore, item 2,5,8,9,10 and 12 disagreed.

Research Question III

What problem is hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital?

Table 4.3: Mean responses of the respondents on the problems hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital

N_1 = 6, N_2 = 26

S/N	ITEMS	$\bar{X}_1$	$\bar{X}_2$	$\bar{X}_t$	Remark
1	Inadequate supply of standard building materials.	3.38	3.00	3.19	Agreed
2	Inadequate facilities machines and tools for effective building maintenance in the hospital.	3.00	3.33	3.17	Agreed
3	Inadequate number of qualified technicians to carry out maintenance work.	2.32	2.17	2.26	Disagreed
4	Poor relationship between management staff and technical staff.	2.73	1.83	2.28	Disagreed
5	Delay of salary and incentive.	2.31	2.50	2.41	Disagreed
6	Inadequate information and communication between management staff and technical staff in the hospital.	3.00	4.20	3.60	Agreed
7	Working environment not conductive for effective work.	2.35	1.50	1.93	Disagreed
8.	Poor administration from the maintenance manager.	2.62	2.83	2.73	Agreed
9.	Improper inventory record keeping for equipment and tools.	2.54	2.33	2.44	Disagreed
10.	Inadequate training and re-training of workers.	3.54	3.50	3.52	Agreed
11.	Ineffective maintenance strategies.	2.85	2.40	2.63	Agreed
12.	Poor planning due to lack of vision for work.	2.27	2.67	2.47	Disagreed

13.	Inability to forecast and see beyond.	2.77	2.17	2.47	Disagreed

Key: $N_{1=}$ Management staff, N_2= Technicians, $\bar{X}_1$= Mean of response of Management staff, ,$\bar{X}_2$ = Mean of response of Technicians, $\bar{X}_t$ = Average mean responses of the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital.

The data presented on table 4.3 revealed that the mean values of item 1,2,6,8,10 and 11 are above the cut-off point. Therefore, all the respondents agreed that the problem is hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital. Therefore, item 3,4,5,7 and 9 disagreed.

Hypothesis I

There is no significant difference between the mean responses of the management staff and technicians on the adequate fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital

Table 4.4: t – test statistical analysis of the management staff and technicians on the adequacy fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital.

N_1 = 6, N_2 = 26

S/N	ITEMS	SD_1	SD_2	t- cal	REMARK
1.	Every year there is budget for maintenance.	0.93	0.10	-1.32	NS
2.	Fund budgeted for maintenance is adequate.	0.68	0.67	-0.88	NS
3.	Workers are well motivated.	0.88	0.75	-1.25	NS
4.	There is proper security of facilities in the maintenance department.	0.47	0.73	-0.65	NS
5.	Lack of government interest in the area of building maintenance in the hospital.	1.01	0.80	-1.00	NS
6.	There is fund for continuous educational program on the maintenance of building structure by the	0.67	0.80	2.22	S

	technicians.				
7.	No long-term arrangements are made for the supply of essential part for replacement.	1.10	1.10	-0.76	NS
8.	Delay of salary and incentive.	0.96	0.40	-2.89	S
10.	There is proper audit of fund in the maintenance department.	0.96	0.75	-0.24	NS
11	The workshop is free from any negative conflict.	0.82	0.71	-0.69	NS

Key: N_1 =Number of Technicians, N_2 = Number of Management staff, SD_1 = Standard Deviation mean of response of Management staff, SD_2 = Standard Deviation mean of response of Technicians, S = significant, NS = Not significant

Table 4.4: revealed that the t –test accept the null hypothesis only at items 1, 2, 3, 4, 5, 7, 9, 10 and 11 respectively at 0.05 level of significance. Meaning that there is no statistical significance differences between the mean responses of the management staff and technicians on the adequate fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital.

Hypothesis II

There is no significant difference between the mean responses of the management staff and technicians on the general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital

Table 4.5: T – test statistical analysis of the management staff and technicians on the general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital

N_1 = 6, N_2 = 26

S/N	ITEMS	SD_1	SD_2	t- calc	Remark

1.	Experience technical staffs are employed in maintenance department.	0.73	0.37	-2.86	S
2.	Most of the maintenance staffs are degree holder.	1.06	0.76	-0.63	NS
3.	Most of the maintenance staffs are HND holder.	0.97	0.37	-1.44	NS
4.	Technical staff co-operate in carrying out their duties and responsibility.	0.75	0.00	-5.87	S
5.	Inadequate tools for technical staff to carry out their duties.	1.14	0.47	0.47	NS
6.	There is adequate practical working being under taken by the technician.	0.84	0.37	-3.91	S
7.	Lack of adequate planning carry out by the technical staff in the maintenance department.	0.76	0.94	1.11	NS
8.	Poor relationship between the management staff and technical staff.	1.10	0.90	-1.21	NS
9.	Improper inventor for equipment and tools.	1.07	0.94	-0.63	NS
10.	Inadequate number of qualified technicians to carry out maintenance work.	1.17	0.40	2.95	S
11.	There are quality staffs.	1.00	1.30	-1.19	NS
12.	Ineffective maintenance strategies by the technical staff.	1.07	0.90	1.69	NS

Key: N_1 =Number of Technicians, N_2 = Number of Management staff, SD_1 = Standard Deviation mean of response of Management staff, SD_2 = Standard Deviation mean of response of Technicians, S = significant, NS = Not significant

Table 4.5: revealed that the t –test accept the null hypothesis only at items 2, 3, 5, 7, 8, 9, 11 and 12 respectively at 0.05 level of significance. Meaning that there is no statistical significance differences between the mean responses of the management staff and technicians on the quality of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital.

Findings

The following are the findings of the study, based on the data collected and analyzed; they are highlighted based on the research questions posed on the study by the hypothesis.

Findings related to the adequacy of fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital

1. Every year there is budget for maintenance.
2. Fund budgeted for maintenance is adequate.
3. Delay of salary and incentive.
4. There is fund for continuous educational program on the maintenance of building structure by the technicians.

Findings related to the general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital

Technical staff co-operate in carrying out their duties and responsibility.

1. Experience technical staffs are employed in maintenance department.
2. Inadequate number of qualified technicians to carry out maintenance work.
3. Lack of adequate planning carry out by the technical staff in the maintenance department.
4. Inadequate tools for technical staff to carry out their duties.

Discussion of Findings

The discussion of findings based on the research questions posed for the study by the hypothesis.

The findings of the study indicated that, every year there is budget for maintenance In contemporary times, there has been a growing interest in the funding of the hospital in Niger State. One of the reasons advanced for this development is the considerable growth in the volume of building structures activities and the huge financial expenditure which have become unbearable by the government. This is because building is today one of the largest industries and the chief employer of highly skilled workforce. In sequel, Nwikina (2000) asserted that building

education is a vital social activity that is capital intensive. To actualize the short and long term plans of action on education, money provides the necessary ingredients for its implementation. Maduewesi (2005) corroborated Nwikina's (2000) when he opined that money provides the essential power with which education acquires its human and physical inputs.

The findings of the study indicated that the fund budgeted for maintenance and continuous educational program on the maintenance of building structure by the technicians is inadequate because the study had as well revealed that NGOs financial contributions enhanced effective implementation of building structures. As disclosed by Nwagwu (2002) that "the era of over dependence on government for the funding of education in Nigeria is becoming over." In a free enterprise economy, he opined that institutions must find alternative means of generating revenue to supplement government budgeting. Thus: building Education is an expensive social service and requires adequate financial provision from all tiers of government for a successful implementation of the building educational programme. In this connection, Government welcomes and encourages the participation of local communities, individuals and other organizations (NPE, 2004). Technicians should be sent for in-service training to enable them acquire more skills and competence in their job performances. The state ministry of education should intensify more efforts in the effective supervision, monitoring and evaluation of the building structures in the state. It also went further that the welfare of workers should be a priority.

The findings of the study indicated that the ability of the technical staff to co-operate in carrying out their duties and responsibility and adapt in the working environment is a essential in occupations especially in the building industry as it involves many employees. Clarke (1997), clarified that employers need flexible workers who are able to face any challenges in workplace besides able to motivate themselves to get through those challenges. Verhaar and Smulders

(1999) mentioned that working with various races, cultures and languages is challenging as employees must be willing to cooperate. The ability to give constructive feedback to others involves explaining the concept, risks and benefit to non- building technicians as well as the ability to clearly explain a project scope, plan and expected cost and revenue as essential in any business (King Fisher, 2004). The application of technology to perform tasks among employees who serve in the production field is very significant as contemporary building industries used varied technologies to simplify operations. Bunn and Stewart (1998) stated that technocrats agreed with the fact that the possession of technological skills are crucial to employability considerations in modern industries. They also revealed that 91% of respondents, in their research work, mentioned that basic technological skills could assist in vocational practices. Similarly, De Leon and Borchers (1998) noted that 80% of employers mentioned that the application of technologies to carry out duties is highly required. In addition, according to Yahya Buntat (2004), the application of technologies, tools and systems in work is considered important and required by the industry.

The findings of the study indicated that the information and communication between management staff and technical staff in the hospital Information and communication technology is of vital importance in public domains where information in the form of teaching is conveyed. The essence is for ease in understanding and participation. Informational skills aid interpretation, communication, organization and maintenance of information. Ability to organize and maintain information was widely used in management. According to Zolingen (2000), skillful employees believed that the key to success at work place is the ability to protect information. It could, therefore, be stated that the work place requires a set of social skills that include information preservation. It also went further that inventory record keeping for equipment and tools' Keeping

track of what is happening on the building industry requires some records. Good management requires having a good useful set of records. Good records do not ensure the building industry will be successful; however, success is unlikely without them. Inventory and records are like the report cards students receive at school. With a report card, managers can tell how well they are managing their operation compared to other producers in their ‘class’. They can also see the strengths and weaknesses in their operation.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary of the Study

Building maintenance is the combination of all technical and associated administrative action intended to retain a structure in order to keep the building in an acceptable condition. The appraisal of maintenance culture of building structure in Ibrahim Badmasi Babangida Specialist Hospital Minna is also important to ensure efficient and equitable system for management and maintenance strategies of the existing housing hospital.

The purpose of the study therefore emphasis the find budgeted for maintenance culture in building structure, the quality of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital and the problems hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital.

The study is aimed at finding the solution(s) to the shortcomings of the current building maintenance culture and focused on the strategies for improving maintenance culture of building structure of Ibrahim Badamasi Babangida Hospital, with a view to access an appropriate recommendation for their sustainability.

Survey approach was used to develop the study. The questionnaire developed for this research was validated by three lecturers, two lecturers from the department of Industrial and Technology Education of Federal University of Technology, Minna and one from the department

of Building Technology of the Niger State College of Education Minna. The validated items used for the study are 36 items. The validated instrument was a structured questionnaire prepared for 6 Technicians, 32 Management staff respectively. The instrument was analyzed using frequency count, mean, and t- test statistics. The research question were formulated and answered and the following findings based on the research questions posed on the study by the hypothesis; every year there is budget for maintenance, delay of salary and incentive, Technical staff co-operate in carrying out their duties and responsibility, improper inventory record keeping for equipment and tools.

Implication of the Study

The implication of the study regarding; the fund budgeted for maintenance culture in building structure, the quality of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital and the problems hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital should be taught right from school.

The implication of the finding indicated the problems hindering appraisal of maintenance structure in Ibrahim Badamasi Babangida Specialist Hospital Minna are improper investor for equipment's and tools, inabilities to forecast and see beyond, inadequate training and re-training of worker and ineffective maintenance strategies. Maintenance operation includes all effects to keep facilities and equipment in an acceptable operation condition. Effective maintenance helps ensure the smooth running of a system by influencing percentage of time that its equipment and facilities can operate. It does also affect the operation of their equipment and facilities, which directly affects the quality of the systems outputs. For building structure and engineering infrastructures to be kept running properly and in good condition, quality maintenance work

must be ensure. Also the finding identifies poor training and re-training of maintenance staff, the right technical staff with the necessary tools must be used for the appropriate jobs.

The philosophy to adopt is to repair when its fails, Pair (2002). The building maintenance technology deals with study of the occurrence of the building defects such as deterioration of building finishes and fabric and the remedies which such defect would require. With reference to the discussion above total quality managed in various maintenance operations with focus on the following.

1. Conveying of meeting on quality as regards maintenance issues periodically
2. Empowering workers through knowledge base consolidation approaches such as: Seminar, Workshop
3. Clear communication between management staff and technician
4. Financial allocation should be put in place for emergency
5. Provision of budget for routine maintenance
6. Experience technical staffs should be employ in maintenance department
7. There should be adequate tools and equipment for technical staff to carry out their duties.
8. The government should have more interest in the area of building maintenance in the hospital
9. There should be proper investing record, keeping for equipping and tools
10. There should be effective maintenance strategies.

If the above could be observed, productivity will be increase among maintenance workers, accident will be reduced, incidence of rework and waste will be eliminated and there will be quality job output of maintenance. Also the finding indicated that to do this requires

disciplined and skilled staff, availability spare part and tools and adequate allocation funds. The maintenance system must be preventive. So that the structure and infrastructure are not allowed to breakdown or constitute security risk.

Conclusion

Base on the findings of the study, it was analyzed that most of government project became a classics failure because of their policy decision were influenced by the policies rather than the aim of providing effective maintenance of the existing house schemes in Nigeria. Reversed in the case here, the structure of the hospital has being managed to a standard by theNiger state Government through the management board of the hospital. This is dive the type of properly. it is a specialist properly to accommodate the sick and ill people.

Recommendation

1. The government should endeavor to release fund as at when due to the hospital management board in order to facilitate the repair of the fault which are reported
2. There should be constant maintenance of equipment there should be available of spare part in the workshop to keep maintenance work effective and improve performance of the facility at maximum
3. Planned preventive maintenance should be ensure functionally, and should, be fully implemented instead of corrective maintenance which lead to high cost.

Suggestion for further research

Base on the findings of this research study; the following suggestions were made for the study:-

1. An investigation into the impact of Total Quality Management Application in the construction Industry. (A case of training).

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APPENDIX B: QUESTIONNAIRE

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

SCHOOL OF SCIENCE AND SCIENCE EDUCATION

DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION

QUESTIONNAIRE FOR APPRAISING THE MAINTENANCE CULTURE OF BUILDING STRUCTURES IN IBRAHIM BADAMASI BABANGIDA SPECIALIST HOSPITAL, MINNA.

PART ONE

Introduction: this is a research work, appraising for the maintenance culture of building structures in Ibrahim Badamasi Babangida Specialist Hospital.

Please kindly complete this questionnaire by ticking (√) the column that represents best your perception about the topic marking the options that are closest to your experience. Be as honest as you can. All information provided will be highly confidential and strictly used for the purpose of this research work.

Management staff ☐

Technician ☐

A four (4) point rating scale is used to indicate your opinions as stated below:

Strongly agree (SA)

Agree (A)

Strongly disagree (SD)

Disagree (D)

SECTION A

RESEARCH QUESTION 1

How adequate is the fund budgeted for maintenance of building structure in Ibrahim Badamasi Babangida Specialist Hospital?

S/N	ITEM STATEMENT	SA	A	SD	D
1.	Every year there is budget for maintenance.				
2.	Fund budgeted for maintenance is adequate.				
3.	Workers are well motivated.				
4.	There is proper security of facilities in the maintenance department.				
5.	Lack of government interest in the area of building maintenance in the hospital.				
6.	There is fund for continuous educational program on the maintenance of building structure by the technicians.				
7.	No long-term arrangements are made for the supply of essential part for replacement.				
8.	Delay of salary and incentive.				
9.	There is adequate management of financial resources.				
10.	There is proper audit of fund in the maintenance department.				
11	The workshop is free from any negative conflict.				

SECTION B

RESEARCH QUESTION 2

What are the general standards of technical staff in maintenance department in Ibrahim Badamasi Babangida Specialist Hospital?

S/N	ITEM STATEMENT	SA	A	SD	D
1.	Experience technical staffs are employed in maintenance department.				
2.	Most of the maintenance staffs are degree holder.				
3.	Most of the maintenance staffs are HND holder.				
4.	Technical staff co-operate in carrying out their duties and responsibility.				
5.	Inadequate tools for technical staff to carry out their duties.				
6.	There is adequate practical working being under taken by the technician.				
7.	Lack of adequate planning carry out by the technical staff in the maintenance department.				
8.	Poor relationship between the management staff and technical staff.				
9.	Improper inventor for equipment and tools.				
10.	Inadequate number of qualified technicians to carry out maintenance work.				
11.	There are quality staffs.				
12.	Ineffective maintenance strategies by the technical staff.				

SECTION C

RESEARCH QUESTION 3

What problem is hindering the proper maintenance culture in the building structure of Ibrahim Badamasi Babangida Hospital?

S/N	ITEMS OF STATEMENT	SA	A	SD	D
1	Inadequate supply of standard building materials.				
2	Inadequate facilities machines and tools for effective building maintenance in the hospital.				
3	Inadequate number of qualified technicians to carry out maintenance work.				
4	Poor relationship between management staff and technical staff.				
5	Delay of salary and incentive.				
6	Inadequate information and communication between management staff and technical staff in the hospital.				
7	Working environment not conductive for effective work.				
8.	Poor administration from the maintenance manager.				
9.	Improper inventory record keeping for equipment and tools.				
10.	Inadequate training and re-training of workers.				
11.	Ineffective maintenance strategies.				
12.	Poor planning due to lack of vision for work.				
13.	Inability to forecast and see beyond.				

APPENDIX C

COMPUTATION OF MEAN AND STANDARD DEVIATION FOR THE MANAGEMENT STAFF AND TECHNICIANS

Table 1: the mean response of Management Staff

Responses	X	F	fX
Strongly Agree	4	14	56
Agreed	3	8	24
Strongly Disagree	2	3	6
Disagree	1	1	1
		∑f =26	**∑fX = 87**

MEAN ($\bar{X}$) = $\frac{\sum fX}{\sum f} = \frac{87}{26} = 3.35$

Table 2: the mean for Technicians

Responses	X	F	fX
Strongly Agree	4	4	16
Agreed	3	2	6
Strongly Disagree	2	0	0
Disagree	1	0	0
		∑f = 6	**∑fX = 22**

MEAN $\bar{X} = \sum \frac{fx}{f} = \frac{22}{6}$ = 3.67

Table 3: Standard Deviation for Technicians

Responses	**X**	**F**	**FX**	$(X - \bar{X})^2$	$f(X - \bar{X})^2$
Strongly Agree	4	14	56	(4 – 3.35) = 0.423	1.69
Agreed	3	8	24	(3 – 3.35) = 0.123	0.99
Strongly Disagree	2	3	6	(2 – 3.35) = 1.823	5.47
Disagree	1	1	1	(1 – 3.35) = 5.523	5.52
		∑f = 26	**∑fX = 87**		**$\sum f(X - \bar{X})^2$ = 13.67**

Variance (S^2) given as $\frac{\sum f(X-\bar{X})2}{N}$

$(S^2) = \frac{13.67}{26}$

(S^2) = 0.53

Standard deviation = $(S.D_1) = \sqrt{s_1}$

$(S.D_1) = \sqrt{0.53}$

= 0.73

Table 4: Standard Deviation for Management Staff

Responses	**X**	**F**	**fX**	$(X - \bar{X})^2$	$f(X - \bar{X})^2$
Strongly Agree	4	4	16	(4 – 3.67) = 0.109	0.44
Agreed	3	2	6	(3 – 3.67) = 0.449	0.90
Strongly Disagree	2	0	0	(2 – 3.67) = 2.789	0
Disagree	1	0	0	0	0
		$\sum f = 6$	**$\sum fX = 22$**		**$\sum f(X - \bar{X})^2 = 1.34$**

Variance (S^2) given as $\frac{\sum f(X-\bar{X})2}{N-1}$

$(S^2) = \frac{1.34}{6}$

$(S^2) = 0.22$

Standard deviation = $(S.D_1) = \sqrt{s_1}$

$(S.D_1) = \sqrt{0.22}$

$= 0.47$

T – test

$$t - test = \frac{\overline{X1} - \overline{X2}}{\sqrt{\frac{S.D_1^2}{N_1} + \frac{S.D_2^2}{N_2}}}$$

$$t - test = \frac{3.35 - 3.67}{\sqrt{\frac{(0.47)2}{6} + \frac{(0.73)2}{26}}}$$

$$t - test = \frac{3.35 - 3.67}{\sqrt{0.037 + 0.200}}$$

$$t - test = \frac{-0.32}{0.49}$$

t-test = - 0.65