KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS AND INDUSTRIAL MANAGEMENT

PROBLEMS OF FACILITIES MANAGEMENT IN POLYTECHNICS IN GHANA: CASE STUDY KUMASI POLYTECHNIC

A THESIS SUBMITTED TO THE DEPARTMENT OF ECONOMICS AND INDUSTRIAL MANAGEMENT KNUST KUMASI IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE MASTER OF BUSINESS ADMINISTRATION DEGREE

BY

NAANA AMAKIE BOAKYE -AGYEMAN

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DECLARATION

I do hereby declare that this thesis is the result of my own research work carried out in the Department of Economics and Industrial Management under the supervision of Mr. J. K. Turkson. References cited in this work have been fully acknowledged.

Signature ---------- Date 20th July, 2005

Naana A. Boakye-Agyeman

I declare that I have supervised the candidate in undertaking the study herein submitted and confirm that the candidate has my permission for assessment.

Signature ---------- Date 20-07-05

Mr. J. K Turkson

DEDICATION

To my husband, Mr. Boakye-Agyeman and my daughter, Princess Afua Gyamfuaa Agyeman for their love and support.

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This study would not have come to this stage without the invaluable help, criticisms and suggestions from people, who, in diverse ways made the successful completion of this work possible.

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ABSTRACT

Education is about excellence and unsatisfactory facilities will affect the ability of tertiary institutions to achieve their mission. Facilities management activities in Polytechnics in Ghana have traditionally focused on the performance of physical building systems and repair works, without detailed consideration for how they might be managed to better support learning and teaching activities. As technical manpower training institutions, polytechnics depend on their facilities. Therefore, the extent to which facilities management is a component of the strategic management (thinking) of polytechnics is vital to the way in which knowledge can be produced, managed, disseminated, assessed and controlled. The current state of physical facilities of the polytechnics is an important indicator of the importance of strategic facilities management in the polytechnics. The study investigated the problems of facilities management and the effect of facilities management on user performance. Primary and Secondary data sources were used. Sample survey, in-depth interviews and observation were used in primary data collection. Analysis of data revealed that there is some level of awareness of the importance of facilities management among top management of polytechnics but level of commitment in implementing facilities management decisions is quite low. It was also observed that the standard of approaches to facilities management in the polytechnics is below expectation. The major problems identified were inadequate funds and facilities management staff, inadequate facilities and large number of facilities users, misuse of facilities, lack of strategic direction in facilities management and poor facilities information management system. Findings of the study suggest that facilities management affects the output of

polytechnic staff and students. Recommendations were made to improve the facilities management in polytechnics.

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INTRODUCTION

1.1 BACKGROUND STUDY

Business today travels at an Internet speed. Within minutes a customer in Ghana orders a product in Latvia, Dubai, or Florida and funds are transferred via international banking from an account in Ghana, Australia or Britain. In like manner, a student or lecturer in Ghana could also assess information in universities around the world within minutes. Availability of efficient facilities allows even small companies to serve global customers. The result is that somewhere in the world, business is being conducted twenty-four hours (24) a day and seven (7) days a week with well managed facilities (Tatum, 1999).

In educational, financial, insurance companies, investment firms, transportation institutions, where business runs around the clock, facilities cannot afford to go down. An hour down time for some companies can cost millions of dollars. As a result most institutions are considering continuous operation of their facilities. This means that facilities management in institutions must be well planned, co-ordinated, controlled and considered as seriously as sales, financial management and other functions.

At the inception of every business or organisation, a greater percentage of the initial capital is spent on the acquisition of facilities – buildings, furniture and equipment and support services. Facilities are most organisations' second largest expense and account for as much as 15% of turnover. They are also the largest item on the balance sheet, typically over 25% of all fixed assets

middle level technical manpower for the nation. As technicians, polytechnic graduates are expected to be conversant with the equipment that they will be working with on completion of their programmes. To achieve this, the National Accreditation Board requires that certain basic facilities be available before the polytechnics can mount programs. According to Lackney (1999), facilities are of crucial importance to teaching and learning processes and improved facilities could lead to considerable improvement in students' performance. This makes the acquisition and management of facilities at the polytechnics very important.

Since their inception, governments have spent huge sums of money on the acquisition and development of facilities for the polytechnics. As part of the government's effort to improve the academic facilities in the ten polytechnics in the country, the Ghana Education Trust Fund (GETFund) has in recent years spent billions of cedis on facilities for the polytechnics. Table 1.1 shows the expenditure of the GetFund on polytechnic projects.

Table 1.1 GETFund's Expenditure on Polytechnic Projects – 2002 and 2003

Polytechnic	2002 - Amount (¢)	2003 - Amount (¢)
Accra	849,690,000	4,676,498,387
Bolga	2,093,868,282	12,837,431,035
Cape coast	2,053,510,348	6,475,855,692
Ho	6,444,516,805	11,915,774,234
Koforidua	2,725,103,606	9,612,834,364
Kumasi	6,031,907,567	5,833,304,406
Sunyani	1,835,763,201	5,541,489,015
Takòradi	2,178,156,119	8,844,726,847
Tamale	4,126,981,112	6,766,349,883
Wa	723,987,670	3,181,870,910
Total	29,063,484,710	75,686,134,773

Source: www.getfund.org., Finance Office – Kumasi Polytechnic, Daily Graphic June 11 2004

Given the huge sums of money being spent on facilities, it is important that good policies are formulated for the management of these facilities. However, the management of educational facilities has been overlooked in the strategic educational planning process (Lackney, 1997).

Facilities management is the practice of integrating the management of business process of an organization with physical infrastructure to enhance corporate performance (Facilities Management Association of Australia, 2002). It is the application of total quality techniques to improve quality, add value, and reduce risk involved in the occupation and use of buildings and equipment and delivering reliable support services (Alexander, 1996:7). Quite

simply the term has been used to define all kinds of support services outside the main core business (Grigg and Jordan, 1993:3). It is broad based and concerned with total asset management of an institution. Traditionally it includes:

- Property management
- Space analysis and management
- Safety and service audits
- Telecommunication and information system
- Furniture and equipment acquisition and planning

The Facilities Manager seeks to add value to the company's or the institution's operations through a combination of strategic and operational activities, covering all parts of the organization's business. These activities apart from being divided into strategic and operational may be further grouped according to whether they are concerned with the physical aspects of facility (e.g. maintenance planning, service auditing, refurbishment, retrofits) and human concerns (e.g. recruitment, productivity, communication, change management, dispute resolution), operations management (outsourcing, security and safety) (Best et al, 2003:4). Therefore, facilities management is about using all the organization's scarce resources to their fullest potential to meet pressing business challenges.

The physical facilities or resources which include buildings, computer network, virtual spaces and database provide the framework within which the organization operates and the optimisation of this framework through a

process of continuous improvement of facilities can lead to maximization of the organization's profit and in the case of educational institution enhances students performance and contribute towards the achievement of the goals of the institution. The working environment is important in terms of productivity and operating costs as well as recruitment and retention of staff.

Following this growing concern, facilities management must change from the traditional operationally based role to an expanded and more dynamic role in strategic management activities (Lackney, 1997). However, it has always been on the lower end of the corporate ladder (Tatum, 1999), because it is believed that facilities management and user performance are independent. But the Facilities Manager must be as crucial as the chief information officer and chief finance officer.

Educational administrators are often more concerned with securing funds for academic facilities than making sure the needs of educational programmes are met in building designs and efficient equipment. As a result, facilities management decisions are not seen by educational administrators as a potentially useful strategic planning tool in improving educational quality and are de-coupled from educational decision-making. But school facilities must be cleaned, protected, preventively maintained, operated, repaired and environmentally regulated to support educational programmes need.

There is no strategic direction as far as facilities management in polytechnics are concerned. Polytechnic programs are designed to equip students with

technical knowledge and skills to be able to meet the changing needs of the industry. Therefore lecturers as well as all supporting staff of the polytechnics must have adequate facilities that run on twenty-four hours, seven days a week to meet the training needs of students. In most businesses, the physical facilities influence customers or staff through the image they convey, likewise, certain University and Polytechnic campuses, are positive assets in attracting students (Best et al, 2003). Facilities must therefore be strategically managed to accommodate the continuous change faced by the polytechnic student. Hence, the study of the problems of facilities management in Polytechnics in Ghana.

1.2 PROBLEM STATEMENT

As stated earlier, facilities are another major cost centre in polytechnics. It is considered as the second largest expenditure after salaries. Before the commencement of any programme, huge sums of money are spent on the acquisition of physical facilities such as buildings and furniture and equipment before the recruitment of staff. However, having acquired these physical facilities at a very high cost, little attention is often paid to their proper management to ensure continuous operations. Most often, the facilities are left to fall into serious disrepair and replaced at an even higher cost in terms of time and money, because the role of facilities management in educational administration has long been overlooked.

When new programmes are being mounted, it is expected that the Facilities/Estates Manager, will be called upon to advise on the facilities

requirement for the new batch of students. However, most often, new programmes are introduced without a critical consideration of the facilities (especially space) requirements for the new batch of students. This has led to congestion and inadequacy of facilities in most polytechnics in Ghana. Most buildings are put up without the contribution of a facilities director on building performance, space requirement and management.

In spite of the important role of the facilities manager in the running of polytechnics, he or she is often left out in the boardroom decisions, because his or her contribution towards academic excellence is underestimated. This has even affected the attitude of management – (academic board) in the approval and implementation of budget for the Facilities Management Department. Furthermore, the deep-seated belief that the physical environment is a neutral factor in improving academic performance of students and productivity of workers has made facilities management in polytechnics less important

Where the role of the facilities manager is duly recognized in the acquisition and management of facilities, the continuous improvement through proper management and maintenance also becomes a problem, due in part to the shortage of management and maintenance staff as well as shortage of funds for maintenance work. Often, facilities managers are forced to do more with fewer human and financial resources due to changing funding arrangements for tertiary institutions in Ghana. Cutbacks are frequently made to the facilities management budget while facilities management plans are deferred.

Again, polytechnics in the country do not use Computer Aided Facilities Management (CAFM) systems and this makes effective facilities management even more difficult. This is because the manual system of facilities records keeping is time consuming, inaccurate and makes the tracing of decisions on facilities management difficult. The problem is compounded by the scope and complexity of facilities management. The job responsibilities of the facilities manager are wide ranging and numerous and involve the co-ordination of multiple disciplines as such it is difficult to determine who manages what. This has resulted in an "anybody can do it" approach to facilities management instead of a professional and strategic approach. This continuous neglect and ineffective management of the facilities in the polytechnics do not only store up potentially enormous bills for the future, but also seriously affect the quality of work and achievement of students and lecturers.

1.3 IMPORTANCE OF THE STUDY (RATIONALE)

At the tertiary level, education is designed to equip people with knowledge and skills to enable them conduct basic research and disseminate research findings. Unsatisfactory facilities will affect the ability of institutions of higher learning to achieve this mission since they are dependent on these facilities. The importance of facilities management is based on the premise that the efficiency of an organization is linked to the physical environment in which it operates (Best et al., 2003:49).

The poor conditions in which many people work, premises that are badly lit, poorly ventilated, inadequate and unclean sanitary facilities, lack of

comfortable furniture and efficiently operating equipment, obviously affect the efficiency, productivity, comfort and good health of workers and in the case of academic institutions the quality of manpower support for the nation as a whole. On the other hand, good facilities management practice in addition to reduced property acquisition costs will lead to reduced absenteeism, improved staff and student morale and performance, higher knowledge and lecturer productivity in terms of research, inventions and innovations. Facilities play a significant role in the creation of motivational learning and teaching environment and should be well designated, efficiently managed and used to their best advantage to support core institutional goals. Given the current increase in student population in tertiary institutions, without corresponding increase in facilities (especially in the polytechnics), the effective management of space, buildings, furniture supply, health and safety and the environment is of utmost importance.

1.4 OBJECTIVES OF STUDY

The main objective of the study is to investigate into the problems of facilities management in polytechnics in Ghana. The specific objectives are as follows:

1. To find out the major constraints in facilities management in polytechnics in Ghana
2. To determine whether facilities in polytechnics are well planned, co-ordinated and controlled to support the achievement of institutional goals.
3. To examine the effect of facilities management on the performance of staff and students.

4. To make recommendations for effective management of facilities in Polytechnics in Ghana.

1.5 HYPOTHESIS

Null Hypothesis – Ho:

Facilities management and user performance are independent.

Alternative Hypothesis – Hi:

Facilities management and user performance are dependent.

1.6 THE SCOPE OF THE STUDY

The study seeks to examine problems of facilities management in polytechnics in the country. However, as a result of time and financial constraints, Kumasi Polytechnic was chosen as a case study institution.

The scope of facilities management is very broad, ranging from the very practical concerns of the physical aspects of facility (e.g. building repairs, maintenance planning, refurbishment) to the more abstract concerns of strategic facility planning such as evaluating the effects of economic change on real estate assets, human concerns (e.g. recruitment, productivity, communication, change management, dispute resolution), but this study focused on physical facilities management – land and buildings, furniture and equipment.

1.7 RESEARCH METHODOLOGY

1.7.1 *Sources of Data*

Both primary and secondary data sources were used in the study.

a. Primary Data

This is data collected by the researcher at first hand, mainly through surveys, interviews, and participant observation (McNeil, 1990:99). Primary data for the purposes of this study refer to information obtained directly from facilities managers and users – staff and students of Kumasi Polytechnic for the achievement of the objectives of the study. This formed the bulk of the data collection activity and it was done in two stages.

The first stage was the qualitative survey; this was a preliminary survey based on personal interviews with facilities managers, and discussions with opinion leaders and some top officials of the polytechnic. This formed the basis for the second stage of the primary data collection - the quantitative survey.

b. Secondary Data

Secondary data are already compiled data used for statistical analysis towards the achievement of the objectives of a study (Bell, 1993:19). This study begun with secondary data collection from textbooks, journals, articles, seminar papers, periodicals and other relevant documented information to provide background information on facilities management.

1.7.2 Population

Kumasi Polytechnic has a total population of four thousand nine hundred and fifty (4950) made up of four thousand six hundred and forty eight (4648) students and three hundred and two (302) staff. Details are shown in Table 1.2 below.

Table 1.2 The Population Of Kumasi Polytechnic

Strata	Number	Status	Male	Female	Subtotal
Students	4648	Student	2938	1710	4648
Staff	302	Academic	78	27	105
		Administrative	151	46	197
Grand total	4950		3167	1783	4950

Source: Planning Unit Kumasi Polytechnic - 2003/4)

1.7.2.1 Sampling Technique

Since the entire population could not be surveyed, a sample was selected using the stratified random sampling technique. By this method/technique, the population was first divided into two or more mutually exclusive segments called strata, based on categories of one or a combination of relevant variables. The population of the Polytechnic was first stratified into facilities managers and users.

The facilities managers were the Estate Manager, Transport Officer, Finance Officer, and the Medical Officer, while the users were staff and students. The Staff was stratified into academic and administrative staff and further into gender - male and female. Students were stratified into schools, department

and gender. After the stratification the proportional sampling technique was used to select sample from each stratum because some departments have larger number of students than others, therefore there was the need for fair representation in the sampling.

After the proportional sampling, the simple random sampling technique was used to select the members to be interviewed using the lottery method. Staff and Students were drawn during working and lecture hours through balloting. Those who were picked were given questionnaires to fill and return.

1.7.2.2 Sample Size

The population was relatively large given the time and financial constraint of the researcher, as such a sample which is a subset of the population (Singleton et al 1993:137; Mason et al, 1999:258), was carefully chosen to represent the views of the entire population.

According to Nwana (1992) and Sanders (1990), if the size of the population is a few hundreds, a 40% or more sample will do, if several hundreds, a 20%, if few thousands, 10% and if several thousands 5% or less sample size will do. However a sample size of about thirty (30) is required in order to provide a pool large enough for even the simplest kind of analysis (Agyeadu et al., 1999: Mason et al, 1999). Based on the above-cited decisions, six percent (6%) of the student population of four thousand six hundred and forty-eight (4648) was chosen since the students' population was quite large, while twenty percent (20%) of the staff population of three hundred and two (302)

was taken. Therefore three hundred and thirty nine (339) people made up of 60 staff and 279 students were interviewed (See Details in Appendix 'A').

1.7.3 Data Collection Instrument

1.7.3.1 Questionnaire

a. Structured Questionnaire

As stated earlier, both quantitative and qualitative approaches were used to collect primary data. The quantitative method, which is a sample survey, was carried out with the use of structured questionnaires, to obtain information from facilities users - staff and students. Both open and closed ended questions were used. With the closed ended questions answers were provided for respondents to choose from. The open-ended questions were without answers; the respondents were to provide their own answers. This gave the respondents the opportunity to express their opinions on issues and justify their answers. The questionnaire was pre-tested using fifty staff and students. The feedback was incorporated in the final version of the questionnaire and administered to the rest of the respondents. The respondents were given the questionnaires to complete and return. (See details in Appendix C).

b. Interview Guide

To capture information that would likely be distorted or withheld with the use of only one method (McNeil 1990:23), the quantitative method was complemented by qualitative method such as in-depth interview to enhance the validity of the data. This was done using interview guide. An interview guide consists of a series of broad interview questions (semi – structured) that

the researcher is free to explore and probe with the interviewee (Maykut and Morehouse, 1994:83). As a guide, it is to prevent deviations from the issues being discussed (Bell, 1992:52, Singleton et al, 1999:249). This was used to obtain information from Facilities Managers of Kumasi Polytechnic. (See details in Appendix B)

1.7.3.2 *Discussions*

As part of the qualitative survey, there were informal discussions with opinion leaders at the Polytechnic such as the Students' Representative Council President, Hostel Presidents and Secretaries, Chairpersons of various unions - Polytechnic Teachers Association, Ghana, Polytechnic Administrators Association, Ghana and Teachers and Educational Workers Union.

1.7.3.3. *Observation*

The non-participant observation technique was used to confirm the authenticity of some of the data obtained from the interviews and questionnaires administered. By this method, the researcher was physically present only as a spectator who does not become directly involved in the activities of the people who are being studied (Agyeadu et al, 1999). As an employee of Kumasi Polytechnic for eight (8) years, the researcher has adequate experience as a user of facilities and observer of activities of facilities managers of the Polytechnic, therefore, she had first hand information on the subject under consideration.

1.7.4 Analysis of Data

As a descriptive survey, the quantitative data was analysed using simple forms of statistical tools such as simple measures of central tendencies that is, percentages, and modes, pie charts, graphs and tables were drawn to provide a picturesque presentation of the data. Completed answered questionnaires were edited, coded and analysed by computer using the statistical package for social scientist software (SPSS 10.0). The Pearson chi-square test for independence was used to test the research hypothesis. The qualitative data was subjected to content analysis to bring out similarities and differences with the quantitative data collected. These formed the basis of the report writing.

1.8 DEFINITION OF CONCEPTS AND VARIABLES

1. **Management**: planning, organizing and controlling of an organization's resources with the aim of achieving organizational goals in an efficient and effective manner.
2. **Facilities**: the buildings, infrastructure and support services that an organization uses to achieve its goals.
3. **Facilities Management**: the proper care of buildings, infrastructure and support services at the workplace in order to achieve the organization's goals in an efficient and effective manner.
4. **Estate**: all the physical or tangible properties and other assets a person owns or controls, which includes both personal and real property, as well as interest in land or other properties.

5. **Real Property**: land and anything that is attached to the land including all ownership rights.

1.9 LIMITATION OF THE STUDY

The major limitation of the study was time. Since the sample size of the study was quite large a longer time was taken to complete the survey than anticipated. Another limitation was the evasive nature of student respondents. Some were skeptical as they were not sure of the outcome of their responses. They were afraid that their programmes would be discontinued if they say that the nature of facilities and their management affect their academic work. To devoid the interviews of these misgivings, careful explanations had to be given.

1.10 STRUCTURE OF THE STUDY

The study has five chapters.

Chapter One deals with the introductory aspect of the study – the background of the study; problem statement; the importance of the study; objectives of the study; hypothesis statement; scope of the study; research methodology, definition of concepts; limitations of the study and the structure of the study. Chapter Two is the literature review – consideration of existing relevant literature on facilities management. Chapter Three covered the background/ profile of the study area – Kumasi Polytechnic. Chapter Four is the presentation and analysis of data collected, and Chapter Five, the conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter reviews relevant literature on facilities management. It includes the consideration of the emergence of facilities management, definitions on facilities management, the scope of facilities management, the facilities management team and the duties of the Facilities Director.

2.2 THE EMERGENCE OF FACILITIES MANAGEMENT

2.2.1 Definition Of Facilities Management

The term facilities management has been coined in recent years to describe the management of buildings, infrastructure and support services (Grigg and Jordon, 1993:1). Formal definitions of facilities management are many, various and sometimes confusing. According to the Facilities Management Association of Australia (FMAA), Facilities Management is the practice of integrating the management of people and the business process of an organization with the physical infrastructure to enhance corporate or individual user performance. Best et al., (2003:2) also defined facilities management as the strategic management of facilities, with facilities managers devoting their attention to a very broad range of concerns including human resource management, real estate portfolio management and quality management as well as the more traditional operational concerns that relate largely to building maintenance. The International Facility Management Association also defines facility management as the practice of co-ordinating the physical workplace with the people and work of the organization. It integrates the principles of

business administration, architecture and the behavioural and engineering sciences. This view is shared by Spedding (1999).

According to the British Institute of Facilities Management (BIFM), facilities management may be defined as the integration of multidisciplinary activities within the built environment and the management of their impact upon people and the workplace, while the South African Facility Management Association (SAFMA) defines facilities management as the management of specific physical entities to enable the business to carry out its core functions. Scarret (1995:88) also defines facility management as the provision, coordination and detailed management of the services and elements and their maintenance, excluding those items specifically and legally assigned to some other persons or group.

These definitions show that there is no single definition that satisfies all concerned and no one focus is universally accepted as being the core of facilities management (Best et al, 2003:46). However, out of this background of misunderstanding, a common view of facility management has taken shape among property and support service specialists that facilities management is the co-ordination of buildings, work and people to a single interactive system (Grigg and Jordan, 1993: 2) towards the achievement of organisational goals (Alexander, 1996).

From the foregoing definitions it can be concluded that facilities management is a further development of property management. That is, a total and

comprehensive property management function which in addition to the traditional functions takes care of the other ancillary roles like cleaning, security, landscaping and provides all the necessary support services for the property so that the occupier could concentrate on its core business. It ensures that buildings systems and services support core operations and processes as well as contribute towards the achievement of its strategic objectives in changing conditions. It focuses resources on meeting user needs to support the key role of people in organisations and strives to continuously improve quality, reduce risks and ensure value for money. The primary function of facilities management is to plan, establish, and maintain a work environment that effectively support the goals and objectives of the tenant organisation.

2.2.2 Historical Background of Facilities Management

More than a century before the coining of the term Facilities Management, some functions of the facilities manager were obviously carried out by people with no technical knowledge. Windows were cleaned, equipment were serviced and repaired, roofs were re-thatched and supplies of candles and coal were ordered and stored (Best et al., 2003:1); but, in recent years facilities management has demonstrated significant growth as a profession in its own right due to the need for specialist people who can add value to businesses and organizations that control infrastructure (Price, 2003). The recent growth in facility management is due to the change in demand for space from heavy industry to offices (Spedding, 1999).

According to the International Facilities Management Association, in the early 1920s, two significant simultaneous events occurred that helped set the evolutionary course of facility management. These were:

1.The use of independent freestanding screens in the office environment popularised in the 1960s was gradually replaced with today's increasingly sophisticated systems furniture.

2.The introduction of computer terminal into the workstation challenged facilities managers to solve computer wiring, lighting, acoustic and territory problems. The office scene was becoming more complex and the facilities manager needed guidance.

The first step towards the formation of a more specialized organization to provide facilities managers with information needed to manage the office of the future, occurred in December 1978, at a conference with the theme "Facility Influence on Productivity" in Ann Arbor, Michigan U.S.A. In May 1980, another meeting was hosted in Houston to establish a formal base for a facility management association known as the National Facility Management Association (NFMAS).

The 1990s saw a rise and increasing global spread of the facilities management industry. In the English-speaking world there were three significant Professional Associations; International Facilities Management Association, British Institute of Facilities Management, Facilities Management Association in Australia plus a growing presence in South Africa since 1997 (SAFMA). In the Non-English speaking world, varying degrees of penetration

and interpretation has occurred but at least there is some level of recognition. There is the European Facilities Management Network – EuroFM launched in 1991, with the Danish Facilities Management Association, Facility Management Netherlands, Hungarian Facility Management, Facility Management Australia as members. In November 2002, the International Council for Research and Innovation in Building and Construction also renamed its W70 Working Commission as facilities management and maintenance at a Conference in Brisbane.

2.3 THE SCOPE OF FACILITIES MANAGEMENT

Facility management is broad based and concerned with total asset management. Like the definition of the term, the scope of facilities management is varied and wide. Although there is no absolute consensus as to what activities comprise facilities management, Alexander (1996:2) said that the scope of the discipline covers all the aspect of property management (buildings, space, furniture and equipment), environmental control, health and safety, and support services. The support services function links much more obviously with the mainstream activities such as security, staff support (catering, health, safety and welfare etc.) communication systems. This collection of activities is not exhaustive, but represent those activities commonly found in practice (Spedding, 1999; Akushie, 2000).

The scope of facility management depends largely on the nature of business that the facilities are supporting. For example in banking institutions, facilities management will normally take the form of information management, security

services and office support service with little emphasis on building performance and space management. However, in educational institutions, emphasis will be on the ability of the building to support the training of students. Facilities management in educational institutions is therefore concerned with property management – management of real property – (land and, building); personal property – (furniture and equipment) and support service - health and safety, and the environment.

2.3.1 Property Management

According to the Essential Dictionary of Real Estate Terminology, an estate refers to all the property a person owns or controls. A property may be personal or real. Real property refers to the interest in land, be it freehold or leasehold and that which is affixed to the land, that is land and the improvement thereon while personal property refers to all movable items of an institution such as furniture and equipment, plant and machinery generally referred to as chattels (Downs, 1975: pp 2-4). Property therefore refers to whatever it is that the estate or property manager manages, including the interest in land and the fixed improvements (like buildings – classrooms hostels, laboratories) as well as the less permanent embellishments (furniture, furnishings and equipment). Property management seeks to advice on the establishment of an appropriate framework within which to oversee property holdings to achieve the agreed short-term and long-term objectives of the estate/property owner and particularly to have regard to the purpose for which the estate/property is held (Scarret, 1995:13). Stapleton (1980:16) expanded this definition and said that it is the direction and supervision of an interest in

landed property with the aim of securing the optimum return; this return need not be financial but may be in terms of social benefit, status, prestige political power or some other goal or group of goals. Property management includes the act of taking care of real and personal properties, such as supervising the development and maintenance of buildings, rent collection, tenant selection, project management, space management, energy, water and sewerage, waste disposal, landscaping, furniture and equipment.

Property management is further broken down into portfolio management and property asset management. Portfolio management is the management of a cohesive group of buildings let to occupiers on the best terms available, where the purpose is to maximise financial returns to the benefit of the owner (example the Social Security and National Insurance Trust properties), whereas the management of buildings held for operational purpose (like the properties of the Kumasi Polytechnic) is termed property asset management (Scarrett, 1995:14). The important aspects of operational property management (especially educational institutions properties) are buildings development and management, furniture and equipment management.

2.3.1.1 Buildings Development And Management

2.3.1.1.1 Building Development Process

This begins with the site acquisition and title documentation. Here the property/estate manager will look for a suitable site for the project and ensure that the right owners are well compensated for the land taken either purchased by private treaty or compulsory acquisition. Title to the land can

then be documented and duly registered as notice to the public of the institution's ownership of the land. The actual development then begins with the accommodation need assessment and brief preparation, building design development, architectural services, interior design services and engineering services, construction tendering and procurement (Remington, 2003). The next important stage of the development process is the project management.

2.3.1.1.2 Project Management

Project management involves the planning, implementation and monitoring of a project (for example real estate development, purchase of furniture, and equipment) from inception to completion to ensure that it is completed within stated time constraints at an agreed cost and to the level of quality expected. (Amoako-Nimako, 2001; Remington, 2003). The role of the facilities manager is the supervision of the actual implementation of the project. That is supervising the activities of other consultants and attending site meetings, vetting certificate for work done approving variation orders, cost control and overall contract management. He is therefore the link between the consultant, management and the entire organization.

The Facilities manager must therefore be well versed in the critical success factors to be able to monitor and control projects. According to Alexander (1996), the critical success factors of project implementation include project mission, top management support, client consultation, personnel recruitment and selection, technical task client acceptance, monitoring and feedback, communication, trouble shooting. Communication is vital for project control,

problem solving and for maintaining beneficial contacts with both clients and the rest of the organization, therefore monitoring and feedback, communication and trouble shooting, must be effective at each point in the project implementation process. After the successful development of the property (buildings) they are handed over to the estate or property manager to manage.

2.3.1.1.3 Buildings Management.

This involves the preparation of management plan for the effective management of the buildings and the space within. This includes budget preparation, negotiating letting of the building on suitable terms, rent determination through the application of valuation methodology, tenancy agreement that will let the tenant take good care of the premises, preparation of good maintenance programme to prolong the life of the buildings, and supervision of repair works to avoid cost escalation in order to reduce operational cost (Scarrett, 1995).

A key part of building management is to ensure that the building stock available performs suitably for the tasks required from all aspects, both now and in the foreseeable future (Alexander, 1996). This is also referred to as building intelligence. According to (Atkin and Brooks, 2000:31), building intelligence encompasses a building's inherent adaptability and services, both technical and non-technical, offered to users. This can be assessed through the measurement of the performance of the buildings. Building performance is assessed or measured by the:

- Technical capability of the building – the ability of the building to support the services for which it was put up.
- Technological environment – the opportunities for flexible location and relocation of equipment, minimum cost per move, a high level of information technology, including office and building automation systems and integration of internal and external communication systems.
- Adaptability and responsiveness – the ability to support the rapidly changing work environment, response to legislation, and changes in work environment without significant redesign or adjustment.
- Users' direct control of their own micro-environment – give users privacy with a sense of community, limited security restrictions with maximum protection of personal items, access to comfort facilities such as washrooms and dinning rooms.

2.3.1.1.4 Space Management

According to Crigg and Jordan (1993:9), since property related costs are driven by space allocation it follows that efficient management of space is key to containing these costs. In the polytechnics where land for development is a major problem, the available space must be well managed to meet the space requirement for academic work. To manage space efficiently, the manager must understand the functions and roles of various departments and define consistent guidelines to allocate space, since the use of space is a major source of conflict at the workplace. To do this the facilities manager will have to come up with a space plan. The aim of space plans is to develop a strategy

based on a set of guideline for accommodating different departments in order to achieve optimum use of space. Space planning involves evaluation of existing space, legal/legislative consideration and building concerns.

Evaluation of Existing Space

Evaluation of existing space begins with space need analysis (Muir, 2003), based on business or institutional factors such as institutional role and image, culture, location affordability, growth projections and ratio of staff grades and functions (Crigg and Jordan, 1993:25). In the case of educational institutions, for instance the polytechnics, it will be based on the total number of full-time employees, staff and student population growth rate, new programmes to be introduced and the space required for these programmes.

Legislative / Legal Consideration

Legislative and legal constraints on space planning vary from country to country (Muir 2003). It is expected that the employers protect the employees. They are expected to take all reasonable and practical steps at the work place to eliminate or minimize risk and thereby avoid employees' injury and illness. The duty of care provision extends to the workplace and includes design of work areas and spaces that address concerns such as lighting, noise, comfort, equipment, furniture and tools.

In Britain, this is provided for by the Workplace (Health, safety and welfare) Regulation. It requires that the working environment must be conducive in terms of temperature and ventilation, that temperature should not be less than

16 degrees centigrade and every room in which a person works must be adequately ventilated and supplied with fresh air or artificially purified air. There must also be suitable and sufficient lighting either natural or artificial in all parts of the premises. There should not be overcrowding and the workplace must be safe. Floor, passages and stairs must be of sound construction, properly maintained and kept free from obstruction and slippery substances (Riches and Keenan, 1998:430).

In Ghana, the Labour Act, 2003 Act 621 also makes similar provision in Part 15 – Occupational Health, Safety and Environment. According to Section 118 (1) it is the duty of an employer to ensure that every worker works under satisfactory, safe and healthy conditions. Subsection 2 stipulates that an employer shall provide and maintain at the workplace, plant and system of work that are safe and without risk to health. This means that the work place should not be overcrowded so as to cause risk of injury to the health of workers. Furniture should be compatible and plant and machinery safe at all times. This calls for effective facilities management at the workplace.

Building Concerns

Once an institution's space requirements have been defined by the space need analysis, information about the physical building is collected and compared with the requirements. A number of consultants will be useful at this stage (Muir, 2003; Crigg and Jordan, 1993:28). The building surveyor will check dimensions and area calculations and the planner will check building codes and regulations compliance. The architect will then check the suitability

of the building for the business, that is the floor space dimensions, overall floor shape, the location of the core and its geometry, impact on the effective internal usable space. The services engineer will then give his opinion on electrical, mechanical, fire services, communication, structural and acoustic data (Best et al., 2003:90). Other factors that will be considered are building design, frequency of internal movement, storage requirement, existing guidelines and standards (Crigg and Jordan, 1993:25). All the information obtained on existing space evaluation, legal/ legislative and building consideration will be analysed to produce a space plan. Finally space indicators are used to monitor space performance and these include:

Efficiency – this indicates how well the space is apportioned as compared to total available space.

Flexibility – this indicates the chargeability of physical space.

Space utilisation – this measures the use of space overtime, and the potential use in future time.

2.1.5 *Personal Property Management*

Personal property are the movable items such as furniture, computers, laboratory equipment, plant and machinery and other facilities that are used with land and buildings for production (Best et al 2003:241). These are used with the real property and must be well managed to be able to support the business of an organization. They are managed through registers that list specification details, acquisition dates, serial numbers, monetary valuation, insurance, warranties, location, maintenance requirement and other information to maintain effective control.

2.3.2 Support Services

Support services play an underlying role in an organisation rather than a centre stage, but like all good productions the leading players cannot perform until the rest of the cast are also playing their parts (Best et al, 2003). At the Polytechnic, the core activity is teaching and the main facilities required are buildings, furniture and equipment, however, good information management systems, security, health and safety, communication and environmental condition are vital for effective use and management of the major facilities.

2.4 DEVELOPMENT OF FACILITIES MANAGEMENT STRATEGY

According to Alexander (1996), facilities management can be viewed at three main levels - strategic, tactical and operational levels.

- **Strategic level** – this is the board level where the Facilities Director together with other board members decide on the facilities needs of the organisation based on the organisation's objectives, needs, and policies (Atkin and Brooks, 2000:13). Decision-making at this level involves the long term planning of facilities, usually beyond a five-year horizon, based on the operational goals of the organization, their changes and resources (physical facilities) available for achieving them, outline information of external facility management environment (as a benchmark), result and profitability.

- **Tactical level** - involves the tactical positioning of the organization in a two to five year time frame. At this level, decisions are concerned with

the acquisition of resources and their effective and productive use. The responsibilities include space planning (establishing space standards, making bulk purchases of compatible furniture systems); building projects (preparing project brief, managing the building team, lease negotiations, building management systems, and health and safety management). At this level the facilities managers act on strategic decisions and develop tactical plans in line with the strategy.

- **Operational level** – this level is concerned with the implementation of the strategic and tactical levels decisions in day-to-day operations, normally within the current budget year. Detailed information on resource, (personnel, material, equipment for maintenance) and operational work are obtained at this level.

To manage facilities efficiently and effectively, a good strategy should be developed within the context of an organisation's strategic plan and accommodation strategy. These should involve development of strategic objectives and a business plan for the facilities management function with proper reference to the organisation's business plan and accommodation strategy (Atkin and Brooks, 2000:14). The business plan for facilities management should:

- Consider the needs of the organisation, differentiating between core and non-core business activities.
- Identify and establish effective and manageable process for meeting those needs.

- Establish appropriate resource needs for providing services, whether obtained internally or externally.
- Identify the source of funds to finance the strategy and its implications.
- Establish a budget, not only for the short term but also to achieve value for money over the long-term.
- Recognise that management of information is key to providing a basis for effective control of facilities management.

able 2.1 Techniques and Tools to Support the Development of Facilities Management Strategy

Developmental Stage	Phase	Technique or Tool
Strategic analysis	Services audit /review	• Benchmarking
	Assessment of expectations and objectives	• Strengths, weakness, opportunity and threats (SWOT) analysis
	Portfolio audit	Space analysis Estate register Maintenance plan Risk audit
	Resource audit	• People/skills audit • Service provider audit (internal)
	Market audit	• Service providers (external) • Supply of real estate and other facilities
Developing solutions	Generation of options	• Outsourcing modelling
	Evaluation of options	• Maintenance plan • Risk analysis • Stakeholder analysis
	Selection of strategy	• Optimising model
Strategy implementation	People and systems	• Change management • Training and Development
	Organisation/structural Implications	• Effective communication programme
	Resource planning	• Project planning/ Programming/ control
	Procurement	• Service provider selection

Source: Atkin and Brooks (2000:16)

As shown in Table 2.1 at page 35, there are three main stages in the development of a facilities management strategy – Strategic analysis, Developing solutions, and Strategy implementation stages.

Strategic Analysis of Facilities Requirements

The aim of the analysis is to establish a thorough understanding of the present state of the organisation's real estate and its approach to facilities management. This means assembling all relevant facts including organisation's objectives, needs and policies. At this stage the organisation should audit and review its services by identifying and differentiating between their core and non-core activities to ensure that effort can be concentrated where it is most needed. This should be done by the use of benchmark.

It must also assess its expectations and objectives by analysing its strengths, weaknesses, opportunities and threats. The organisation should also audit its portfolio using space analysis, maintenance planning, estate register and risk auditing. Part of the strategy analysis should include a review of personnel employed in the provision of services and facilities management as well as the process and systems of facilities management.

Developing Solutions

At the solutions development stage, a structured approach is adopted to interpret the information obtained from the analysis stage. This is done by generations of options for facilities management, setting criteria for judging the options, evaluating the options against the objectives of the organisation

and selecting the preferred option, that is, the organisation's actual facilities management strategy.

Strategy Implementation

The Strategy implementation stage completes the strategy development process. At this stage the broad policy statements are developed into operational plans and implemented. The implementation plan should include timetables, key elements of change management, training, resource planning, and communication. Finally, procurement of services is considered and suppliers are selected.

On completion, the facilities management strategy should incorporate financial objectives, goals and critical success factors in terms of time, cost, and quality objectives, target for potential efficiency gains and quality improvements, customer – focus strategy, technical strategy, in-house/ outsourcing strategy, procurement strategy, human resource plan, methodology for managing change and information technology strategy (Akushie, 2000; Atkin and Brooks, 2000).

2.5 APPROACHES TO FACILITIES MANAGEMENT

According to Scarrett (1995:14) and Atkin and Brooks (2000:33) there are four broad models of facilities management in common use today. These are:

- In-house method – here the facilities managers are part or full-time employees of the organisation that owns the properties. The advantage of this method is that the team can be focused solely on the interest of

the institution. The in-house facilities management team is considered as part of the assets of the organisation. Therefore they will ideally be at least a party to management board decisions if not members of the Board of Directors (Spedding, 1999). However, there is a limitation, the team may not have all the expertise required for the management of the facilities or the staff may not be adequate for the services required.

- Appointed agent or outsourcing – with this method the facilities managers are appointed from outside the organisation (not full-time employees of the appointing institution). The advantage with this method is that it is possible to draw on knowledge and expertise beyond the immediate management area. However, agent may not have an in-depth knowledge of the facilities needs and problems of the institution. Further, there will not be exclusivity of engagement and the commitment is to a number of clients.
- Combination of in-house and outsourcing – this envisages two managers and two teams working together at various levels and intensities without either manager having total line management. Such an arrangement needs strong commitment from each team member to succeed.
- A hierarchical division, whereby the in-house manager directs the strategic thrust, limiting the agent to carry out a limited management role – the thrust of the business is conducted by the in-house managers, leaving the appointed agent to carry out the basic and repetitive tasks of property management. The reason for giving special assignment to an agent may be that in-house expertise is lacking or too

limited, that a second opinion is sought. There should be a contract between the parties setting out the precise extent of the agent's responsibilities to avoid misunderstanding.

2.6 FACILITIES MANAGEMENT TEAM

Facilities management draws on a body of knowledge. Architecture, Engineering, Construction, Technology, Management, Law and Economics are the fields in which the foundations of its core competence are to be found. Core competence in facilities management, according to Atkin and Brooks (2000:150) covers:

- Real estate management – building performance, environmental services, workplace design
- Financial management – accounting, finance, purchasing and supply, legal aspects
- Organisational management – organisational structure, behaviour, processes and systems
- Innovation and change management – technology and information management
- Human resources management – motivation, leadership, health and safety.

Price (2003) was of the view that, the facilities management industry can be divided into three categories: facilities managers, specialist consultants and service providers.

- Facilities Managers are responsible for particular facilities either for one organization or on behalf of a number of organizations and functions largely at the strategic level.
- Specialist Consultants provide targeted expertise in areas as diverse as architectural, structural, fit-out services and landscape design, cost management, project management, environmental assessment, energy planning and dispute resolution and function largely at the tactical level. The specialist consultant may include a land economist/ estates manager, (a general practice surveyor), quantity surveyor, architect, services and environmental engineer.
- Service providers include cleaning contractors, insurers, furniture suppliers, security, construction, catering, fleet managers and a range of other support services and functions largely at the operational level. All these professionals come together to work as the Facilities Management Team.

The Facilities Director is the head of the team. He/she co-ordinates and manages the delegated non-core functions and provide an interface between members of the team – service providers and the client – both internal and external. According to Best et al (2003), a Facilities Director may be a land economist with a certificate in Services Engineering or a services engineer with certificate in Accounting or Real Estate; and a Masters in Business Administration. Given the wide scope of facilities management, the manager or director must be knowledgeable in a variety of disciplines, with an in-depth knowledge in management. He/she must be able to take a physiological view

of buildings, that is, must understand how buildings and other constructed facilities function as an environment to support people in their work. A fundamental characteristic of the environment is change, and one of the main competences that facilities managers should have is an ability to manage change and resolve conflicts. The ultimate aim of the facilities manager is total quality management.

2.7 TOTAL QUALITY MANAGEMENT IN FACILITIES MANAGEMENT

Customer satisfaction, be it internal or external underlines the basic purpose for facilities management. Facilities therefore need to exhibit high quality standard in relation to key performance areas such as occupational health and safety, indoor air quality, fire safety, security and cleanliness (De Valence, 2003). The delivery of quality service in these areas is no accident; it requires careful planning, constant monitoring and the introduction of improvement initiations. This is the underlying principle of total quality management in facility management. According to Crigg and Jordon (1993:228) total quality management in facilities management means satisfying customer requirements, reducing costs, getting things right the first time, and avoiding waste by eliminating errors. The facility manager should be seen to support and motivate its teams by open communication and total commitment based on the principle of total quality management. These principles include:

- The philosophy – prevention not detention. This means that, work should be identified and carried out as soon as possible to avoid further damage of property asset.

- The approach – management must support facilities management decisions. They must show total commitment to the effect that they will be prepared to use their authority to support decision in times of crisis.
- The scale – every member of the team must be responsible for whatever facilities management decision taken. There should be group cohesiveness.
- The measure – cost of quality. Individuals should be given responsibility to look at their tasks and try to eliminate waste therefore reducing cost even more.
- The standard – right first time, this means that things must be done meticulously at the first time. This will mean no time wasting, not putting people under undue pressure and satisfying customers on first contact.
- The theme – continuous improvement, as a result of competition in the world today we need to ensure that after initial stock of total quality management, items do not fall back to old ways. This means that all customers of facilities management services should be reviewed on a continuous basis. This can be done by undertaking quality assessment of facilities to rank against industry benchmark and to highlight areas that can be improved or are unsatisfactory.

2.8 FACILITIES MANAGEMENT BENCHMARKING

Benchmarking is an external focus on internal activities and aimed at supporting the drive towards best practice through continuous improvement

(Atkin and Brooks, 2000:130). According to Armstrong (1994:33), it is a continuous, systematic process of evaluating organisations recognised as industry leaders, to determine business and work processes that represent 'best practice' and establish rational performance goals. It is about establishing the norms for performance in terms of financial, organisational, innovation and change management and customer focus. To be successful, benchmarking must be stakeholder driven, forward looking, participative and focused on quality and performance.

The process of benchmarking begins with a clear understanding of the organisation's mission and objectives, a thorough knowledge of operations, and a commitment to continuous improvement performance. Facilities management benchmarking involves the following steps:

- **Competitive Analysis** – the systematic analysis of competitors activity so that you can improve your performance.
- **Best Practice** – looking for best practice associated with the way facilities are managed. Some of the indicators of best practice include – cost of maintenance, frequency of facilities failure, subsequent repair costs, improvement in productivity of buildings and comfort and health of occupants (Akushie, 2000).
- **Performance Comparison** – a means of assessing facilities and facilities managers' performance.
- **Standard Setting** – a means of providing guidance on setting appropriate performance standards.

The purpose of benchmarking is to identify areas for improvement and stimulate change. It can provide management with a tool for making decisions about policies and procedures in regard to how services should be procured, and managed. To establish how well facilities are being managed there is the need to study what best-in-class organisations are doing. Continuous comparisons with organisations recognised as achieving best practice allow an organisation to recognise and close the gap between its own performance and best practice performance. Other benefits from benchmarking are that effective goals and objectives based on external conditions are set, customer requirements are defined and met, true measures of productivity of facilities are developed, competitiveness is enhanced and best way of doing things are sought, analysed and incorporated into facilities management plan (De Valence, 2003).

2.9 ADVANTAGES OF FACILITIES MANAGEMENT

The advantages of effective facilities management include:

a. Cost Control

Facilities are the second greatest cost of most organisations, so costly burden of too many facilities needs to be avoided. Worse still is having too little facilities, which could severely inhibit operations and thus prove to be financially disastrous. Facilities must therefore, be effectively managed to avoid the two situations. Effective facilities management ensures that there is a comprehensive span of cost control based on good budgeting,

communication, regular reporting system and careful performance monitoring (Akushie, 2000; Crigg and Jordan, 1993:8).

b. Increase Productivity

Workplace efficiency is closely linked to the facilities that are used in production. Since increased efficiency leads to increased productivity and profitability, there is growing interest by management in how best to manage facilities. When carefully designed and well-managed facilities enhance productivity as down time, travel time between functional areas and levels of disruption are reduced. Accessibility of information is also enhanced (Lamacraft, 1989). According to the International Facility Management Association (IFMA), business entities have come to realize that maintaining well-managed and highly efficient facilities is critical to success.

c. Improve Quality Of Work life

When buildings and equipment are safe, pollution, temperature, airflows, lighting and noise are controlled and furniture is ergonomically designed, quality of life at the workplace improves and productivity increases since sick leave and absenteeism reduce significantly (Lamacraft, 1989). In the case of educational institutions, Lackney (1999) was of the view that effective facilities management could lead to considerable improvement in students' performance.

d. Reduce Occupational Risk

Effective facilities management ensures compliance with legal requirement on safety at the workplace. It also helps to identify the main classes of relevant risk and to apply models for determining the exposure of an organisation to risk and for identifying the level of control that may be exercised over particular risks (Alexander, 1996).

2.10 PROBLEMS OF FACILITIES MANAGEMENT

The fact that facilities management is still emerging presents a number of problems. These include:

a. Skill-Base Needed

Due to the wide scope and the complexities in facilities management, most companies find it difficult deciding on what to put in recruitment advertisement. Some describe the facilities managers as a professional non-specialist, a broad-based generalist with skills that are people and management oriented than technical, since surveyors tend to be interested in just bricks and mortar. Some are also of the view that women make good facilities managers as they attach importance to details (Gale, 1999).

b. Low Level of Recognition of the Importance of Facilities Management

Although facilities are the second greatest cost outlay after payroll it is often left out in the priority list of most organisations. Unlike the finance and information managers, facilities managers are always at the lower end of the corporate ladder. They are often left out in boardroom decisions and this

affects the implementation of facilities management decisions (Tatum, 1999; Buys and Nkado, 2001). In educational institutions it is not considered as a strategic tool in improving the quality of education (Lackney, 1997).

c. Strict Cost Control Measures

Traditionally, senior managers consider the facilities they occupy a necessary cost of doing business. This mind-set leads to strict cost control and expense cuts and places the facilities manager in the difficult role of simple cost containment. Cutbacks are often made to the facilities management budget where there is the need to reduced cost resulting in frequent deferment of facilities maintenance (Lamacraft, 1989; Amoako-Nimako, 2001).

d. Poor Record keeping

Communication and decision-making between facilities users and managers are dependent on information, which is obtained through good facilities record keeping system. Incomplete and conflicting documentation as result of poor record keeping will hamper the ability to trace decisions on facilities and identify them for effective management (Gale, 1999; Alexander, 1996).

CHAPTER THREE

PROFILE OF THE STUDY AREA – KUMASI POLYTECHNIC

3.1 BRIEF HISTORY

The study area is Kumasi Polytechnic, a non-university tertiary institution set up to train middle level technical manpower for the nation. It is located in the Kumasi District of the Ashanti Region – Ghana. The Honourable Kojo Botsio, the then Minister of Education and Social Welfare laid the foundation stone of the present Kumasi Polytechnic on 15th May 1954. The institution was then called Kumasi Technical Institute. In October 1963, the institute was converted to a non-tertiary polytechnic status under the Ghana Education Service, and started offering technician, diploma and sub-professional courses together with the original craft courses it was offering.

As a result of the Educational Reform Programme and the enactment of the Polytechnic Law, 1992, PNDC Law 321, the status of the Polytechnic was raised to the level of a tertiary institution. The polytechnic now trains students up to the Higher National Diploma level, with a vision to mount degree programmes.

3.1.1 VISION

To train middle level manpower equipped with practical technical skills for the nation.

3.1.2 MISSION STATEMENT

To transform the institution into an academic, technical and practical excellence capable of running credible Higher National Diploma and Degree programmes that meet acceptable local and international standards.

3.1.3 OBJECTIVES

The objectives of the Polytechnic are to:

a. provide tertiary education through full-time courses in the fields of manufacturing, commerce, science, and technology, applied social science, applied arts and such other areas as may be determined by the authority for the time being responsible for higher education;
b. encourage study in technical subjects at tertiary level; and
c. create opportunities for development research and publication of research findings.

3.2 MAJOR ACTIVITY

The major activity of the Polytechnic is impacting knowledge through formal teaching and it is organized into three schools with fifteen academic departments running Higher National Diploma courses and other non-tertiary programmes. The programmes offered are the following:

a. School of Applied Sciences

HND Fashion and Textiles Design
HND Hotel, Catering and Institutional Management
HND Dispensing Technology
HND Statistics

b. School of Business and Management Studies

HND Accountancy

HND Secretaryship And Management Studies

HND Marketing

HND Purchasing And Supply

HND Estate Management

c. School of Engineering

HND Building Technology

HND Furniture Design and Construction

HND Mechanical Engineering

HND Electrical and Electronic Engineering

HND Civil Engineering

HND Chemical Engineering

d. Other tertiary level courses offered are:

Electrical and Electronic Engineering

Motor Vehicle Technicians III

Mechanical Engineering Technicians III

Construction Technicians Course III

Dispensing Technology III

Institute of Chartered Accountants (CA Ghana) Level I Certificate (part-time)

3.2.1 STAFFING POSITION

The Polytechnic is functionally organized, with the Polytechnic Council as the highest decision making body, followed by the Academic Board. The Principal

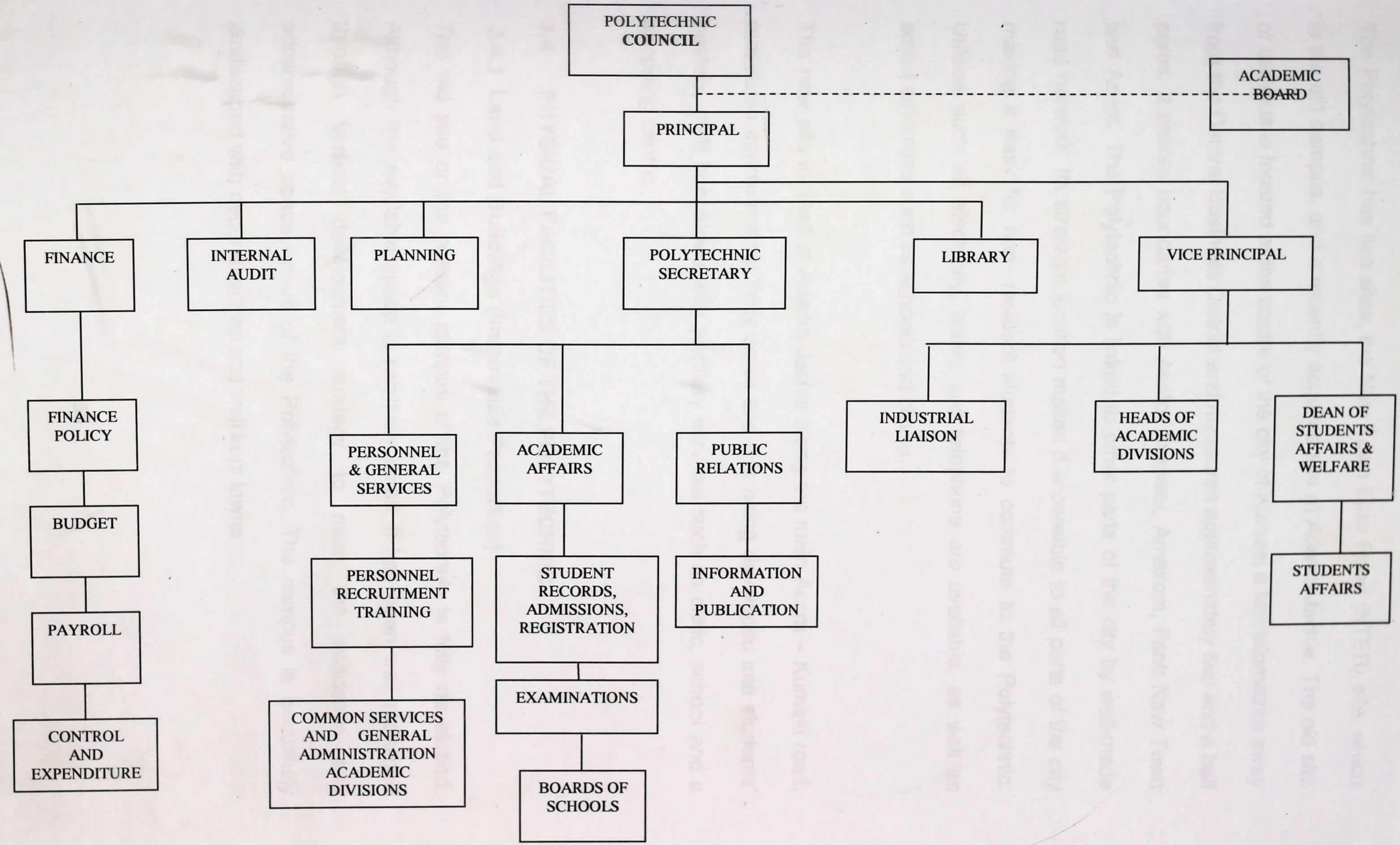
of the Polytechnic is the Chief Executive Officer. Other Principal Officers of the Polytechnic are:

- The Vice Principal
- The Polytechnic Secretary
- The Finance Officer, and
- The Librarian

The Polytechnic has a total of three hundred and two (302) staff. Out of this number, one hundred and five (105) are teaching staff, who are the line staff and one hundred and ninety-seven (197) are non-teaching staff and they are the supporting staff.

The structure of the Polytechnic is shown in figure 3.1, the organisational chart of Kumasi Polytechnic at page 52.

FIGURE 3.1 ORGANISATIONAL CHART OF KUMASI POLYTECHNIC



3.3 GEOGRAPHICAL LOCATION OF THE POLYTECHNIC

The Polytechnic has two sites, the New Town Ejisu Road (NTER) site, which is the old campus, and a recently acquired site at Adarko Jachie. The old site or campus is located at the centre of the city of Kumasi a few kilometres away from the Central Business District and measures approximately two and a half acres. It shares boundaries with Asafo, Asawasi, Amakom, Fanti New Town and Asem. The Polytechnic is linked to other parts of the city by well-made road network. Its strategic location makes it accessible to all parts of the city making it easy for non- resident students to commute to the Polytechnic. Utilities such as electricity, water, and telephone are available, as well as social amenities such as schools and clinics.

The new site located at Adarko-Jachie along the main Accra – Kumasi road, measures approximately thirty acres and it is being developed into students' hostels, staff bungalows with ancillary services such as clinic, school and a shopping centre.

3.4 PHYSICAL FACILITIES OF THE POLYTECHNIC

3.4.1 Land and Buildings (Immovable Properties)

The old site or the present campus of the Polytechnic is fully developed. Although the available space is relatively small, it has been well managed through vertical development strategy to meet the academic and administrative space needs of the Polytechnic. The campus is beautifully landscaped with decorative tree and well kept lawns.

Table 3.1 Landed Properties of Kumasi Polytechnic

Property	Quantity
Classroom blocks	
Four storey	
• Complete	1
• In-complete	1
Three-storey	1
Two-storey	1
One-storey	6
Staff bungalows	
• Three-bedrooms	10
• Two-bedroom flats	8
• Two- bedrooms	4
Administration/library block	1 (five- storey)
Student hostels	3 (two-storey)
Security post	10(single storey)
Non-resident students facility	1(single storey)
Clinic	1(single storey)
Computer Centre	
• Single storey	1
• Two-storey	1
Sports complex	1
Total	51

Source: Authors Compilation 2004

3.4.2 Movable Properties

The movable properties of the Polytechnic comprise all the properties that can be moved from one place to the other, they are otherwise referred to as chattels and are made up of the furniture and fittings, equipment – computers, laboratory and surveying instruments and vehicles. Since the Polytechnic has

no assets register, the quantities of its movable properties could not be obtained.

3.5 Facilities Management At The Polytechnic

According to the statute of the Polytechnic, there must be a Director of Works who normally functions as the Facilities Director and operates at the strategic level, an Estates Manager who is at the tactical level and Estate Assistants who are at the operational level. The Polytechnic has an estates organisation that takes care of all the facilities of the Polytechnic. Until March 2004 it was headed by a Works Superintendent assisted by a Ground overseer. Facilities management at the Polytechnic is only at the operational level, that is, the day-to-day cleaning and repair works. There is no strategic direction in facilities management as shown in the organisational chart of the Polytechnic. Though the Polytechnic statute stipulates that there should be a development officer, his position is not indicated on the organisational chart.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

This chapter provides the results of data obtained from the questionnaires, interviews, observations and discussions. Issues examined included background of respondents, facilities required by the departments in the Polytechnic, their availability, problems, user perceptions and effect of facilities management on user performance.

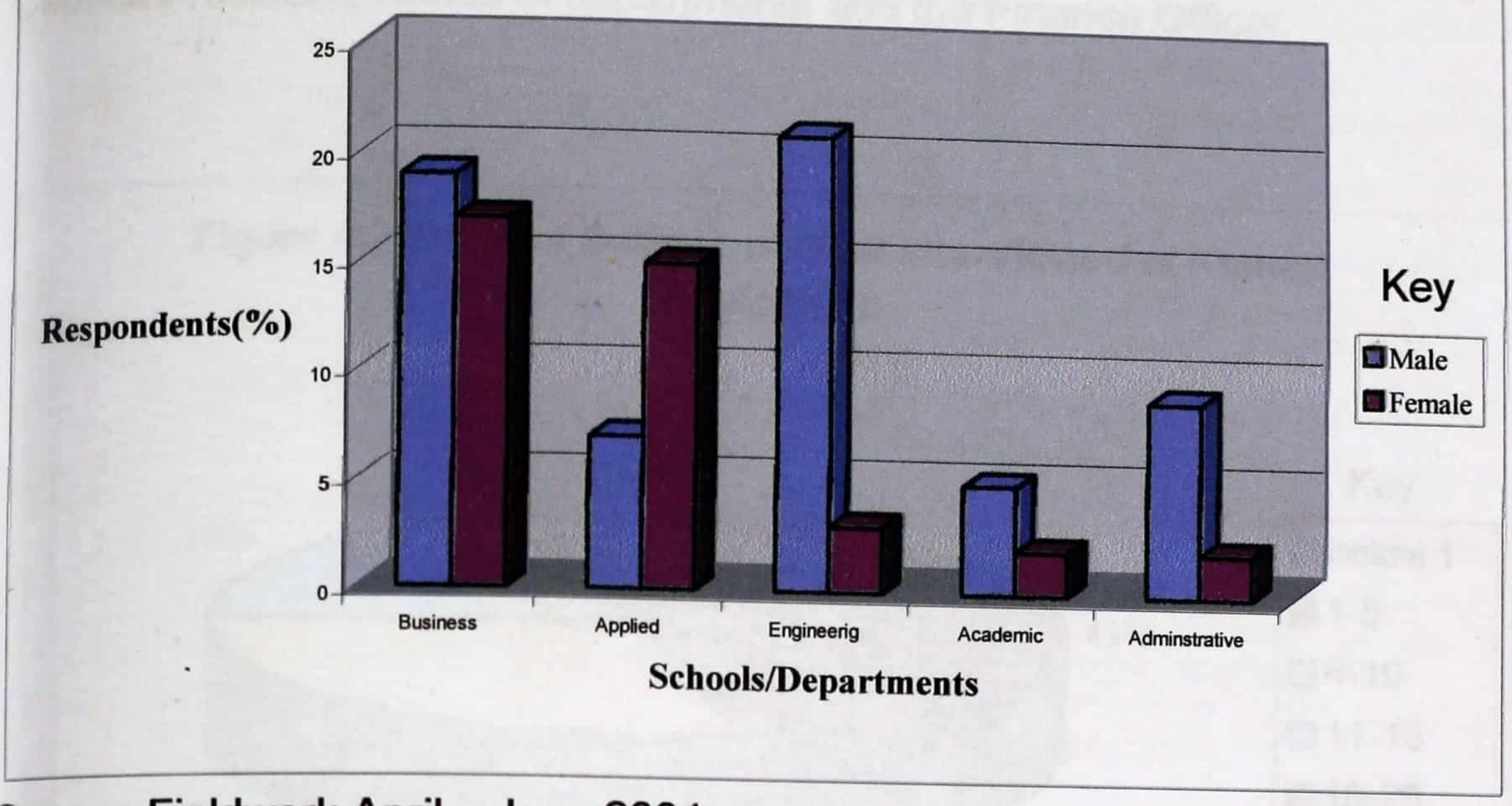
4.1 BACKGROUND OF RESPONDENTS

Respondents for the study were drawn from the various schools and departments at Kumasi Polytechnic. These were grouped into facilities managers and users.

Facilities Users

The facilities users were the respondents for the quantitative survey. The sample size was 339 made up of 279 students and 60 staff, out of this number, 307 made up of 251 students and 56 staff responded. This gives a total response rate of 91%. Figure 4.1 at page 57 shows the distribution of respondents by schools, departments and gender, with 64% of the total number of respondents being male and 36% being female. The students constituted 82% of the respondents, 36% from the school of Business and Management Studies, 23% each from Applied Sciences and Engineering. Staff constituted 18% comprising 11% administrative and 7% academic staff.

Figure 4.1 Background of Respondents of the Quantitative Survey



Source: Fieldwork April – June 2004

Facilities Managers

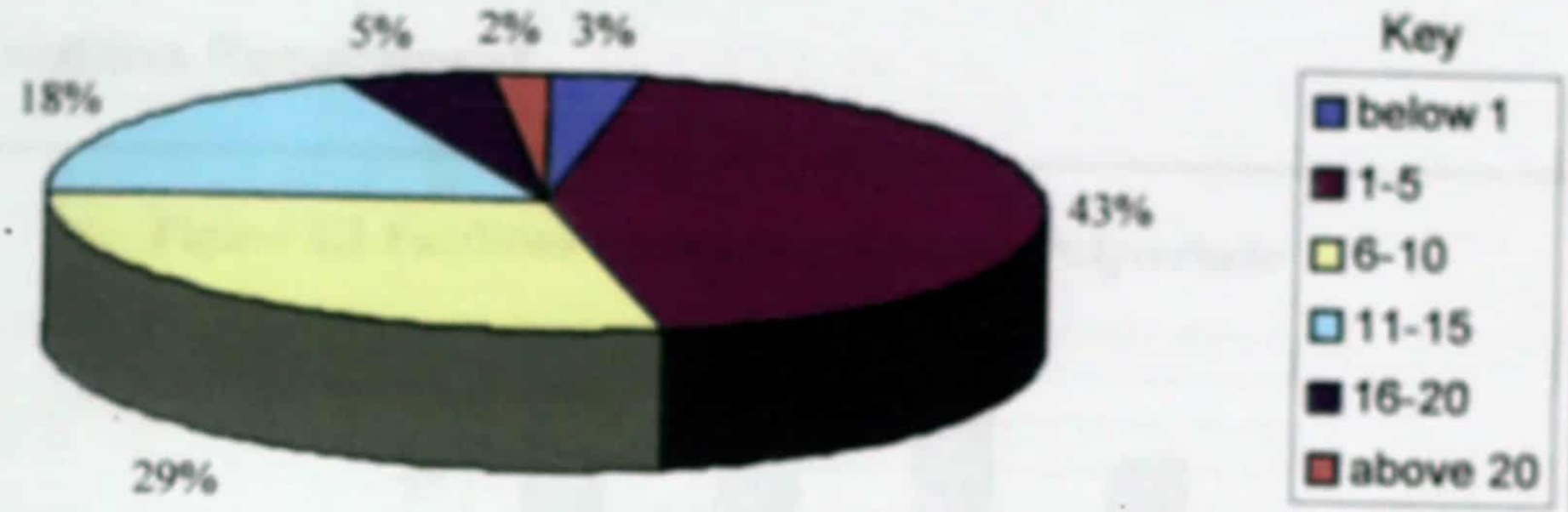
These are people responsible for managing facilities at the Polytechnic. They include the Estates Officer, Transport Officer, Finance Officer, Works Superintendent, and Grounds Overseer. The Facilities Managers were the respondents for the qualitative survey and were interviewed using in-depth interview guides. Their views were the most important and the views of the facilities users were to confirm or refute some of the issues raised by the facilities managers.

In-depth interviews

Some opinion leaders in the Polytechnic were also interviewed informally through discussions. They are chairpersons of the Polytechnic Teachers Association, Ghana, Polytechnic Administrators Association, Ghana,

Teachers and Educational Workers Union, the Students' Representative Council President, Heads of departments and the Finance Officer.

Figure 4.2 Years of Service of Staff Interviewed at Kumasi Polytechnic



Source: Fieldwork April – June 2004

Figure 4.2 shows that 43 % of the respondents had worked at the Polytechnic between 1 – 5 years, 29 % for 6-10 years, 18% for 11-15 years, 3% had worked at the Polytechnic for less than one year and 2% for above 20 years. The modal years of service are 1 – 5 years. Put together, 90% of the respondents had worked at the Polytechnic from between I to 15 years. This implies that the respondents are more or less non-participant observers at the Polytechnic and therefore, have insight into the facilities management problems at the Polytechnic.

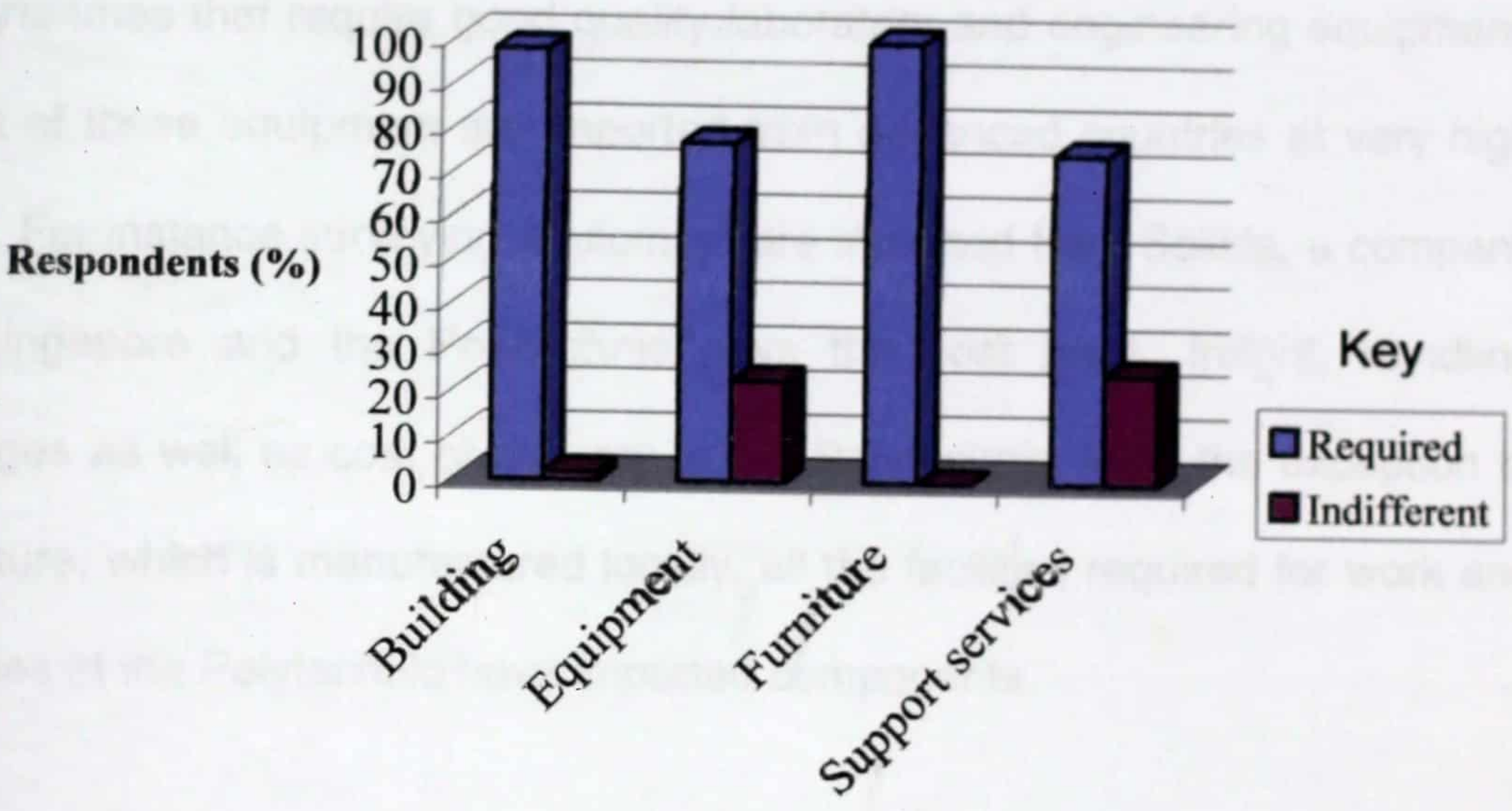
It can be inferred from Figure 4.2 that the problems of facilities management at the Polytechnic have persisted for not less than 15 years. This was expected since the Polytechnic is still developing and as such has a lot of

teething problems, which include among others the problems of managing physical facilities. However, since the physical facilities play an essential role in the achievement of the objectives of the Polytechnic, these problems ought to be addressed.

4.2 NATURE OF FACILITIES

4.2.1 Facilities Requirement

Figure 4.3 Facilities Required at Kumasi Polytechnic



Source: Fieldwork April – June 2004

Figure 4.3 shows that 98% of the respondents stated that they need buildings for their studies and work and 2% were indifferent. Thirty five percent of these respondents were from the School of Business and Management Studies. Out of the 77% of the respondents who said they needed equipment for their work and studies, 21% of them were from the School of Applied Science and 23% from the School of Engineering. All the staff constituting 18% of the respondents reiterated that they need equipment for their work. Twenty-three

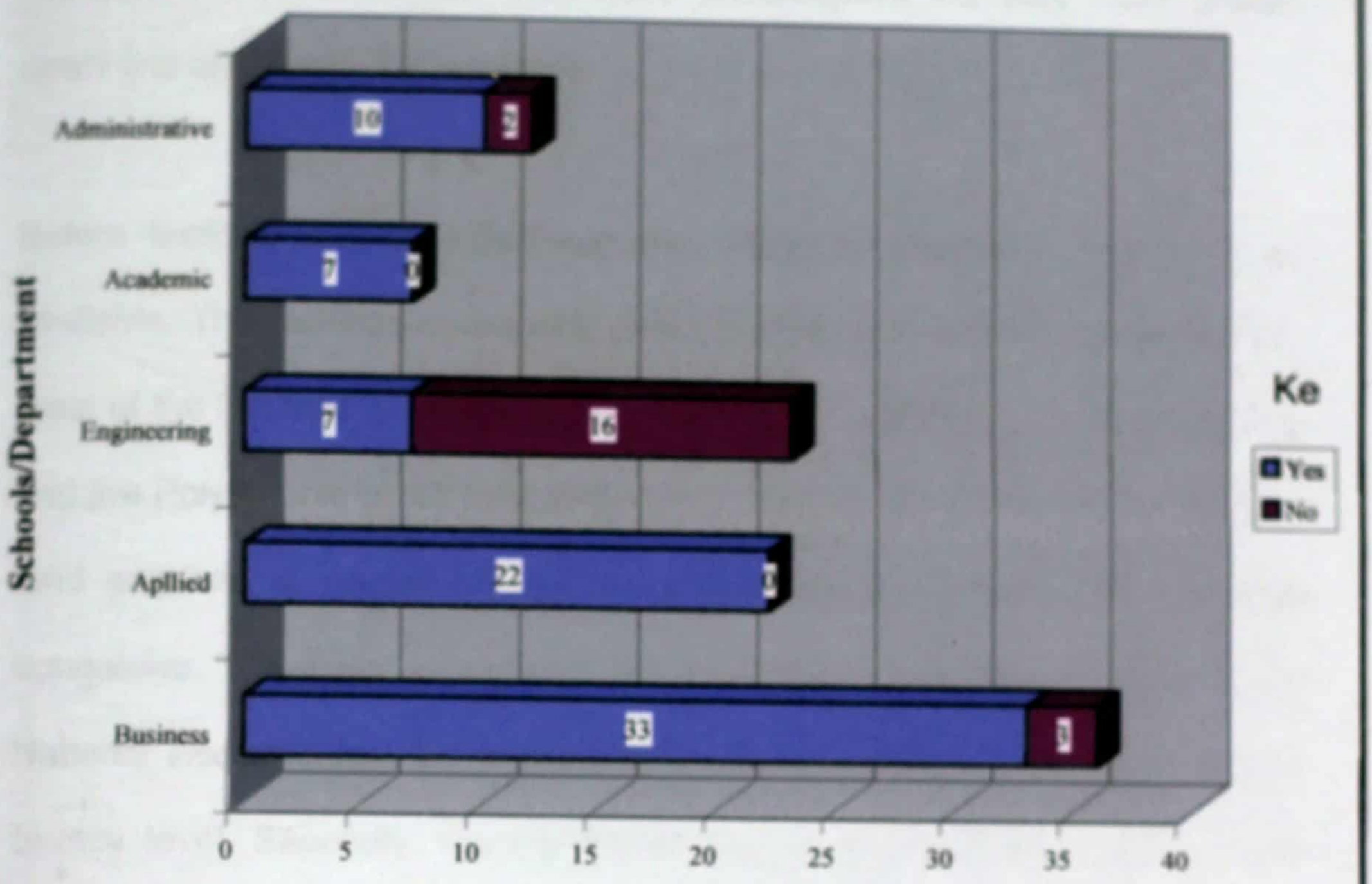
percent were indifferent. All the 307(100%) respondents said that furniture are needed for their work and studies. Seventy-five percent of the respondents cared about the type of support services provided while 25% were indifferent.

Since programmes offered at the school of Business and Management Studies are classroom-based, which means that students spend most of their time in the classrooms, the students were of the view that classrooms must be well-managed to make them comfortable and suitable for their programmes. The Schools of Applied Sciences and Engineering offer practical oriented programmes that require good quality laboratory and engineering equipment. Most of these equipment are imported from advanced countries at very high cost. For instance surveying equipment are imported from Sokkia, a company in Singapore and the Polytechnic pays the cost price, freight, handling charges as well as cost of delivery to the Polytechnic. With the exception of furniture, which is manufactured locally, all the facilities required for work and studies at the Polytechnic have imported components.

The polytechnics run variety of programmes as such there are many facilities to be acquired and managed. This means that more funds and skills are needed for the acquisition and management of facilities at the Polytechnic. However, the study revealed that there are no strategic plans for the effective management of these facilities acquired at very high cost. As a result most of these facilities get spoilt in no time. The polytechnics were upgraded to tertiary level in 1994 as such, they are still at the formative stage with lot of problems including unavailability and inadequacy of facilities.

4.2.2 Availability of Facilities

Figure 4.4 Availability of Facilities



Source: Fieldwork April – June 2004

According to Figure 4.4, 79% of the respondents made up of 33% from the School of Business and Management Studies, 22% from School of Applied Sciences, 7% from School of Engineering, 7% of Academic staff and 10% of Administrative staff stated that facilities are available. Twenty-one percent of the respondents stated that some of the facilities needed are not available, with an alarming 16% from the School of Engineering, 3% from School of Business and Management Studies and 2% from the Administration. Further investigations revealed that the School of Engineering has a peculiar problem because some of the departments do not have enough space for the

installation of some of the available laboratory equipment and as a result, students have to go to the Kwame Nkrumah University of Science and Technology (KNUST) for some practical works. It was also revealed that some of the administrative staff need photocopiers but they have broken down and as it were, not available.

Before facilities can be effectively and efficiently managed, they must be available. The facilities managers, users and opinion leaders confirmed that most of the facilities required for the activities of the Polytechnic are available and the Polytechnic is still acquiring more. For instance, a thirty-acre piece of land acquired at Adarko Jachie is being developed into hostels and staff bungalows. The major reasons for the availability of facilities are that; it is a National Accreditation Board requirement for mounting any program at the tertiary level. Secondly, the GETFUND has in recent years spent a lot of money on acquisition of facilities and students also pay academic facilities user fees every year towards the acquisition and maintenance of facilities. Table 4.1 shows the Polytechnic's expenditure on physical facilities between 1999 and 2004at page 63

Table 4.1 Capital Expenditure on Physical Facilities from 1999 to 2004

Year	Amount (¢) Spent on Facilities	Total Budget	% Of Total Budget
1999	788, 000,000	3,046,496,694.00	26
2000	983, 600, 000	4,408,388,228.00	22
2001	1,260,600,000	4,925,557,362.00	26
2002	1,100,000,000	5,745,632,123.00	19
2003	1,600,000,000	6,128,369,332.14	26
2004	2,831,000,000	7,966,424,570.00	36

Source: Finance Office, Kumasi Polytechnic

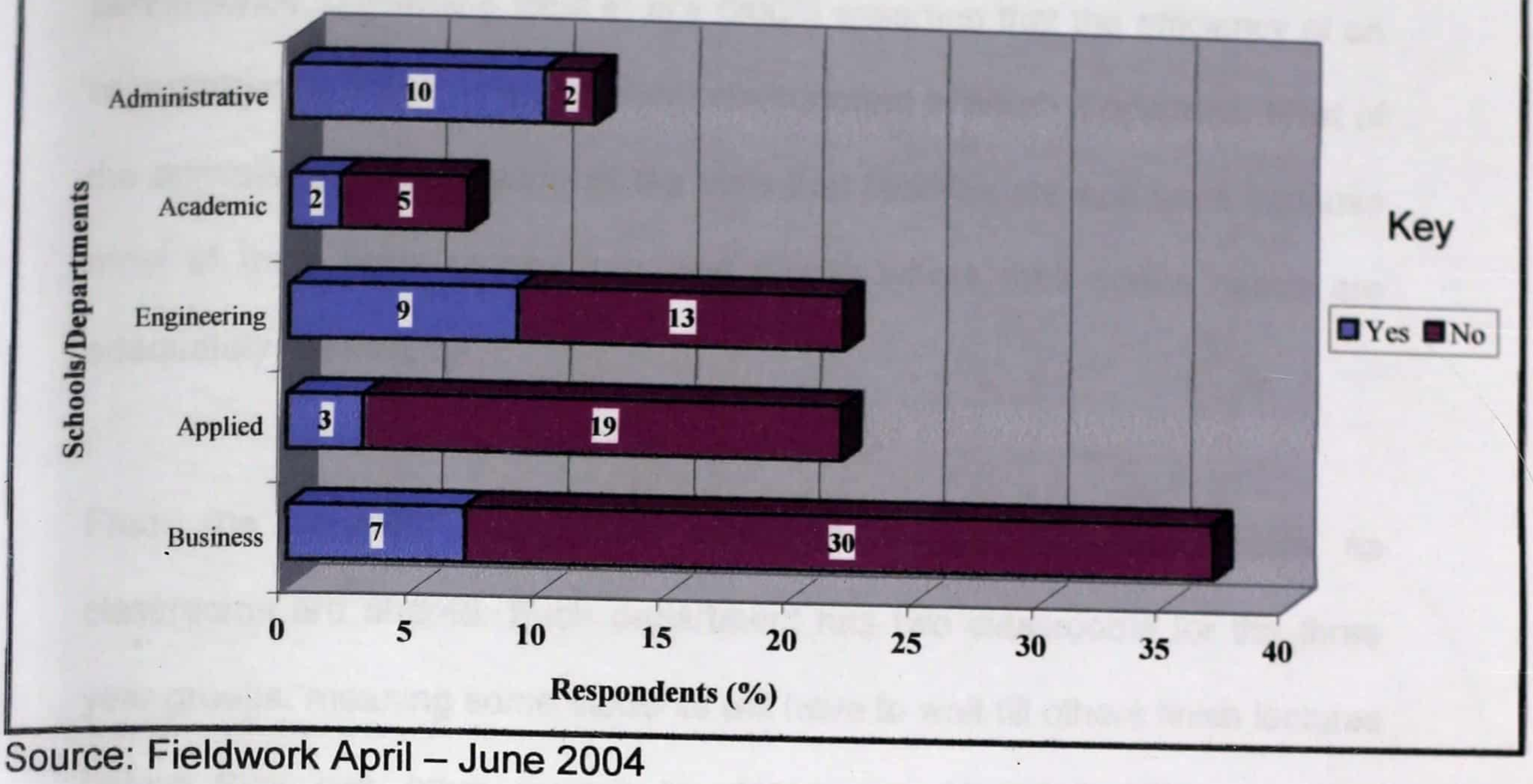
The Polytechnic's capital expenditure, which is basically physical facilities acquisition expenditure, increases every year as shown in Table 4.1 above. In 1999, the total budget of the Polytechnic was ¢3,046,496,694 and ¢788, 000,000 of it was spent on physical facilities acquisition. This amount represented 26% of the total budget of the Polytechnic. The expenditure on physical facilities increased to ¢983,600,000 in 2000, representing 22% of the total budget of ¢4,408,388,228. In 2001, the total budget was ¢4,925,557,362 and ¢1,260,600,000 of it representing 26% of the total budget was spent on physical facilities. However, in 2002, there was a slight reduction in the capital expenditure to ¢1,100,000,000. The amount represented 19% of the total budget of ¢5,745,632,123. According to the Finance Officer, this reduction was due to the fact that the Ghana Education Trust Fund (GETFUND) financed some of the Polytechnic's facilities development projects in that year. But the amount rose again to ¢ 1,600,000,000 in 2003 representing 26% of the total budget of ¢6,128,369,332. The Polytechnic

budgeted ¢2,831,000,000 for capital expenditure for 2004. This amount represents 36% of the total budget of ¢7,966,424,570. It is clear that the Polytechnic spends between 19% to 36% of its total income on facilities acquisition and development. In addition, in 2002 the GETFund spent a total of ¢ 29,063,484,710 on the development of facilities in the polytechnics. This amount increased to ¢ 75,686,134,773 in 2003 (Source: Finance Office – Kumasi Polytechnic). This means that there was a 62% increase in funds disbursed to all the polytechnics.

The huge sums of money spent on facilities, support Crigg and Jordan's (1993) view that physical facilities are the second largest expenditure item of most organisations. However, it was observed that little attention is paid to the maintenance of these facilities acquired at very high cost because the Polytechnic does not have a specific budget for facilities maintenance. Each department is arbitrarily allotted some amount for facilities maintenance based on the previous year's budget.

In spite of the fact that government, foreign donors, non-governmental organisations and students have helped in equipping the polytechnics in the country, facilities are still not adequate. Most of the respondents were of the view that these facilities are still not adequate as shown in Figure 4.5 at page 65.

Figure 4.5 Adequacy of Facilities



Source: Fieldwork April – June 2004

In spite of the efforts being made towards the acquisition of physical facilities at the Polytechnic, facilities managers, users and opinion leaders stated that physical facilities are woefully inadequate. Figure 4.5 shows that 69% of the respondents stated that physical facilities are not adequate. Thirty percent of these respondents were from the School of Business and Management Studies, 19% from the School of Applied Sciences, 13% from the School of Engineering, 5% from the academic department and 2% from the administration.

Most of the academic staff were of the view that facilities were inadequate because they do not have personal offices. Heads of departments share four-metre square offices with all other members of staff. The same office is used as general office for students' registration and all other administrative work. The offices are therefore overcrowded thus not conducive for personal

studies. But according to Maslow's Theory of Human Motivation, a personal territory – a comfortable personal office is a motivating factor for improved performance, confirming Best et al's (2003) assertion that the efficiency of an organisation is linked to the physical environment in which it operates. Most of the administrative staff were of the view that facilities are adequate because most of them have moved into new offices where their space needs are adequately catered for.

From the students' standpoint, buildings are woefully inadequate as classrooms are shared. Each department has two classrooms for the three year groups, meaning some students will have to wait till others finish lectures before they can have access to classrooms. Hostel facilities are also inadequate; the Polytechnic has only three hostels accommodating only 13% of the entire student population. Students waste a lot of time commuting to the Polytechnic, as most of them are non-resident students. This has led to lateness at lectures.

Learning and teaching equipment were also said to be inadequate. To offer students equal opportunity in practical training, practical work is done in groups, thus using two or three days for practical work instead of one day. The extra days are considered as overload for which the Polytechnic has to pay. This increases the cost of teaching at the Polytechnic. Sometimes students have to travel to the Kwame Nkrumah University of Science and Technology for some practical and laboratory work. Again, the Polytechnic

has not got enough buses so the students go in batches and this affects their work as some arrive late.

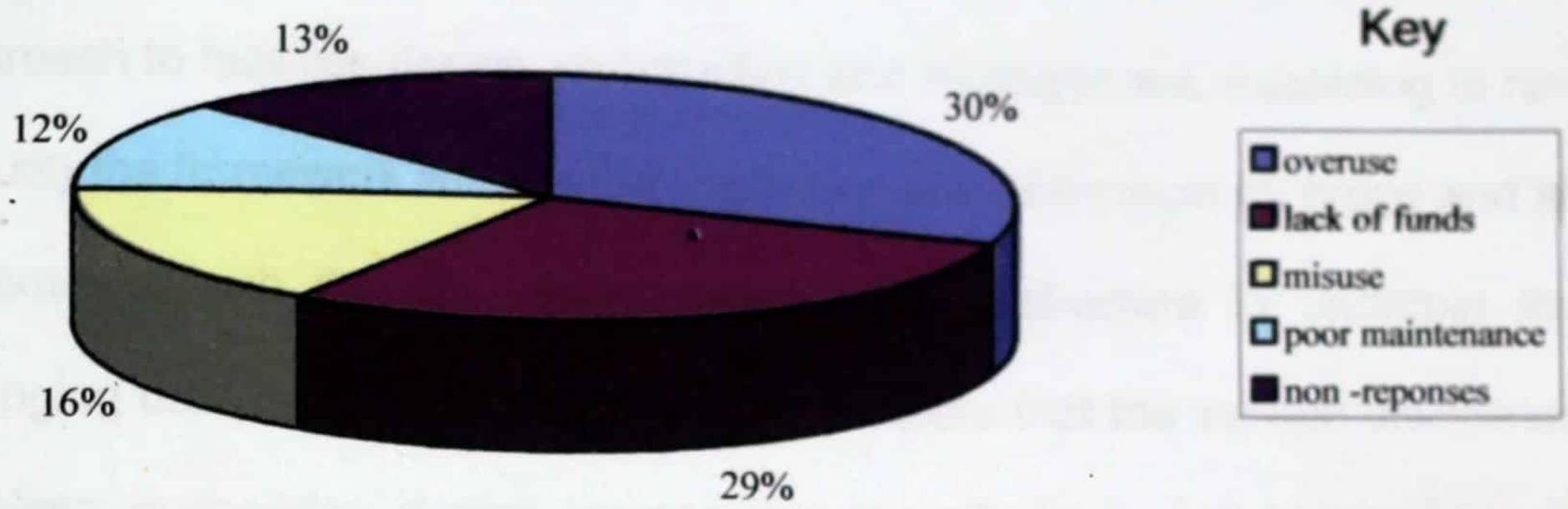
It was further revealed that some support services are not adequately provided. With the environment, one can say that it is well catered for, as a visit to the Polytechnic will show. The compound is clean and beautifully landscaped; lawns are well-kept with well-made car park, a neat sports complex, and waste well managed and disposed. Some safety and security measures are also in place to ensure the safety of the Polytechnic community. For instance, there are some fire extinguishers around as a preventive measure in case of fire outbreak but not all areas have them, but the Polytechnic Clinic has only three rooms – the consulting room, reception and a sick bay and one part-time medical officer for the four thousand nine hundred and fifty staff and students of the Polytechnic.

4.2.3 Reasons for Inadequacy of Facilities at the Polytechnic

According to the Finance and Estate Officers, inadequacy of facilities at the Polytechnic is due to lack of funds for the expansion of existing facilities as students intake increases. Other members of staff and students supported this view as can be seen from Figure 4.6 at page 68. Thirty percent of the respondents stated that facilities at the Polytechnic are inadequate because of the large number of users as against the number of facilities available. This was followed closely by lack of funds for planned maintenance and acquisition of more facilities as 29% of the respondents said. Sixteen percent stated that facilities are misused (especially by students), 12% were of the view that poor

maintenance practice leads to frequent breakdown of facilities especially furniture and equipment thus reducing the number of facilities available. Twelve percent did not respond.

Figure 4.6 Reasons for Inadequacy of Facilities



Source: Fieldwork April – June 2004

The study shows that large number of facilities users and lack of funds for the expansion of existing facilities are the major reasons for the inadequacy of facilities, but these two problems are the result of incorrect budgeting techniques and lack of proper maintenance management system. Maintenance budget is often based on the previous year's spending plus adjustment for changes in prices and inflation because until March 2004 there was no qualified Estate Officer to prepare a budget for the department.

The inadequacy of facilities at the Polytechnic is also the direct result of lack of space. There is a clear indication that those who acquired the current site of the Polytechnic did not take into consideration the future needs and its growth prospects. Secondly, existing buildings do not have the inherent

adaptability and technical capacity to support the changing needs of the polytechnic. These problems are the results of lack of strategic direction, professional advice and consultation in facilities acquisition, development and management decisions. Facilities management decision at the Polytechnic has always been a top-to-bottom system of decision-making where management decides for the rest of the people with little or no consultation. This is contrary to Alexander's (1996) view that there must be a holistic approach to facilities design, construction and management. According to him (op cit) the framework within which decisions are taken must be broad and all embracing, with the aim of generating an infrastructure to underpin the changing demands of occupants. This will ensure that the various disciplines involved in facilities design incorporates a unified view of buildings as a functioning unit rather than a shell with many independent, contradictory and inefficient services.

4.3 FACILITIES MANAGEMENT STRUCTURE

Facilities management must be well planned such that there will be a single point of responsibility and decisions will be linked to the executive management (Alexander, 1996; Price 2003). At the KNUST, there is a Director of Works and Physical Development who is at the strategic level, the Estates Officer, Maintenance Engineer, Medical Director, Transport Engineer and an Environmentalist are at the tactical level and the Service Providers at the operational level. Facilities management is therefore linked to executive management.

The study revealed that facilities management is not well-planned, co-ordinated and controlled at the Polytechnic. According to the Finance Officer, there is no policy on facilities management that links the three levels of facilities management. Decisions are made as and when problems arise and there is no single point of responsibility. The Estates Officer and the respondents confirmed this. Fifty-four of the respondents were not sure of who is responsible for facilities management decisions at the strategic level, 16% said heads of departments, 15% said the Hall Warden, 8% said the Estates Officer, 2% said the principal while 5% did not respond. The Development Officer and Estate Officer who serve as the link between the executive management and the operational level are not even represented on the organisational chart of the Polytechnic (Refer to Figure 3.1 at page 52). In effect, there is no facilities management department

Currently there is no link between the strategic and the tactical levels, since the Polytechnic has no Facilities Director who functions at the strategic level where decisions are made. As a result, there is also no representation on two important committees that decide on physical facilities development – the Development Committee is responsible for all matters concerning the acquisition, development, maintenance and disposal of land, building and property coming within the functions of the Council and the Tender Board that consider the award of contracts of physical development and acquisition of all other Polytechnic properties. For instance, the Ho and Accra Polytechnics recently advertised for Development Officers (Daily Graphic, 21st July 2004). This means physical developments have been carried out in the polytechnics

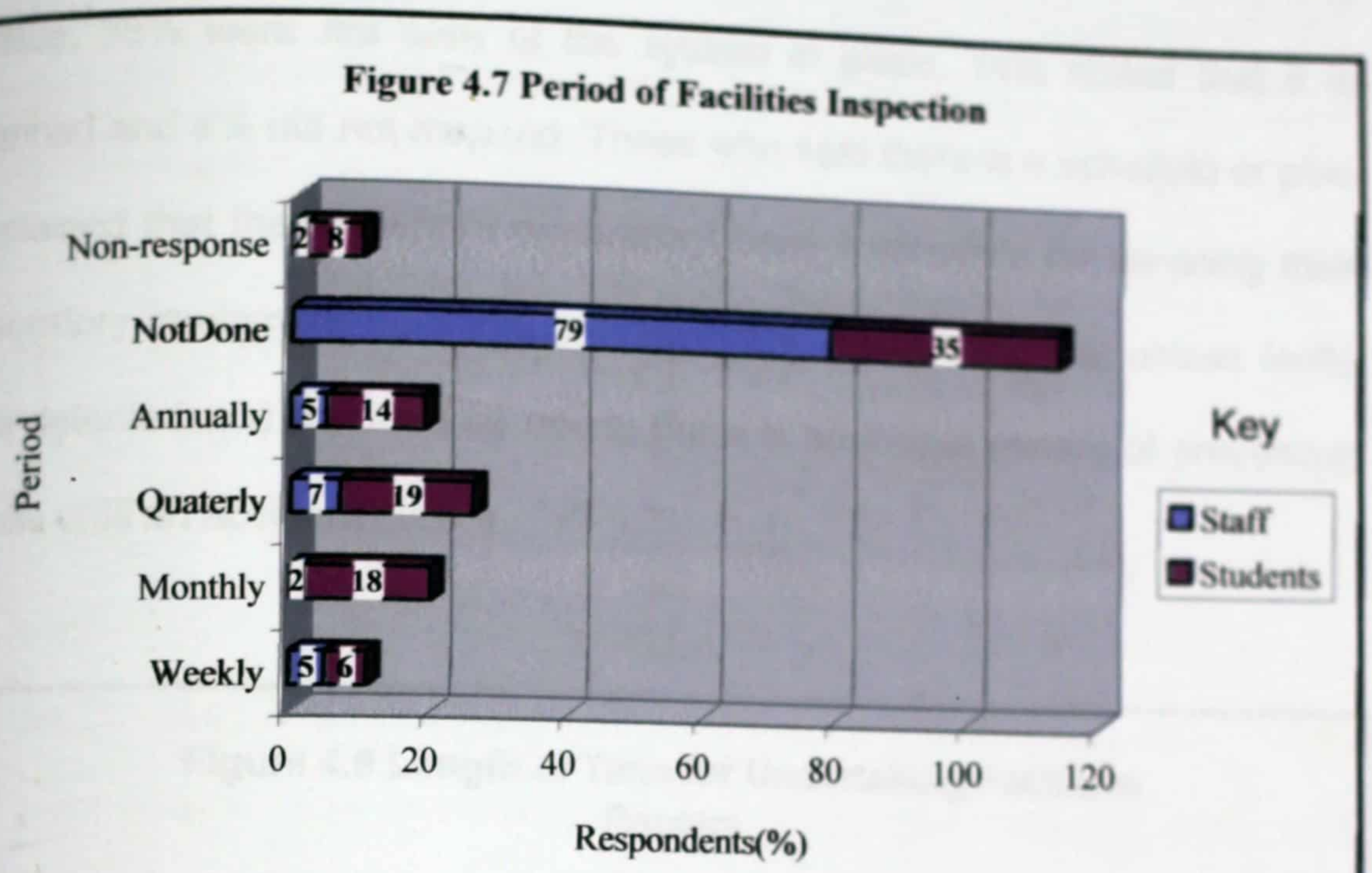
without the Development Officers' valuable contributions. He or she has key contributions to make from the inception to the completion stage, ensuring among other things that problems of existing buildings are considered in new buildings (Alexander, 1996). The effect of lack of professional advice in the development and management of facilities has manifested in the space utilization of the two new office blocks recently commissioned at the Kumasi Polytechnic. While one has a problem with the office layout, the other has a problem with the internal useable space. Facilities management decisions at the Polytechnic shows that facilities management decision-making is not directly linked to the Executive Management and this does not augur well for the implementation of facilities management decisions, since this link is crucial in changing management's perceptions about facilities management.

4.4 MODE OF FACILITIES MANAGEMENT

Facilities management at the Polytechnic is basically the daily cleaning and repair works on landed properties and furniture, but regular planned physical inspection of facilities is an essential part of good facilities management practice. According to Figure 4.7 at page 72, an alarming 79% of staff and 35% of students reiterated that regular physical inspection of facilities is not done. Nineteen percent of students and 7% of staff stated that it is done quarterly, 18% of students and 2% of staff said it is done monthly, 14% of students and 5.4% of staff said it is done annually, 6.4% of students and 5.4% of staff said it is done weekly while 8% of students and 2% of staff did not respond to the question. According to the newly employed Estates Officer,

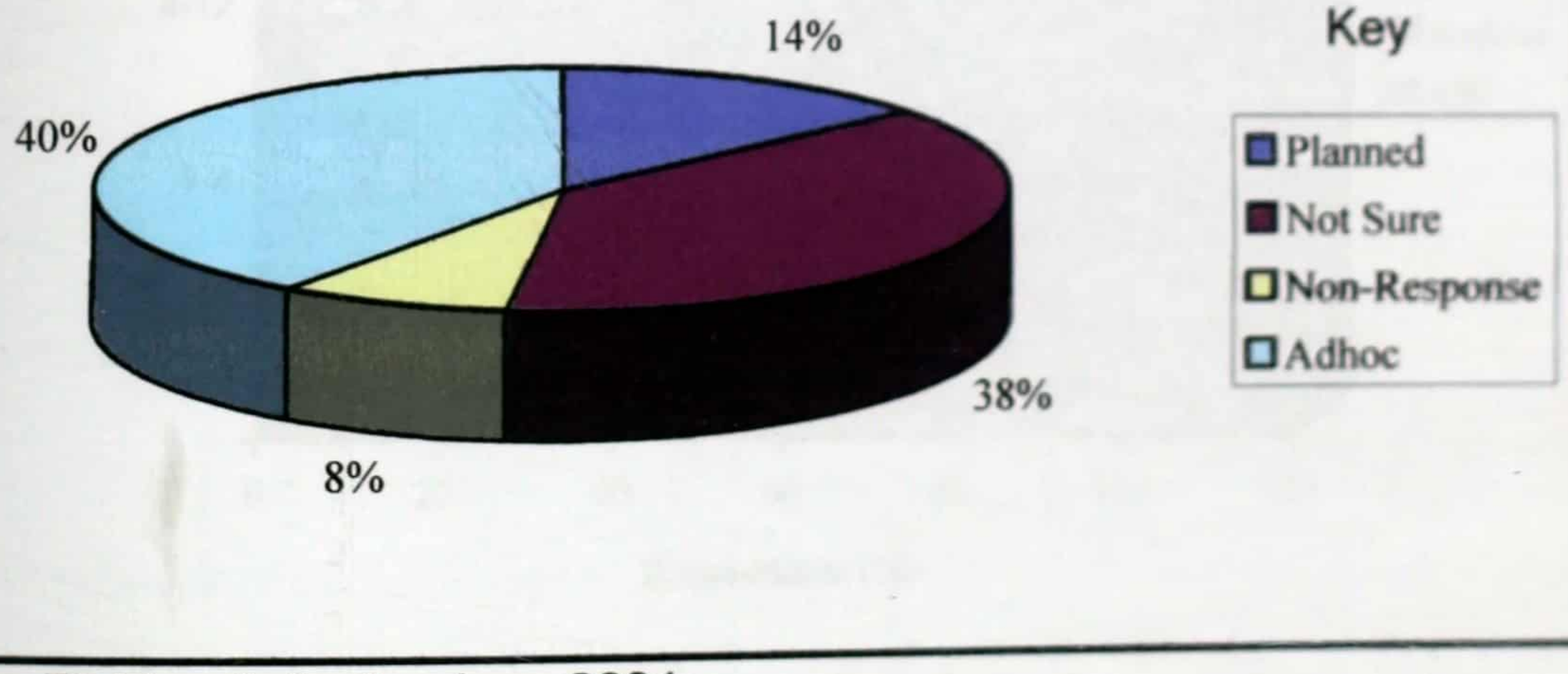
there was no document on the schedule for facilities inspection when he took over.

Figure 4.7 Period of Facilities Inspection



Source: Fieldwork April – June 2004

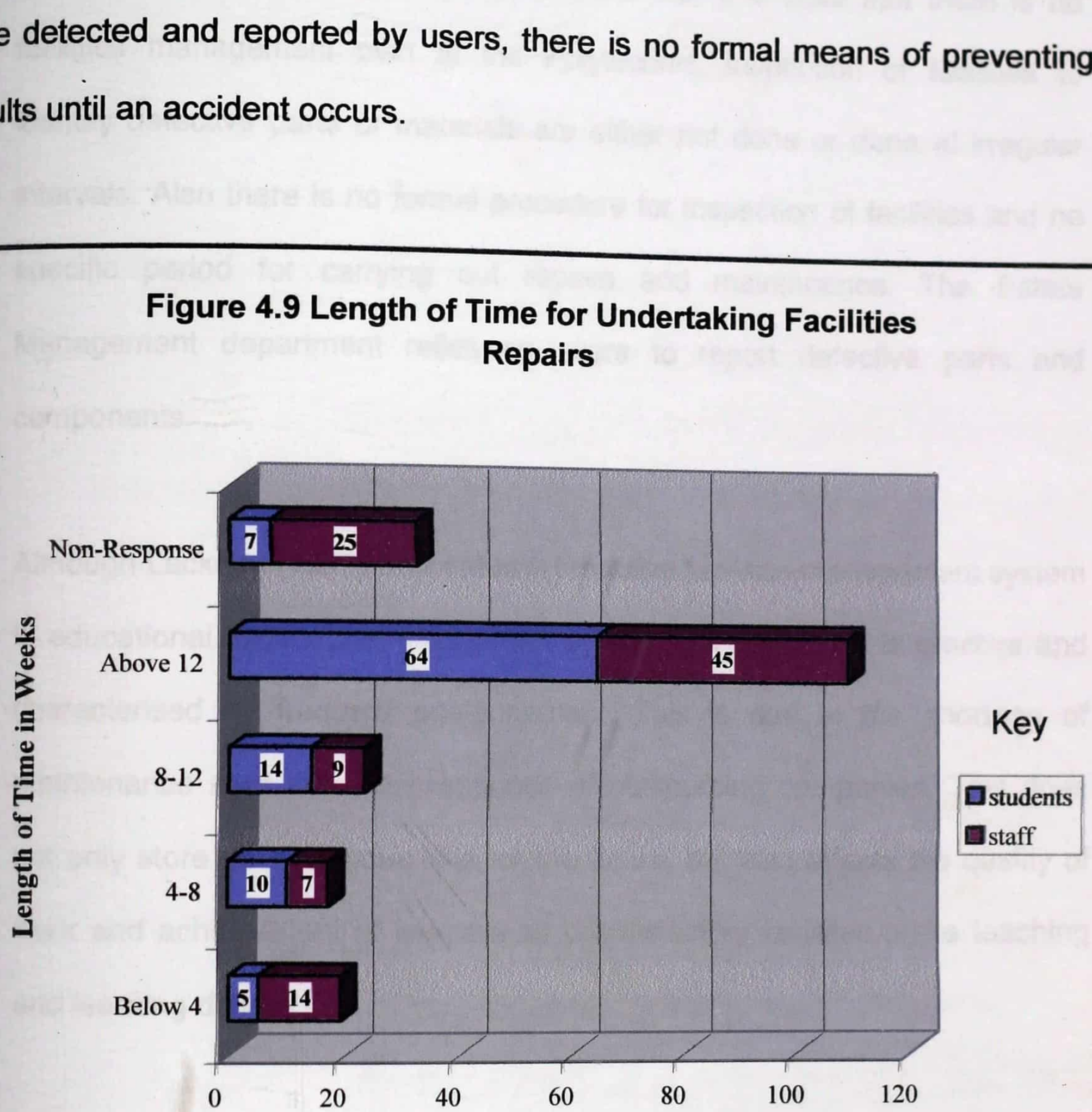
Figure 4.8 Procedure for Facilities Inspection



Source: Fieldwork April – June 2004

The study also revealed that there is no formal procedure for facilities inspection. Figure 4.8 at page 72 shows that 40% of the respondents stated that facilities inspection is done as and when problems arise. That is, it is adhoc, 38% were not sure of the system in place, 14% stated that it is planned and 8% did not respond. Those who said there is a schedule or plan explained that their heads of department have a schedule for servicing their laboratory equipment from the manufacturers. This shows that unless faults are detected and reported by users, there is no formal means of preventing faults until an accident occurs.

Figure 4.9 Length of Time for Undertaking Facilities Repairs



Source: Fieldwork April – June 2004

From Figure 4.9 at page 73, 64% of the students and 45% of staff indicated that it takes more than twelve weeks for repair works to be carried out. Fourteen percent of students and 9% of staff said it takes 8 –12 weeks, 10% of students and 7% of staff said 4 – 8 weeks, while 5% of students and 14% of staff said less than 4 weeks. Seven percent of students and 25% of staff did not respond.

Based on the data in Figures 4.7, 4.8 and 4.9, it is clear that there is no facilities management plan at the Polytechnic. Inspection of facilities to identify defective parts or materials are either not done or done at irregular intervals. Also there is no formal procedure for inspection of facilities and no specific period for carrying out repairs and maintenance. The Estate Management department relies on users to report defective parts and components.

Although Lackney (1999) advocates a proactive facilities management system in educational institutions, the system at Kumasi Polytechnic is reactive and characterised by frequent postponement. This is due to the shortage of maintenance staff and slow response of outsourcing companies. This does not only store up enormous bills for the future, but also affects the quality of work and achievement of learners as unsatisfactory facilities make teaching and learning difficult.

Furthermore, it was revealed that although the Polytechnic owns all its properties, maintenance management is basically “operate-to-failure” and

"condition-based". Operate-to-failure means that all regular servicing is done, but nothing else to prolong the life of the building or equipment until a complete failure occurs. "Condition-based" also means parts or materials are replaced before they fail, but the replacement is done only when there is a clear indication that failure would occur. It is only the transport department that has fixed time maintenance strategy. That is, component parts and materials are replaced strictly in accordance with predetermined or manufacturer-specified schedules even if they are nowhere near failure (Buys and Nkado, 2001; Atkin Brooks, 2000). However, for effective facilities management, there must be a facilities preventive maintenance plan that specifies the period for facilities inspection, procedure for inspection and the period within which maintenance should be carried out, so that work can be carried out in a systematic way to ensure effective use of the limited funds available. Alexander (1996) also stated that some of the best practice criteria for maintenance management in tertiary institutions are the establishment of regular maintenance inspection cycles to identify defects, availability of a sound facilities management policy and setting priorities for executing maintenance work. It is therefore disturbing to note that the Polytechnic has no policy on facilities management.

4.5 PROBLEMS OF FACILITIES MANAGEMENT

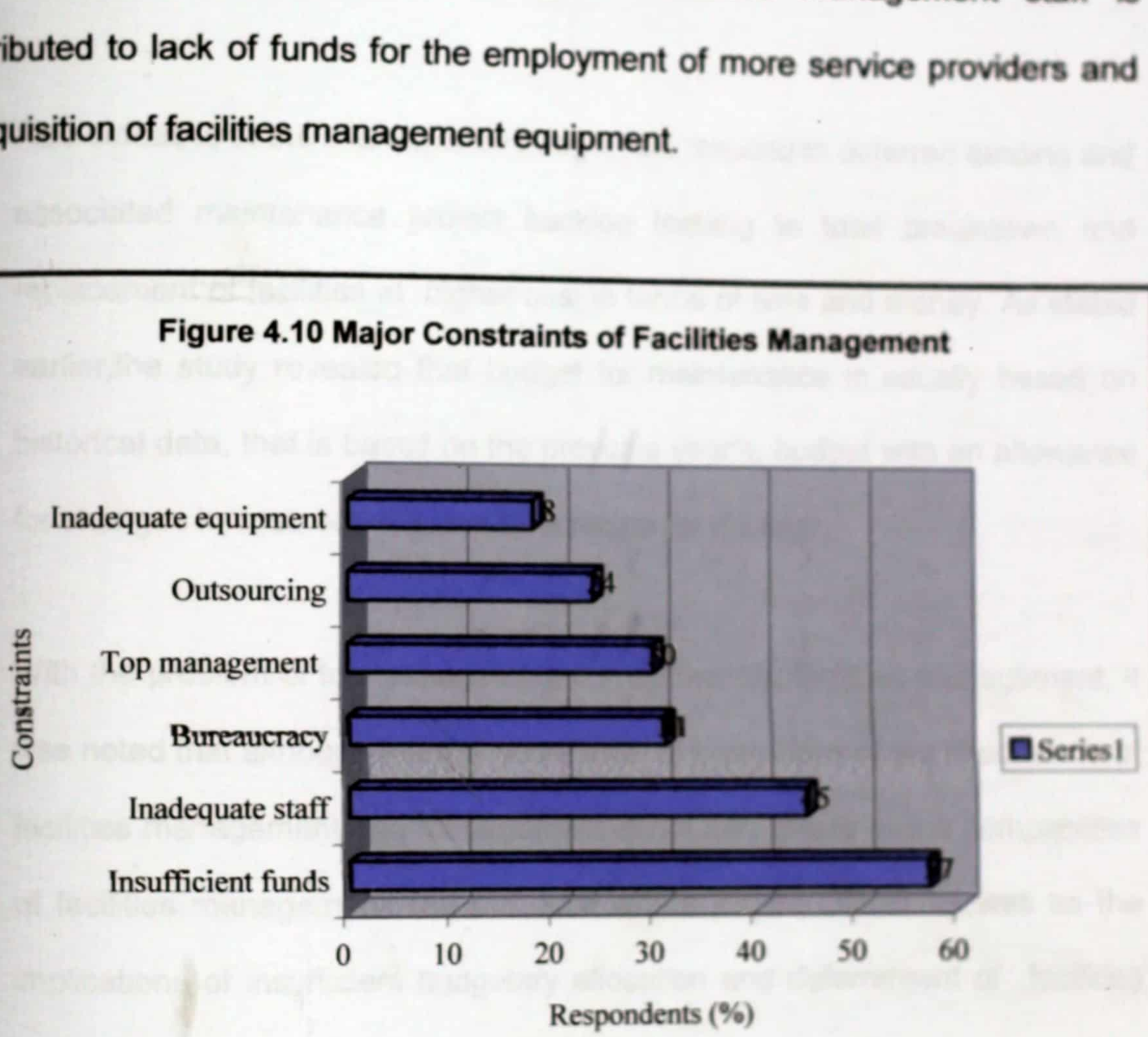
4.5.1 Major Constraints of Facilities Management

Figure 4.10 at page 76, shows that insufficient funds is the major constraint of facilities management followed closely by shortage of facilities management

staff, bureaucracy, lack of top management commitment, delays by outsourcing companies, and inadequate facilities management equipment.

It is true that insufficient funds is the major problem militating against the effective management of facilities because most of the problems encountered is as a result of inadequate funds from the central government and improper budgeting techniques. The inadequacy of facilities for instance, is due in part to lack of funds for the expansion of existing facilities leading to the overuse of the facilities. Secondly, the shortage of facilities management staff is attributed to lack of funds for the employment of more service providers and acquisition of facilities management equipment.

Figure 4.10 Major Constraints of Facilities Management



Source: Fieldwork April – June 2004

(The total percentage in Figure 4.10 is more than 100 because of the multiple responses)

The Polytechnic has one Estate Officer with no professional assistant, one Works Superintendent who doubles as the Estate Assistant and the Maintenance Officer, one Computer Technician, one Plumber, one Electrician, one Mason and two Carpenters who carry out the maintenance and repairs of all the Polytechnic's properties. These problems are a matter of concern as facilities cannot be well-managed without sufficient facilities management staff.

Also cutbacks to the maintenance budget has resulted in deferred funding and associated maintenance project backlog leading to total breakdown and replacement of facilities at higher cost in terms of time and money. As stated earlier,the study revealed that budget for maintenance is usually based on historical data, that is based on the prevoius year's, budget with an allowance for changes in cost, but this can be a recipe for disaster.

With the problem of top management commitment to facilities management, it was noted that although there is some level of awareness of the importance of facilities management, top management is not fully aware of the complexities of facilities management and the work of the Estate Officer as well as the implications of insufficient budgetary allocation and deferrement of facilities maintenance. This has resulted in unnecessary bureaucracy as revealed by the study. To them, the Estate Officer is only responsible for the day-to-day

cleaning and maintenance of buildings and therefore must function only at the operational level. But for best practice in facilities management, the Estate Officer must be part of management decision at the tactical if not at the strategic level.

Although Alexander (1996) and Spedding (1994) argued that where there is inadequate facilities management staff, outsourcing of maintenance work is more advantageous, the Polytechnic has not benefited from outsourcing companies because of their slow response to requests, unfamiliarity with the characteristics and problems of the institution and sometimes delays in execution of contract works. As a result, interviewees were of the view that the Polytechnic should probably make less use of outsourcing.

4.5.2 Poor Facilities Record Keeping

Record keeping is important in good facilities management. It ensures that quality records are available, that the decision-making process can be traced, properties can be easily located and identified, and that there are feedback mechanisms in place to ensure effective communication amongst the facilities management team. The facilities management department should therefore have a good facilities information management system, which will ensure that there are quality records on the nature and all necessary data relating to the use, maintenance and installation of facilities.

According to the Finance Officer, the Estate Officer and the Works Superintendent, there are no records on the assets of the Polytechnic

because there is no systematic way of keeping records and inventories of facilities and their maintenance schedule. As a result, facilities cannot be identified and managed. This fact was checked at the academic departments and heads of department said that they do not have asset registers but they have list of facilities at their departments. Most of the Polytechnic's properties are also not marked for identification so they can be taken away without detection.

4.5.3 Mishandling of Facilities

It was observed that mishandling of Polytechnic properties is another major problem of facilities management. A look around the campus revealed that most classrooms do not have adequate light and louver blades. Each classroom should have six fluorescent lights but most classrooms have only one, because students remove them and other electrical fittings and sometimes break louver blades. Furniture are also mishandled in a similar manner. Some writing slabs on classroom chairs have been removed and taken to students' hostels. Some are also left in the open at the mercy of the weather. As a result, most of the classrooms do not have chairs and students spend quality time going round looking for chairs.

Huge sums of money are spent on the maintenance of these facilities. For instance, in 2003, out of the total of ¢399,956,729 spent on facilities maintenance, ¢190,418,425 was spent on the replacement and acquisition of new furniture and equipment (Source: the Finance Office – Kumasi Polytechnic). Since funds for facilities maintenance are often inadequate,

some of these maintenance works are deferred. This leads to substantial decay of facilities and higher repair cost, which further reduces funds available for routine maintenance.

4.6 USERS' PERCEPTION OF FACILITIES MANAGEMENT

Table 4.2 Users' Perception of Facilities Management

	Students			Staff			
Perception	Business	Applied	Engineering	Academic	Administrative	Total frequency	Total %
Excellent	7	1	3	-	-	11	3.5
Very good	7	12	7	2	5	33	10.7
Good	20	12	10	16	2	60	19.5
Fair	60	34	32	3	20	149	48.5
Poor	7	12	13	-	8	40	13
Indifferent	10		4	-	-	14	4.5
Total	111	71	69	21	35	307	100

Source: Field Survey April – June 2004

According to Table 4.2 the survey revealed that 48.5% of the respondents rated the system of facilities management as fair, 19.5% rated it as good, 10.7% rated it as very good, 3.5% rated it as excellent and 13% regarded the system as poor while 4.5% did not respond. Most of the respondents were of the view that, facilities are fairly managed because the Polytechnic authorities are doing their best within the numerous constraints.

This is true because, though the facilities management system is below the best practice standard, there is a mechanism in place to take care of facilities. The employment of an Estate Officer is a step in the right direction as it is an

indication that management is aware of the importance of facilities management. Also some amount of money is allocated in the Polytechnic's budget for the maintenance of facilities no matter how little it may be. However, since only 19.5% of the respondents rated the system as good there is the need for improvement.

4.7 EFFECTS OF FACILITIES MANAGEMENT ON USER PERFORMANCE

The effect of facilities management was assessed by testing the research hypothesis, using the Chi-square test of independence.

Statement of Hypothesis

H_o: Facilities Management and User Performance are Independent

H_1: Facilities Management and User Performance are not Independent.

Test Statistic – Chi-square Test of Independence

In order to test the null hypothesis, we calculate a chi-square statistic that compares the cell frequencies that were actually observed with the estimated expected cell frequencies assuming independence.

The Chi-Square (χ^2) Test for Independence is

$$\chi^2 = \sum_{\text{all cells}} \frac{(f_o - f_e)^2}{fe}$$

Where fo = the actual tally in a particular cell

fe = the expected tally in a particular cell if Ho were true

$$fe = \frac{\text{(row total) x (column total)}}{\text{overall total}}$$

Significance level (α) = 0.05

Degrees of freedom = (number of columns – 1) (number of rows –1)

$$(c - 1)\,(r - 1)$$

$$(3\text{-}1)(4\text{-}1) = 6$$

Decision Rule: Reject Ho if and only if $\chi^2 > \chi^2.05$ otherwise accept Ho.

Where χ^2 = calculated Chi-Square Value

$\chi^2.05$ = Chi-Square Critical Value.

If the value of the chi-square test statistic(χ^2)is large, it indicates that the observed cell frequencies differ substantially from the expected cell frequencies calculated by assuming independence. Therefore, the larger the value of chi-square, the more doubt is cast on the null hypothesis of independence (Bowerman and O'Connell 1997: pp 1170 – 1171).

Table 4.3 Effect of Facilities Management on Performance of Students

Facilities	Responses			
	Positive	Negative	Indifferent	Total
Buildings	69	73	109	251
Furniture	35	157	59	251
Equipment	70	115	66	251
Support services	28	114	109	251
Total	202	459	343	1004

Source: Author's Fieldwork April – June 2004

Table 4. 4 Results of Chi-Square Test of Independence

	Calculated value-χ^2	Degree of freedom	Critical value $\chi^2.05$
Pearson chi-square	83.343	6	12.592

Source: Fieldwork April – June 2004

Table 4.3 at page 82, shows that a total of 459 students were of the view that the way facilities are managed has a negative impact on their performance, 343 were indifferent and 202 said the effect is positive. Using the responses in Table 4.3 in testing the null hypothesis, Table 4.4 shows that at 5% or 0.05 significant level and 6 degrees of freedom, the chi-square critical value ($\chi^2.05$) is 12.592 while the calculated chi-square value (χ^2) is 83.343. Since the calculated chi-square value is greater than the chi-square critical value, we reject the null hypothesis and conclude that facilities management and user performance are not independent. (See details of calculation in Appendix 'D')

Table 4.5 The Effect Of Facilities Management On Staff Performance

Facilities	Responses			
	Positive	Negative	Indifferent	Total
Buildings	4	40	12	56
Furniture	18	29	9	56
Equipment	12	35	9	56
Support services	4	41	11	56
Total	38	145	41	224

Source: Fieldwork April – June 2004

Table 4.6 Results of Chi- Square Test of Independence for Staff

	Calculated value- χ^2	Degree Of Freedom	Critical value- $\chi^2.05$
Pearson chi-square	89.247	6	12.5916

Source: Fieldwork April – June 2004

According to Table 4.5 a total of 145 respondents stated that the way facilities – buildings, furniture, equipment and support services are managed has negative impact on their performance, 38 said the impact is positive, while 41 were indifferent. Based on the responses in Table 4.5, at 5% or 0.05

significance level with 6 degrees of freedom, the critical chi-square value ($\chi^2.05$) is 12.592 and the calculated chi-square value (χ^2) is 89.247 as shown in Table 4.6 below. Since the calculated chi-square value is greater than the chi-square critical value we reject the null hypothesis and conclude that there is evidence of a significant dependence of facilities management and user performance. (See details of calculation in Appendix 'E').

The concerns expressed by the respondents as well as the test results are true because, since facilities are inadequate, longer hours are spent in teaching and learning as most of the facilities are shared. Also the poor ventilation and airflow as a result of inefficiently operating ceiling fans resulting in high room temperatures in the dry season are potential contributors to many health related problems. The nature of furniture can also influence users stress levels. Since the Polytechnic is located between two busy roads, students and staff are distracted by the noise from the activities on the street.

These observations confirm Lackney's (1999) view that, the quality of facilities, and the degree to which occupants feel that indoor environment meets their physiological needs with respect to noise, temperature, air quality and illumination have an impact on the output of staff and academic performance of students not only in terms of test scores but active participation in class. These problems as stated earlier are the direct results of lack of strategic direction in facilities decision-making process. From these observations, it can be said that although facilities management affects user

performance, it has been a blind spot in the management of polytechnics in Ghana.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

The study attempted to find out the major problems of facilities management in the polytechnics in Ghana with particular reference to Kumasi Polytechnic. Three hundred and twelve staff and students were formally interviewed at the Polytechnic.

5.1 MAJOR CONCLUSIONS OF THE STUDY

The study has revealed that the nature of facilities and their mode of management affect the performance of staff and students since education is about excellence and the achievement of excellence is very much dependent on the availability of physical and human resources. However, it has been revealed that physical facilities management in polytechnics in Ghana is fraught with many problems and effort at solving them must be multi-dimensional.

1. The study has revealed that facilities management at the polytechnics is ad-hoc and not strategically planned in line with the objectives of the polytechnics. It was also revealed that facilities management is effective only at the operational level. There is no representation at the strategic level because the Polytechnic has no Development Officer and the position of the Estate Officer is not indicated on the organisational chart of the Polytechnic. As such, there are no strategic decisions based on which tactical plans for facilities management are

maintenance departments to take care of their facilities. However, the problems identified in this study show that facilities management has not been very effective in the polytechnics. Although the study was undertaken at Kumasi Polytechnic, findings can be applied to the other polytechnics since they have the same statutes and organisational structure. Based on these findings the following are recommended:

5.2.1 Restructuring of Estate Management Department

5.2.1.1 Organisational Structure

The study revealed that although there is an Estates Department, the positions of the Development and Estate Officers are not shown on the organisational structure of the Polytechnic. This shows that there is no well-established facilities management department at the Polytechnic. It is therefore recommended that the Estate Running Department be restructured into a Facilities Management Department.

As part of the restructuring process, the polytechnics should formulate well-defined policy guidelines for facilities management embodied in a facilities plan, which will establish a single point of responsibility. This means that, there must be a well-established facilities management department with a facilities director at the strategic level, who will establish appropriate relationship at the strategic, tactical and operational levels and be empowered so as to make effective decisions about the use and management of facilities closer to top management and facilities users. At the tactical level, there must also be an Estate Officer, Maintenance Officer, Information Systems Officer,

and full-time Medical Officer. These officers will act upon the strategic decisions and come up with a tactical plan base on which the Service Providers at the operational level will implement the decisions. There must be a good balance between in-house labour and outsourcing.

5.2.1.2 Education of Users on Good Facilities Usage and Management Practices

For successful implementation of decisions, the facilities department must educate all stakeholders especially top management, on the importance of facilities management. This should include education on prompt fault reporting practices, proper use of facilities and the consequences of neglecting facilities maintenance. There must also be an open, effective, two-way line of communication at all levels of the Polytechnic in order to gather information on user preference and expectations and managers' performance.

5.2. 2 Recruitment of More Facilities Management Staff

A major finding of the study was that there is shortage of funds, facilities management and maintenance staff. To minimize this problem, it is recommended that as a matter of urgency, the number of maintenance and management staff should be increased. As is being done for the finance office and academic departments, more staff must be recruited for the facilities department and provision should be made for their recruitment in the annual budget. In the short-term the Polytechnic should adopt the outsourcing mode of facilities management to get work done in good time.

5.2.3 Income Generation For The Facilities Management Department

According to the Finance Officer, as the Government's budgetary allocation to the Polytechnic reduces it is the facilities management budget that is most affected making available funds inadequate for facilities management. To address this problem, the polytechnics must generate funds internally to supplement the available funds. This can be done by taking on fee-paying students. Also as the GETfund is financing most of the infrastructural development, reasonable percentage of the facilities user fees must be set aside for the management of facilities. Staff of the Facilities Management Department must be educated in proper budgeting techniques to enable them prepare realistic budget for the department. Since mishandling of facilities was identified as one of the major problems of facilities management in the polytechnics, students must be surcharged for the destruction of properties.

5.2.4 Integrated Facilities Maintenance Management

The study revealed that facilities maintenance is basically the maintenance of buildings done on Condition-based and Operate-to-failure basis. To minimise this problem, facilities maintenance management should be part of the total organisational management. There must be a facilities management strategy based on the objectives, needs and resources of the Polytechnic.

To ensure that maintenance works are carried out before expensive corrective maintenance has to be done, there should be a maintenance plan that will set out the minimum acceptable condition of facilities, indicate all categories of maintenance works, establish regular planned facilities inspection and

determine the sequence of carrying out maintenance work. A maintenance manual should also be provided for easy reference of maintenance works.

5.2.5 Use of Maslow's Hierarchy of Needs to Meet Staff and Student Facilities Needs

It has been established that facilities management enhances or affects the performance of staff and students towards the achievement of the vision of the polytechnics. The study revealed that classrooms, hostel, library, laboratory facilities, furniture and equipment are inadequate. It is suggested that the Polytechnic authorities adopt Maslow's hierarchy of needs model to assess the facilities requirements of staff, so that if staff are not motivated in terms of remuneration, as this is determined by the central government, the authorities can create good working conditions for self-motivation. Therefore physiological needs, security and safety and ego-status (Mullins, 1999:416) which are directly related to physical facilities, such as good physical work environment – well furnished offices for staff, adequate space provision, compatible furniture, modern equipment, and good support services, must be provided.

5.2.6 Facilities Information Management System

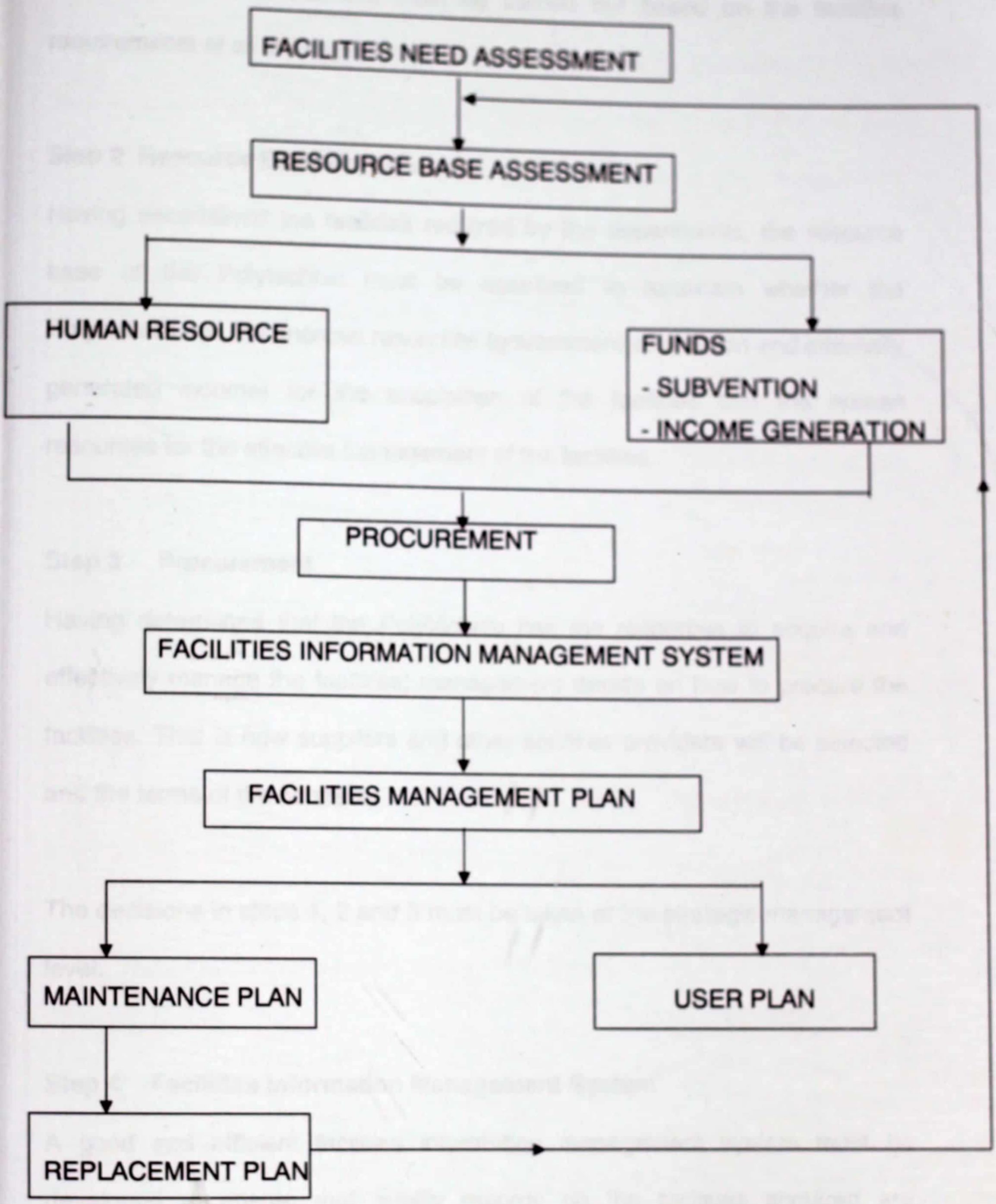
Another major finding of the study was that there is no system for comprehensive and up-to-date listing of facilities (inventories) to ensure easy identification of assets of the Polytechnic for effective management.

It is recommended that the entire facilities management system must be computerized to facilitate easy identification of facilities, comprehensive, accurate and up-to-date listing of facilities. This will form the basis for effective facilities information management system, which will ensure that quality records are available and decisions on facilities management can be easily traced.

5.2.7 Systematic Approach to Facilities Management

It was observed that facilities management at Kumasi Polytechnic is adhoc, disjointed, and does not follow any laid down procedure. It is therefore recommended that facilities management be carried out systematically based on the steps in the flowchart at page 93.

Figure 5.1 FLOWCHART FOR FACILITIES MANAGEMENT



Source: Author's Construction 2004

Step 1 Facilities Need Assessment

Facilities needs assessment must be carried out based on the facilities requirements of all the departments at the Polytechnic.

Step 2 Resource Base Assessments

Having ascertained the facilities required by the departments, the resource base of the Polytechnic must be assessed to ascertain whether the Polytechnic has the financial resources (government subvention and internally generated income) for the acquisition of the facilities and the human resources for the effective management of the facilities.

Step 3 Procurement

Having determined that the Polytechnic has the resources to acquire and effectively manage the facilities, management decide on how to procure the facilities. That is how suppliers and other services providers will be selected and the terms of the contract.

The decisions in steps 1, 2 and 3 must be taken at the strategic management level.

Step 4 Facilities Information Management System

A good and efficient facilities information management system must be developed to ensure that quality records on the facilities acquired are available for easy identification and management of facilities.

Step 5 Facilities Management Plan

At this level the facilities managers must come up with an effective facilities management plan made up of a maintenance plan with a replacement plan and a user plan. The maintenance plan must be comprehensive and systematic, encompassing short-term, medium-term and long-term measures for facilities maintenance. The plan must also stipulate the period for the replacement of facilities.

The facilities user plan must indicate how facilities must be handled. It must also include guidelines on prompt fault reporting and the good facilities usage and management practices.

Decisions in Steps 4 and 5 must be at the tactical and operational levels of management.

If the above recommendations are implemented, problems of facilities management at the Polytechnic will be minimised.

5.3 SUGGESTIONS FOR FUTURE RESEARCH

1. The magnitude of the effect of facilities management on user performance has not been investigated.
2. Other factors that affect the performance of staff and students was also not considered.

Further research could be in out these areas to make this study complete.

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APPENDIX "A"

Details Of Sample Selection Using The Stratified Random Sampling Technique

Department /Schools (1-17)	Stratum Population (N_1)	Male (M_i)	Female (F_i)	Stratum Sample size ($sn_i=N_1/Nxn$)	Male ($sm_i=M_i/Nxsn_i$)	Female ($sf_i=F_i/N_ix$ sn_i
Academic	105	78	27	21	16	5
Administrative	197	151	46	39	30	9
Accountancy	1212	878	334	73	53	20
Estate management	164	96	68	10	6	4
Marketing	181	113	68	11	7	4
Purchasing & Supply	171	114	57	10	7	3
Secretarial studies	294	21	273	18	1	17
Dispensing Technology	380	253	127	23	15	8
Catering	325	9	316	20	1	19
Fashion & Design	397	89	308	23	5	18
Statistics	109	88	21	6	5	1
Building Technology	148	183	10	9	8	1
Chemical Engineering	107	74	33	6	4	2
Civil Engineering	170	145	25	10	9	1
Electrical Engineering	361	316	45	22	19	3
Furniture Design & Construction	103	102	1	6	0	6
Mechanical Engineering	526	502	26	32	31	1
Total Population (N)	4950	3167	1783	339	222	117

Stratum sample selection using proportional stratified random sampling approach.

Stratum Sample size (sn_i) = N_1 /N x n

Academic Staff (sn_1) = 105/302 x 60 = 20.8 approximately 21

Administrative Staff (sn_2) 197/302 x 60 = 39.1 approximately 39

Total 60

Sample Size For Academic Staff

$Sm_i = M_i/N_i \times sn_1$ = 78/105 x 21=15.59 approximately 16

$sf_i = F_i / N_i \times sn_i$ = 27/105 x 21= 5.39 approximately 5

Where N is total population of the main stratum (N = 302 for all staff and 4648 for the students of Kumasi polytechnic).

N_1 is the population for each department or sub stratum (N_1 = 105 for academic staff and N_3 =1212 for accountancy students).

n is sample selected

M_i is male population

F_i is female population

Sn_i is stratum sample size

Sm_i is male sample size

Sf_i is female sample size

i = 1-17 that is, the number for each department as shown in Table 1.2. The sample size of 339 taken for the study constitute approximately seven (7%) of the total population of 4590

APPENDIX "B"

INTERVIEW GUIDE FOR FACILITIES MANAGERS

1. Department

2. Position

3. Qualification (facilities management related)

4. Responsibilities

5. How long have you been at your current position?

6. How long will you be here?

7. Who is responsible for the management of your facilities?

Section Two

a. Facilities management structure

1. To whom are you responsible?

1b. Which of the council statutory and academic board committees are you a member?

2. How are your facilities planned, co-coordinated and controlled?

3. Do you have adequate facilities management staff in terms of "quality" and "quantities" (i.e. number and qualification) (i) Yes (ii) No

b. Facilities inspection

Do you inspect facilities?

Do you have formal procedure for inspection?

If yes, how is it done?

How often are facilities inspected?

What does the frequency of inspection depend on

c. Computerization of FMS

Do you use computer application in managing facilities? Give reasons for your answer

d. Current management /maintenance approaches

i. What is the method used in the management of facilities?

a. In –house b. Outsourcing c. others

ii. What are the merits and demerits of your method?

iii. How are the following facilities managed?

a. Buildings

b. Space

c. Furniture and equipment

d. Environment-waste management, grounds and gardens

iv. Who is responsible for the management of these facilities?

v. How large is the budget allocation and expenditure for the management of facilities.

vi. Is the amount allocated sufficient?

vii. If it is insufficient, state why and how it can be improved

viii. Do you contribute to facilities acquisition and budget preparation?

e. Maintenance Strategy

Which Of These Systems Do You Operate?

(a) Operate-to–future

(b) Condition – based

(c) Fixed time

Section Three – Problems Of Facilities Management

What are the major problems encountered in your work?

Section four- Effect Of Facilities Management on Output

What Facilities do you need for work? - Are they available and adequate?

How does the nature of the facilities affect your work?

Section Five - Recommendation

How do you assess the current facilities management system?

How can facilities management in the Polytechnic be improved?

APPENDIX "C"

USER PERCEPTIONS OF FACILITIES MANAGEMENT IN KUMASI POLYTECHNIC

This questionnaire is being administered to staff of the Kumasi Polytechnic to determine how facilities are managed and maintained in the institute. This is part of a research project being undertaken by a post-graduate student. It would be very much appreciated if this questionnaire could be completed and returned in a week to the Estate Management Department. The confidentiality of all responses given is assured.

Facilities refer to all aspects of property, space, environmental control, health and safety, communication and other support services for creating quality working/learning conditions to support key activities.

A. Background Of Respondents

1. Category of respondent

   1 = Staff 2 = student

2. Sex 1= male 2= female

   (If you are a staff go to 3a, if student go to 3b)

3. Department

   3a. 1= Academic 2 = Administrative (Go to 4)

   3b. (from 3b go to 5)

1 = Accountancy	6 = Dispensing Technology	11 = marketing
2 = Building Technology	7=Estate Management	12 = mechanical engineering
3 = Catering & Hotel Mgt	8 = Electrical Engineering	13 =Purchasing supply
4 = Chemical Engineering	9 =Fashion And Textiles	14 = Secretaryship
5=Civil Engineering	10 = Furniture Construction & Design	15 = statistics and computer studies

4. How long have you been working in this institution?

1 = Below 1 year

2 = 1 – 5

3 = 6 – 10

4 = 11 – 15

5 = 16 – 20

6 = Above 20

B. Facilities Requirement

5. What are the basic facilities that you need for your work/studies?

Facilities required

1 = Buildings

2 = Furniture

3 = Equipment (laboratory, surveying, computers, engineering, office, classroom)

4 = Support services (hygienic environment, health &safety, communication, power supply)

6. Are the facilities available? 1= Yes 2= No

6b. Are they adequate? 1=Yes 2=No

6c. If No, why are the facilities inadequate?