UNIVERSITY OF CAPE COAST

TEACHING SPACE UTILIZATION AT THE CENTRAL UNIVERSITY COLLEGE, ACCRA

BY

EMMANUEL KOBINA BAIDOO

Thesis submitted to the Institute for Educational Planning and Administration of the Faculty of Education. University of Cape Coast in partial fulfilment of the requirements for award of Master of Philosophy Degree in Educational Administration

JANUARY 2011

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature……. Date……..……

Name: Emmanuel Kobina Baidoo

Supervisors' Declaration

We thereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature …… …….. Date…….

Name: Mr. J.M. Dzinyela

Co- supervisor's Signature…… Date……..

Name: Mr. S. K. Atakpa

ABSTRACT

Studies on Space Utilization in our educational institutions are not new but this is the first time a study on Space Utilization has been conducted in a privately owned tertiary institution in Ghana. This study, The Utilization of Teaching Space at Central University College was conducted specifically to find out the key challenges private universities face in the use of space and time in the day to day administration of their facilities and to provide information on Time Utilization Rate, Space Utilization Rate and Global Utilization Rate for the planning of short and long term educational investments and students intake. In all, 60 Academic staff, 30 Administrators and 14 Technicians making a total of 104 respondents was involved in the study and data were collected through the use of questionnaire, interview guides and observation checklist.

After the analysis of the data, it was revealed that, the Global Utilization Rates of the teaching space facilities from Mondays to Fridays, were tilted towards the morning sessions for the whole 2005/2006 academic year as against the afternoon and evening sessions as shown in Table 31 and Table 32. The second findings that emerged were dissimilar to the findings and trends set by empirical studies earlier taken by researchers on space utilization. Contrary to the established norms, the GUR (87.43%) for general purpose classrooms and the average GURs (101.92%) for the laboratories recorded in this research were higher than all the established norms of 80% and between 40-70% for classrooms and specialized rooms by British Department of education and science.

ACKNOWLEDGEMENTS

I wish to express my profound gratitude to all who, in diverse ways, contributed to the success of the thesis. My heartfelt thanks go to my principal supervisor, Mr. J.M. Dzinyela for his encouragement and support during all the stages of the research. He provided the kind of intellectual interaction and feedback that are best suited for the style of my work. I'm also indebted to Mr. S. K. Atakpa my co-supervisor for his support, encouragement and commitment throughout the writing of this work.

I cannot end by not thanking all lecturers of the Institute for Educational Planning and Administration, especially Dr. G.K.T Oduro, for their love, advice, suggestions and support during my M.Phil programme. My gratitude extends to all lecturers, administrators and laboratory technicians of the Central University College for allowing me to collect data from the Central University College, Accra. Finally, to my special and bosom friends, Ms Barbara Ennin, headmistress, CapeDeaf and Margaret Twum for supporting me financially and with other logistics throughout my programme. I thank you and appreciate everything you have done to make this thesis a reality.

DEDICATION

To my dear wife, Mrs. Gloria Baidoo, my children; Paa Ekow, Nana Ansah and Papa Sakyi and all my siblings.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

Background to the Study

The UNESCO Conference on the Development of Higher Education in Africa held in 1962 at Tananarive in Madagascar referred to Higher Education as all types of education of an institutional nature (be it academic, professional, technological, teacher education) such as Universities, University Colleges, Polytechnics, Technological Institutions and Training Colleges, for which the basic entrance requirements are completion of full secondary education, of which the usual entrance age is 18 years, and in which the course leads to the giving of a named award (degree, diploma or certificate of higher studies). It should be pointed out that the Tananarive conference also considered that the skills required for the modernization of the new nations in Africa and the development of their resources are predominantly those that are acquired in institutions of higher learning especially the universities.

The conference also held the view that in the pursuit of that objective, the African universities would need to review their progress in the light of changing conditions and demands without isolating themselves from their societies or lowering their academic standards. This conference at Tananarive opened the floor gate for the proliferation of universities across the length of

Africa. African states realized the need for higher institutions as the channel for its human resources development. Forojalla (1993) puts it "it is the neither human resources of a nation, not its capital nor material resources that ultimately determine the place and character of its economic and social development" (p.68).

Early Development of Universities in Ghana

After the Second World War most African countries started agitating for better deals with their colonial masters for self rule and independence. This agitation was not exclusive for the development of higher education in the colonies.

Pressurized by a resolution moved in the Gold Coast Legislative Council in July 1946 by C.W. Tachie Menson, the then Governor of Gold Coast Sir Alan Burns set up a local committee under the chairmanship of Kenneth Bradley, the colonial secretary, to advise him "as to the wishes of the people in regard to the fuller development in higher education in the Gold Coast". The Bradley report plainly stated: 'The people of the Gold Coast are convinced that post-secondary courses at Achimota college are capable of development to degree level and they are not prepared to spend several years in waiting and certainly not in waiting for the establishment of degree courses elsewhere' (Bradley Report, 1946).

Acting on Bradley report the leaders of the then Gold Coast made concrete proposal to establish The University College of Gold Coast with funds mainly generated in the country. So the first university college in the Gold Coast was opened in October 1948 under Mr. David Mowbray Balme who became the

first principal. The initial enrolment of the new institution was 90 students from the then Achimota College. The university college was affiliated to the University of London, which had the right to conduct examinations, to supervise staff recruitment, control degree structures, syllabuses and to evaluate the standard of the examinations in the university college.

The University College of the Gold Coast had this relationship with the University of London for nearly 13 years till 1960. On the recommendation of a commission on university education appointed by the government of Dr. Kwame Nkrumah in 1960, The University College of the Gold Coast achieved an independent status, with powers to grant its own degrees and to be governed by a council, which was incorporated by the University of Ghana Act 1961 (Act 79 of 22nd August 1961). So the first fully fledged university was born in Ghana with the name "University of Ghana"

The Kumasi College of Technology, which was established in 1951, was also upgraded to university status as the Kwame Nkrumah University of Science and Technology by an Act of parliament in August 1961. The University College of Cape Coast, which was inaugurated in 1962, also became the University of Cape Coast under the University of Cape Coast Act 1971 (Act 390) with power to confer its own degrees. The Government of Ghana in 1992 established two additional public universities by amalgamating some diploma-awarding institutions to establish the University College of Education, Winneba which became a fully fledged university in the year 2002 with the new name

University of Education, Winneba and the University of Development Studies in the three Northern Regions.

With the inception of the 1987 Educational Reforms, enrolment at all the various levels of education in Ghana increased over the period. However, these increases in enrolment did not correspond to increases in the physical facilities of the institutions involved. The general impression by heads of institutions and well meaning Ghanaians and other stakeholders in the educational systems has been that, there are limited instructional or teaching spaces available at the various institutions in the country as well as inadequate residential accommodation for students.

In an article written by Victoria Odoi, captioned "Poor response to Legon's appeal" published in the Daily Graphic on Tuesday, March 2nd 1999, the then Vice-Chancellor of the university of Ghana, Prof. Ivan Addae-Mensah, quoted as saying "his heart always bleed, when he goes through the painful experience to turn away otherwise qualified students to pursue university education due to lack of facilities". Prof. Ivan Addae-Mensah expressed this concern when he was delivering his opening address during the faculty week of the Faculty of Agriculture at Legon on appealing for funds for supporting the ever-increasing pressure on the university physical facilities.

This assertion by Prof. Addae-Mensah vividly came to the fore when in 2004/2005 enrolment of undergraduates of the University of Cape Coast, only 4284 students (made up of 2917 males and 1369 females respectively) were given admission out of 12920 (9028 males and 3892 females) qualified

applicants (University of Cape Coast's Data Processing Unit. March 2005). One of the most important goals of the 1987 Educational Reform of Ghana was the provision of increase access to the various levels of education, including increasing access to tertiary education. But it looks like beyond cosmetic improvements, the public universities' structures have not expanded appreciably over the past few years vis-à-vis increase in their enrolment. This has brought in its wake deterioration in conditions and quality as too few facilities and a small number of aging academic staffs are made to handle a large student body.

Although inadequate financial arrangements lie at the heart of Ghana's tertiary education challenges, they are not the sole source of its woes. The demand for qualified academic staff to teach in the universities and polytechnics has reached the point where it now outruns the supply, whiles staff/student ratio keeps on deteriorating. Besides, there is a huge brain drain as a result of uncompetitive salaries, whiles some of the senior members of staffs are aging and getting ready to go on retirement. This problem is clearly illustrated by the age profile for academic staff at the University of Ghana. Only 15% of the academic staff is aged 40 years or less. In contrast 40% of the staff is between 51 and 60 years. Strikingly, 11% of the staff is over the age of 60 and already past the age of retirement.

As the Government of Ghana has shifted its focus and resources towards providing Universal Primary Enrolment (UPE), the government is unable to channel as much of its funds to public universities. Recognizing this, the Government now actively encourages private sector investment in tertiary

education. In 1993, the Government of Ghana created the National Council for Tertiary Education to oversee the administration and improvement of tertiary education, and the National Accreditation Board to oversee accreditation of new private institutions. During an interview in June 1998, the then Minister of Education, Mr. Ekow Spio-Garbrah indicated that private universities are considered necessary to lighten the heavy taxpayer burden of providing education. The government is also seeking to encourage private investment in education by granting import tax exemptions for laboratory equipment and library books.

In the past decade, Ghana's expenditure on education has been between 28% and 40% of its annual budget. The government has always faced difficult choices as to whether to shift resources to lower level education or provide them at the tertiary level. As the former Minister of Education, Prof. Christopher Ekumfi-Ameyaw acknowledged in 2001 that funding continues to be one of the challenges facing education in Ghana.

Available statistics indicate that government's budgetary allocations to the country's universities have not kept up with their ever-increasing requirements. Worse still, these allocations do not get to the universities on time. The universities themselves generate very little income. So with the creation of the National Council for Tertiary Education and the National Accreditation Board, individuals and organizations were encouraged and urged to invest in tertiary education in the country in order to help solve some of the teething

challenges facing the public universities in terms of enrolment and providing quality education.

It must be noted that the public sector's inability to meet the ever increasing demand for tertiary education ushered in the emergence of a small, but growing private tertiary education sector, mainly driven by religious bodies, private individuals and non-governmental organizations. (NGOs). From 1992 about 10 private universities have been given the go-ahead by the National Accreditation Board, which oversees the accreditation of tertiary institutions. And since then, tertiary education in the country has never been the same since they are filling a vacuum that has been created as a result of the inability of the public-run universities to meet the demand for tertiary education.

Establishment of Private Universities

When the society saw the need for more tertiary institutions to be established to cater for ever increasing demand for university education in the country, the Churches took the initiative in the establishment of private universities in the country to fill the void left by a deteriorating public university system. In the last decade about 22 private universities have been established in the country and about 16 of them are church owned.

The Seventh-day Adventist Church, International Central Gospel Church and an Islamic body have started their universities whilst the Presbyterian Church is currently finalizing plans to make its university operational. The latest to join the fray is the Catholic Church, which has established the Catholic

university college. The number of churches involved in the establishment of private universities once alarmed the then Education Minister, Ekow Spio-Garbrah, who expressed concern about the churches' whipped-up interest in university education. The Minister had argued that much is needed to be done at the pre-tertiary level rather. But the churches say they are responding to a felt need in tertiary education hence their present lurch: "it is our committed goal to contribute meaningfully to the manpower development of our nation by making university education accessible to a large number of qualified students" explains Dr Anderson Mensah; acting Vice-Chancellor of the Central University College.

In his keynote speech on the inauguration of the Ashesi University in 2004, Mr. Paul Effah, Executive Secretary of the National Council for Tertiary Education, on behalf of the then Minister of Education, Kwadwo Baah Wiredu among other things said the private universities can contribute to the collective national development goal of improving the quality of life of all Ghanaians by reducing poverty, raising standards through sustained increase in national wealth and more equitable distribution of benefits there from.

He went on to enumerate the advantages of private universities as:

a. The participation of private tertiary institution frees government resources to be targeted to the poor and needy.
b. Private tertiary institutions are creative in their academic programmes; their establishment in Ghana has availed to students a range of choices and introduced healthy competition with public institutions.

Mr. Paul Effah went on to say that the responsibility of education goes on beyond government. “Indeed education is the collective responsibility of the entire nation; local, regional, national government as well as NGOs and the private sector. That is why the recent development and growth of private universities is a healthy development for the future of our educational system”. He said it is estimated that only 30 percent of qualified applicants gain admission into the public institutions. This implies that due to limited facilities in public universities, it is impracticable to admit all qualified applicants. There is therefore an urgent need to expand access to tertiary education and to establish mechanism for sustainable financing of tertiary education.

History and Objectives of the Central University College

Central University College (CUC) is a non-profit making educational initiative of the International Central Gospel Church (ICGC). The college is to provide Christian - based education for the expansion of God’s Kingdom. The college has its origins in a short-term pastoral training institute, which started in 1988. It was later incorporated in June 1991 under the name Central College. The name was later changed to Central Christian College in 1993.

The college upgraded its programmes to the baccalaureate level. In line with its national aspiration, the college expanded its programmes to include an integrated and practice-oriented business (the school of Business Management and Administration). To reflect its new status as an arts university, the name was changed to Central University College in 1997.

Objectives of the University College

1. To provide resources for high quality and integrated university education, within the context of the historic Christian faith and commitment.
2. To provide, with other Christians and institutions academic leadership to the church and society in Africa so as to address through research, education and consultation, the socio-economic and political problems of the African society and those challenges unique to the church of Christ.
3. To provide adequate resources for quality university education, training, research and consultancy based on biblical concepts and values, which reflect African cultural heritage.
4. To guide students to understand and accept themselves, their individual needs and talents, and to develop their potential for productive life and service.
5. To provide students with balanced educational programmes that will help them to develop, to broaden their perception of the inherent inter-relationship between the physical and spiritual needs, and to develop a holistic approach to life.
6. To equip students to personally commit themselves to social renewal through evangelism, church planting and godly-inspired leadership.
7. To develop in students a deeper understanding of traditional and modern Africa culture and to equip them to effectively provide Christian approaches to socio-economic and political development of the African continent. To play effective role in the development and expansion of Christian universities in Africa through the exchange of ideas and resources.

8. The university shall admit for study for degrees, diplomas, certificates or other awards of the university, such candidates, as shall have been accepted by the senate as being academically qualified, and who accept the university's Christian mission and philosophy without regard or preference to gender, ethnic origin, race or physical disability being imposed as a condition for being a student.

In seeking to achieve its aims and objectives, the university shall:

(a) Provide a high quality and stimulating learning environment to enable students to achieve their full potential

(b) Provide a wide range of educational activities in an enabling environment to ensure that students acquire the necessary technological know-how required for national development.

(c) Collaborate with religious, civil, public, and private sector authorities for the development, implementation and review of training packages.

(d) Offer courses of study leading to bachelor, masters and doctorate degrees, except that for some period of the commencement of such programmes of study, Central University College and affiliated institutions shall jointly award the degrees.

(e) Collaborate or co-operate with any local or international institutions and organizations whose objectives are similar or complementary to those of the university college.

(f) Sponsor or encourage the publication of the results of studies or research work, which are of academic or practical value.

Affiliation

Information Technology usage and practice have been integrated into all the programmes of the university. Students are expected to be conversant with basic computer technology and the various software packages in their areas of specialization. The Central University College also has programmes to enable their students to have a competitive edge on the job market by making French language studies compulsory for all in the business school and also those in Bachelor of Arts (theology) programmes. Students are required to attain a certain level of proficiency in order to graduate. Those who proceed beyond the minimum level are awarded a certificate after passing the requisite examinations.

Worker-Friendly Programmes

Central University College has a conviction that the nation needs to expand school choices and educational opportunities and facilities in order to provide all students with the best possible education. The university is of the conviction that the doors of tertiary education must be opened to all who work hard and are capable of pursuing university education. In consonance with this conviction, the university has structured its programmes into four (4) main streams; The Morning School/Session, The Afternoon School/Session, The Evening School/Session and The Weekend School/Session. The morning School/session starts from 7:30 am and ends at 11.30am; The Afternoon School/session starts at 12: 30pm and ends at 4.05pm and The Evening

School/Session starts at 4.30pm to 9.30pm. The weekend programme runs from Friday evening, 5:00pm to 8:00pm; and Saturday, 8:00am to 8:00pm. This arrangement will enable determined workers to upgrade their knowledge and skills thereby enhancing their effectiveness at a more affordable cost.

Structure

The university is organized into three (3) schools of instruction: The School of Theology and Missions, The School of Applied Sciences and The School of Business Management and Administration.

Central University College from very humble beginning has grown to become a major private university in the country, which enrolls students from all over the country and even outside the country. Enrolment of students and staff recruitment has over the years increased appreciably. From a humble beginning of an enrolment of less than six hundred (600) students, today, as at the time of the study, that is 2005/2006 academic year total students' enrolment is about five thousand, an increment of almost ten times the initial students' enrolment.

Central University College is housed in rented premises and for that matter space has become a major issue. It is on record that factors, which inhibit increased accessibility to tertiary education in Ghana and especially in the universities, among other things are inadequate staff, lecture rooms, laboratories, library facilities as well as students' accommodation facilities.

With the inception of the GETFUND, the Government of Ghana is seeking to solve some of the numerous challenges confronting tertiary education

in the country in order to expand accessibility. Thus government is seeking to expand and improve infrastructural developments, for it is essential to note that expansion and development of instructional facilities and the general use of the physical learning environment in instructional design are paramount for the provision of quality education. The efficient use and utilization of these resources will eventually lead to increase access and enhance quality education delivery.

It is difficult, if not impossible, to separate instructional activity from the physical environmental setting within which learning occurs. The relationship between the physical learning environments on behaviour and attitudes of both teachers and students is well documented (Gump 1987). The classroom temperature, lighting and air quality to some extent have some effect on the learning environment. In addition the cleanliness, orderliness and character in a classrooms are perceived by teachers to influence student behaviour.

It is observed that the arrangement of furniture and the allocation of spaces within the classroom or teaching room can greatly affect quality and what can be accomplished within a given instructional setting. It is believed that the learning environment can have both positive and negative effect on the ability to teach and students' ability to focus on learning tasks. To a great degree, teachers feel that having a significant control over lecture room adaptability instills a sense of personalization and ownership within their students. Many teachers attempt to create learning environments that foster healthy social interaction,

provide places for students' privacy as well as facilitate and maintain an appropriate level of sensory stimulation.

In most of the tertiary institutions in Ghana, it is not uncommon to see or found students standing in balconies during lecture periods, and others sharing desk meant for a student. The lecture halls always seem very congested, perceived too constraining and restrictive. This is perceived not to be conducive for teaching and learning. According to Kenny and Foster (1983), the study on efficiency of teaching space facility is a cardinal factor of enrolment. According to Owolabi (1996) the assessment of qualitative change in education in areas such as curriculum, instructional methods and evaluation of students' performance is dependent on quantitative information like space, time and global utilization rates obtained through assessment of the utilization of teaching space facilities. As at now, Central University College, a privately owned institution, has no quantitative data on their teaching space facilities, as well as how often these facilities are used (frequency of use) and space utilization rate (occupancy rate). These data are needed for a key facility planning activity for short, medium and long-term enrolment exercises.

Statement of the Problem

As campuses work to achieve efficiency level, improving space utilization has gained importance as a key facility planning activity to increase accessibility to tertiary institutions. Increasing classroom utilization has long been under the microscope as a target for improving the use of campus space.

Improving classrooms and laboratory use is another matter altogether. These important instructional spaces remain under the radar, because they are not well understood and because they are so varied.

Classrooms and laboratories are important and are either underutilized or over-utilized component of campus instructional facilities. For many universities in Ghana and elsewhere, the amount of space dedicated to classrooms and laboratories exceeds the amount of space actually put into use. The need for space utilization to campus instructional programmes is very paramount to tertiary education. However, are there enough publications and published information about their use and utilization? According to the University Rationalization Committee (1988) efficient and effective data collection and plausible solution on utilization of facilities within the various higher educational institutions is almost non-existent. The report stressed that its assessment on teaching space facilities in tertiary institutions was inadequate.

Space Utilization has unique characteristics that make it difficult to manage. Teaching Space Utilization is also broadly defined within the facility planner's lexicon, and cover among other things science class laboratories, lecture theatres, classroom space and time space. Based on the recommendation of the (U.R.C 1988), studies were carried out on utilization of teaching space in University of Ghana and Kwame Nkrumah University of Science and Technology. However since the inception of private universities there has been no such study conducted to find out how the private tertiary institutions are

faring, considering the topic under consideration. Hence, the need for this study at the Central University College.

Purpose of the Study

The purpose of the study sought to fill the gap in the literature of Space Utilization of tertiary institutions especially in the private sector by providing information on the efficient utilization and use of teaching, classroom and laboratory spaces at the Central University College of Ghana. The study, Teaching Space Utilization in the Central University College was to assess and evaluate the extent to which the physical teaching and learning environment at the university is currently being utilized and suggest ways and means for its optimal utilization.

Research Questions

1. What is the Time Utilization Rate of General-Purpose Classrooms at the Central University College?
2. What is the Time Utilization Rate of Laboratories at the Central University College?
3. What is the Space Utilization Rate of General-Purpose Classrooms at the Central University College?
4. What is the Space Utilization Rate of Laboratories space at the Central University College?

5. What is the Global Utilization Rate of General-Purpose Classrooms at the Central University College?
6. What is the Global Utilization Rate of Laboratories space at the Central University College?
7. What Factors Currently Affect the Use of Teaching Space Facilities at the Central University College?

Significance of the Study

Although research on schools' physical environment is extensive, much of the literature on the classroom has focused on social and psychological elements rather than on the use of the physical environment. Use of physical space is important in a total learning environment and varies depending on context in terms of the physical environment of the classroom: time and occupancy, program "authority" and school sameness

This study would be placed at the libraries of the various universities and would be useful for administrators wishing to plan the short and long term admissions or enrolments for other universities and the Central University College in particular. This research would also be useful in planning the day-to-day administration of the teaching space facilities in other private universities. Moreover, the results of the study may help management of the Central University College to improve time, space and global utilization rate of facilities in the school.

The study may also help the school administration to determine whether there is the need for new lecture theatres or otherwise. Finally the result of the study may be used as a basis for planning teaching space utilization of other tertiary institutions and help to project teaching space requirements of new institutions which are yet to be brought into the tertiary education system.

Delimitations of the Study

The study was limited to only teaching space facilities (lecture theatres) and laboratories at Central University College. Other spaces like the library, offices and entertainment hall were not studied. The study covered Mondays to Fridays when the teaching space facilities are officially scheduled for lectures. Weekend school session and lectures scheduled on Sundays at the convenience of students were not observed. In addition, periods that fall outside the official contact hours, that is before 7.30am and after 9.30pm were also not taken into consideration. The study was also limited to only Central University College; hence all findings were restricted to the use of physical facility in the school. This implies that, conclusions drawn were not extended beyond the institution.

Limitations of the Study

The researcher encountered problems that affected the accuracy of figures during checking of students' attendance. Students were counted from one instructional room to another. However in cases where the classes were very large and there was congestion, counting during lessons hours was a problem.

This was likely to affect the validity of the results. To lessen such problem it became necessary to count the students before and after lectures. Two assistants were employed to assist in counting students at rooms that had large numbers.

Another factor that limited the validity of the findings was the attitude of some lecturers. Some lecturers were absent themselves throughout the period of the exercise. This gave a wrong impression that the teaching space was underutilized. That is, the long absence appeared to reduce utilization level of teaching space facilities (Time, Space and Global). To control such occurrences the observation was done once again at another period when the lecturer was in attendance. Generally, the observation was done in the 8^{th} and 9^{th} weeks of the first and second semesters when there was busy work on campus. In addition observations for academic staffs who made up for lost periods by extending their lectures or lessons to different periods or days which made it appeared that there was increase in Utilization of Teaching Space was not taken into consideration. Limitations deriving from researcher characteristics or personal predilections are, at times, unavoidable and may restrict access to data. The special relationships that researchers develop during fieldwork are critical to the depth and breadth of information they acquire.

Definition of Terms

Teaching space: A room or area specially set aside for teaching and learning.

Time Utilization Rate: This is the ratio between the number of hours (or periods) during which a classroom is put into use per week and the theoretical

number of hours (periods available per week by convention).Time utilization rate is sometimes referred to as frequency of use factor.

Space Utilization Rate: This rate compares the average size of the section occupying and the theoretical capacity of the room (average number of seats in the classroom). It is also known as the occupancy of room factor.

Global Utilization Rate: This gives the ratio between the number of student hours occupied and the theoretical number of student hours available

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The purpose of this review was to survey the body of literature that informed the basic questions of the study of the concept of Teaching and Laboratory Space Utilization. The review of literature in this chapter was in two main parts; the theoretical review and empirical review.

In Ghana, literature was reviewed on the topic under discussion. These related literature were studies carried out in the University of Ghana Legon on Space Management and a similar study at the Kwame Nkrumah University of Science and Technology, Kumasi, by the same researcher Owolabi (1993 &1994).

Other researchers are Atta-Boison (1995) on Human and Facility Resources Utilization at the University of Education, Winneba, Apori (1997) on Utilization of Teaching Space at the University of Cape Coast. Others are Bannerman-Mensah (2001) on utilization of teaching space at Mfantsipim Senior Secondary school and Akomaning (2001) on Utilization of teaching space at Takoradi Polytechnic. (All these publications are unpublished).

Again most of the literature that was reviewed on the topic were studies carried out in some countries like Canada, Britain (Roger, 1993) and United States of America (Russel &Doi, 1957) as well as some international

organizations induced surveys carried out by the United Nations Educational, Scientific and Cultural Organization (UNESCO, 1884, 1985). The results of this study were compared with those existing studies carried out and thus helped to find out the best approach to use in order to ascertain a meaningful measure of efficiencies of teaching and laboratory space facilities.

Theoretical Review

The theoretical literature observations on teaching and laboratory space utilization was mainly based on the concept of time and space utilization, , the need for space utilization, teachers' use of teaching and laboratory space, the assessment of space utilization and time tabling as a measure for merging teaching space. The empirical review dwelled mostly on the assessment of teaching and laboratory space facilities and key variables that inhibit utilization of teaching space faculties.

As campuses work to increase their efficiency, improving space utilization has gained importance as a key facility planning activity. Increasing classrooms use and utilization has long been under the microscope as a target for improving the use of campus space and improving laboratory use. These important instructional spaces remain under the radar, because they are not well understood and are so varied. Are laboratories being well used? Laboratories are an important and often underutilized component of campus instructional facilities. For many colleges and universities the amount of space dedicated to laboratories exceeds the amount of space used for classrooms.

Laboratories are essential to the teaching mission, allowing hands-on instruction to be carried out in rooms tailored to a space of academic programme need. Laboratories are significant source of departmental pride. At the same time, on some campuses, underused or unused teaching laboratory space can provide an opportunity to reclaim and reuse excess space for other high priority needs such as research.

Theoretical Perspective and Concept

Theoretical perspectives, or conceptual frameworks are those loosely interrelated sets of assumptions, concepts, and propositions that constitute a view of the world that structure strongly the questions a researcher asks and the means chosen to answer them. It guides researchers in framing their project, determining what kinds of investigations are appropriate, and shaping their analysis. Theory helps one to work through the contradictions that are learnt and contradictions that delve deeper into the important parts of data and expand theory. Theoretical perspective is a way of looking at the world and making sense of it to understand how individuals identify what they know. Theory assumes that individuals' behavior are to be understood as a process in which individuals shape and control their conduct by taking into account the expectations of others with whom they interact.

The theoretical review was based on the research and finding of others who have done research work on the topic. It was also based on idea and

knowledge shared by authors, researchers and scientific educations who have done an in depth studies of teaching and laboratory space utilization globally.

The Concept of Time and Space Utilization

Kenny and Foster (1983) defined utilization as how spaces are actually used or how it is hoped and planned that the spaces should be used. They further report that utilization may be shown graphically or defined mathematically as the product of one or many rooms of the frequency factor and Space Utilization Rate. Owolabi (1996) stated that: There are two dimensions; the time dimension considers the proportion of time the room is used, and the space dimension considers the proportion of space put into use. For what proportion of the working hours is a school room put into use? The answer to such a question becomes important when one realizes that buildings whether put into use or not, deteriorates overtime. The more buildings are put in use, then the better. The schools that tend to have more courses and programmes are likely to have greater time utilization in their rooms than the other schools (p.111).

Room utilization relates to mapping of groups and rooms. When a room which is built to accommodate a large number of students is used by a small number of students then the space is underutilized. This is factual when the same facilities were used regardless of the size of audience. For example, the use of microphones, loud speakers and chalkboard apparatus as well as other audio visual aids will render the same service irrespective of the class size. This

therefore implies that the more the number of people put into a room, the greater the space being utilized.

The Need for Space Utilization

As schools work to increase their efficiency, improving classroom space use and utilization has gain importance as a key planning activity for excellent teaching and learning process. Increasing classroom use and utilization has long been under the microscope as a target for improving quality teaching and learning process, but these important instructional spaces remain under the radar, because they are not well understood and because they are varied. Most individuals can recall a time when they learned in spite of the setting. Teachers, too, have observed that they could teach anywhere, even under trees. However, the real issue is whether the student learned and the teacher taught as much or as well as they would have in a better environment. The relationship between school facilities and student achievement is a complex issue with an extensive body of literature. Although there are no empirical facts that show that students performance rise when facilities go from decent to divine, it does show that achievement lags in shabby and dirty buildings and environments.

Clearly, a high-quality learning environment is essential to educating students yet, in spite of the many hours spent in schools, our knowledge of their effects on us and of our ability to affect them is really quite small. School environments have a largely untapped potential as active contributors to the learning process as we often focus on understanding the activities of school

while giving little attention to understanding the role that the physical environment plays. Environmental psychologists have demonstrated that we influence and are influenced by the physical environment that surrounds us, as good design, is that which causes minimal human discomfort and maximum human functioning

If, indeed, activities such as teaching and learning cannot proceed without affecting and being affected by the places in which they occur, then educators would do well to look closely at their classrooms to understand how they can use the environment as a tool in improving instruction and achievement. Therefore while teachers and students acknowledge the need for differentiated learning space, research to guide the customization of classrooms is scarce. Space is needed for technology, projects, and group work based on the unique needs of different content areas and age levels. Yet, in many schools, all teachers are compelled to work in the same type of space.

Russell and Doi (1957), identified two main reasons for the essence of space utilization. The first reason is that information on the extent and kind of use made of the physical facility is a condition of good management. They also mentioned increased student enrollments as the second compelling reason for plant utilization. These assertions presuppose that when there is available data on space utilization it gives room for proper and efficient utilization of teaching space facilities which takes into consideration the increase of students' enrollment. .

The understanding of efficient space utilization has become an important aspect of school management in the United States of America. According to Glenn and Rourke (1966), who supported Russel and Doi (1957), efficient space utilization is first and foremost the means of tackling short run overcrowding and scheduling problems in schools. Owolabi (1998) also notes that, as enrollment keep expanding in tertiary institutions, teaching space becomes a scarce commodity. Thus efficiency in the management of teaching spaces becomes the watchword for institutions setting to expand student intake.

Assessment of Teaching Space Facilities

Teaching spaces in educational institutions especially in the tertiary levels are expanding everywhere in Ghana as the Ghana Education Trust Fund (GETFUND) is dolling out millions of Cedis every year to expand teaching facilities in the country's universities and other institutions. According to Hallak (1977), the world as a whole devoted about $20,000 million to setting up, expanding and converting schools. This year and in the next few years sums of the same order of magnitudes will go to developing school infrastructures, which in turn will need increased financing to remain functional.

Owolabi (1998) posits that "the amount has increased enormously in recent years and is still on the increase. But resources can be unnecessarily committed to putting up more building in tertiary intuitions when the existing ones have not been of maximum use" (p.36). Owolabi further indicated that, if the government or the society is to invest more in building then there is the need

to produce a given output. The likely waste would imply that the government or the societies were providing less satisfaction for a given amount of cedis invested in tertiary education.

According to Owolabi, (1998) to determine whether there is any need for additional building, and to know how serious the need may be, the utilization of the existing building, both in space and in time, should always be diagnosed.

The Council for Educational Facility Planners (CEFP) and the United Nations Educational and Scientific and Cultural Organization (UNESCO 1984, 1985) report that, teaching spaces may be assessed in respect to conditions of the teaching spaces, social norms for provision of teaching spaces, the education space requirement in a given society and the efficiency of utilization of a teaching space.

Empirical Review

The empirical perspective was based on studies, surveys, research findings and recommendation of researchers, educators, authors and others who have done a lot of work on the topic. Teaching space is a vital resource at any university. There are several ways to assess the adequacy of teaching space. Measures include how intensely these spaces are being used, if they are the appropriate size for the scheduled classes, and if the size is adequate for the number of students, given the desired seating style. In assessing the teaching space facilities, Kenny and Foster (1983), carried out a survey which showed that there was available space capacity which was not being utilized. Their

empirical studies also revealed that for general purpose teaching room, utilization levels was 80% and for specialist rooms of 40% recommended by British Department of Education and Sciences (BDES, 1971, 1972) were unrealistic and unachievable even with the help of a computerized space allocation and time-tabling system. They further reported that in a real world it is never going to be possible nor would it be desirable to reach utilization levels of 100% since both people and spaces were discrete items. Kenny and Foster concluded that, it is not possible to recommend any rigid target figure to which colleges should aspire due to the fact that the administrators have no control over any key element that affect the utilization of teaching space facilities and also due to wide variation in the circumstance they operate.

The British Department of Education and Science (1992) reports that the idea of utilization came about because Time Utilization Rates and Space Utilization Rates, the indicators which were being used to assess levels of use of teaching space facilities, did not combine the use of space with the use of time.

The report suggested two methods of assessing the utilization levels of a given teaching space facility. They are static and dynamic methods. These methods of assessment is a proper exercise, which use existing information to compare the seating capacity of a teaching space facility with load (students), which is put into it. The load as stated was expressed in Space Full Time Equivalent Students (SFTES) based on whether the number of students enrolled or the numbers of hours students are in contact with teaching staff. According to the report the second method, dynamic method, measures how people use

teaching space areas given to various activities over time. In dynamic assessment, on the ground measurement is made on the actual head of students using various types of teaching space accommodation.

The report shows that the method requires researchers to make up-to-date inventory of the existing accommodation and to count the number of students using it at a typical period of time (e.g. One week or curriculum cycle).

The British Department of Education and Science (1992) further recommended to educational administrators that educational adulterators should target utilization levels of 80% - 70% for specialist rooms .

Rawlinson (1973) also mentioned that the most efficient method of assessing a teaching space facility is to station observers (surveyors) in the space to be monitored to note number of users and activities performed over a given period. Rawlinson suggested that scrap-round occupancy method as the most appropriate mode in order to cover a wide range of space types. The method consists of identifying spaces to be studied and visiting each one of them over a pre-determined interval and noting the number of people present.

According to the report, the use of dynamic method and the snap-round occupancy count procedure is expected to provide statistics on space utilization and pattern that will enable any over and under provision of various kinds of space to be recognized and necessary action taken. Rawlingson (1973) further recounted that the diagnosis is also necessary for the assessment and priority ranking of needs in the various institution under the management of an agency.

Stoops, Rafferty and Johnson (1995), cited in Owolabi (1998), indicated that "the efficiency of school plant utilization depends largely upon the degree to which the various rooms can be used during all the hours of the day" (p.37).

Owolabi (1998) further stated that: A computerized data system showing the numbers in class per each of the course taught in each room each period in the week facilitates the storing of data for assessing utilization of teaching spaces. Such assessment should be carried out before new teaching spaces are contracted (p.38).

Key Elements that Affect Utilization of Teaching Space Faculties

Report produced by the British Department of Education and Science (1992), UNESCO (1984, 1985), Kenny and Foster (1983) and the Council for Educational Facility Planners (CEFP, 1976) listed time tabling and space allocation, educational structure, content and method of delivery, educational programmes being offered and students' enrolment as factors that influence teaching space utilization.

The UNESCO report mentions that, educational policies on funding, provision of infrastructure like teaching space facilities and adjoining auxiliary spaces, hiring and maintenance of human resources, norm on student to lecturer ratio and acceptable ergonomic standards which have been designated as non academic issues also affect the utilization of teaching spaces. Rogers (1993) argued that both academic and non-academic factors have effect on Time and

Space Utilization Rates, which of the multipliers that determines the Global Utilization Rates.

Elements that Affect Time Utilization Rate

Elements that affect Time Utilization Rate are both academic and non-academic factors.

Academic Factors

Rogers (1993) mentioned two main academic factors that affect Time Utilization Rate. They are time tabling and space allocation. He further states that these can be done either manually or with computers. To enhance effective and efficient utilization of time, Rogers mentioned two main modes of timetabling. That is, departmentalized and centralized timetabling.

The report described departmentalization as the assignment of teaching space facilities to year groups or classes in a department or faculty. The advantage associated with the departmentalized time tabling indicated by the report are patriotism in students, retention of permanent seats, storage of school materials in available lockers, reduce movement with lecture theatres which eliminates time wasted for change over; ease of time and guaranteed for the use of teaching space facility by the year group it has been earmarked to anytime the group wishes. The report also indicates some disadvantages associated with this method of timetabling. They are boredom, inefficient use of space resources

and the need for inexhaustible financial resources for prompt provision of teaching space facilities for any extension plan for further development.

The report cautioned that considering the limiting factors associated with the departmentalized timetabling, a continued practice may lead to lower time utilization, and space allocation results form the limited use of available space owned or allocated to the year group in departments or faculties. In order to optimize the utilization of space facilities, Rogers (1993) recommended the use of centralized timetabling and computers. In the same vein at University College of Education Winneba, Owolabi (1993) recommended the use of centralized timetable system. According to Owolabi (1998), "Timetabling is a decision support task that assists in no small measure to the process of managing teaching spaces in tertiary institution to achieve educational objective" (p.40). He defined timetable as a list, which makes a conspicuous display of time and place for courses and works, and helps to organize institutional activities in a manner that ensures economy in the use of time and space.

Owolabi (1993) further indicated that central timetabling is based on the principle of efficiency in the utilization of scarce resources. This presupposes that, the introduction of central timetabling in our higher institutions would result to efficiency in the utilization of teaching spaces. According to Owolabi (1993a), "efficiency is the optimal relation between input and outputs. An activity is being performed efficiently when a given quantity of output is obtained with minimum inputs or if a given quantity of inputs is able to yield maximum outputs"(p.4).

Owolabi (1993) further mentioned that:

> The inputs of the timetable sub-system are transformed into output with a view to obtaining as much teaching as possible and at minimum cost. For example, each of the ten former departments was offering education as a course. The education classes used to occupy ten rooms at ten different periods with ten teachers. When the central timetable was installed, the ten classes were combined and taught in two large lecture theatres (Assembly Hall). There was savings in the use of space and time (p.40).

There are two broad groups of tangible inputs into the timetable sub-system, teaching spaces (classes) and teaching time (teachers). The other inputs; semester courses, requirement and requests, class sizes, operating hours, distance between rooms (see Table 1,) are merely symbolic. But these symbolic inputs greatly influence the allocation of time and space on the timetable (Owolabi, 1998).

Owolabi (1998) concludes by saying that:

> Utilization of teaching spaces and teachers' time are harmonized in the schedule for course work. Efficiency exists in a continuum ranging from low to high. Efficiency of teaching time and teaching space ranges from low to high. There is a direct relationship between the efficiency of the timetable and the efficiency in the use of teaching space and teaching time (p.40).

He further mentioned that:

> Where the timetables are low quality departmentalized, uncoordinated and with several mismatches in room sizes and class sizes, the utilization rate of spaces and time will be low. The converse is also true. There is however an inverse relationship between efficiency of the timetable and unit cost of education where good timetable leads to efficiency in the use of teaching resources, the unit cost of education will tend to fall. Thus, good timetabling can in the long run, increase the efficiency in the use of teaching spaces and bring down the unit cost of education in tertiary institutions (p.40).

Rogers (1993), further outlined that when centralized time tabling is being used for teaching space allocation, parameters like class size, space needed by each class, course contents, methods of delivery and contact hours between learner and teacher should be taken into consideration, and care taken so that students are not indiscriminately pushed around. Those measures according to Rogers were to ensure that high Time Utilization Rates for teaching space facility were obtained.

Rogers (1993), concludes that increased use of centralized time tabling in higher and further educational instructions in Britain was due to the cost - effective use of expensive teaching spaces and the accommodation of more students within existing teaching space facilities which increase their time utilization rate.

To ensure high Time Utilization Rates, Owolabi (1996) also revealed that "underutilization in time can be reduced by increasing course offerings, increasing number of sections, introducing preparation periods (Prep periods), organizing coaching classes and extending the use of school buildings to community members for organizing meetings and ceremonies" (p.14).

Rogers (1993), again declared that empirical studies carried out at Demontfort and Boummouth Universities in Britain on the use of computerized and centralized time tabling between 1990-1991 and 1992-1993 showed an increase in student Full Time Equivalents (FTES) of 47% and 54% respectively with just concurrent increase in teaching space facilities by 9% and 8%. Rogers (1993) attributed the improved FTES to the increased Time Utilization Rate or frequency of use of available teaching space faciities when the computerized timetabling was used for time tabling and space allocation, which enables more students to be, accommodated within the existing teaching space facilities.

The British Department of Education and science (DES, 1992) defined centralized time tabling as the pooling of all general teaching space facilities suitable for use by a variety of courses together and scheduling them for use by learning groups on hourly basis (p.12 & 13).

Non Academic-Factors

UNESCO Report (1985) listed the condition of teaching spaces, ergonomics and auxiliary spaces provided alongside teaching space facilities as non-academic elements that affect time utilization rates. According to them the

reports indicated that teaching space facilities with higher rates of depreciation were utilized minimally to reduce to a minimum the unit cost of education, which arose from increased maintenance cost. In addition, the optimum utility according to them led to increased Time Utilization Rate.

Apori (1997) as cited in Studies conducted by UNESCO (1985) on factors that affect teaching space identified that;

Hot environments with extreme variation in temperature, rusts, decay from corrosion, predominant in coastal area, oxidation and erosion which accelerated deterioration rate of buildings as factors which caused teaching space facilities to be depreciated at high rate and utilized at high frequencies (p.15).

According to him the above factors resulted in high Time Utilization Rate values for such spaces facilities.

Owolabi (1993a) also mentioned that:

> Overtime, developed properties including school buildings get damaged not only because they are put into use by human beings, but also because cracks are created by expansion and contraction during temperature changes, rust and decay are brought in by corrosion and oxidation, wall bases are dug by erosion and oxidation. Agents of weathering are more active in hot climate where lizards, spiders, rats and birds take possession of unused rooms. Because unutilized buildings depreciate relatively fast in tropical areas, the proportion of working hours for which a room is put into use becomes important for efficiency consideration.

> The institutions that have more programmes are likely to have greater time utilization of the resources (p.2).

Studies conducted by Council of Education Facility Planners (CEFP 1976) on economic factors like illumination, thermal comfort, acoustics and provision of comfortable furniture respectively, cited in Apori (1992) and Bannerman (2002), act independently or interact to determine the extent of use of teaching space within a given period which is directly related to the teaching spaces and teaching Time Utilization Rate.

Elements that Affect Space Utilization Rate

United Nations Educational Scientific and Cultural Organization (UNESCO 1984) reports that space utilization rate (SUR) of teaching space facilities is influenced by time-tabling, mode of instructional delivery, educational policies, provision of auxiliary space alongside the teaching spaces and ergonomic factors.

The report shows that in time tabling and space allocation, when teaching spaces are allocated to class sizes based on seating capacity of the teaching facilities as practiced in centralized time-tabling, it leads to high space utilization rates. The report further explains that the use of teaching space facilities based on adequate mapping of class sizes and seating capacities of spaces, leads to less variation between actual number of students who occupy teaching space faculties and the spaces permissible to seating capacities. This according to the report results in high space utilization rates for the space

facilities. A study on space utilization conducted by Owolabi (1992, 1993, 1994 and 1995), in five higher intuitions in Ghana generally revealed that, teaching space facilities were under-utilized.

At University College of Education Winneba, Owolabi (1992) pointed out that generally teaching space facilities are being under utilized in time and over utilized in space. His study revealed that at University College of Education Winneba, before the introduction of the central timetable system each of the 10 departments offered education as a course of study. The education classes according to the report occupied 10 different periods with 10 different teachers. This was total waste and misuse of resources.

Owolabi (1992), therefore recommended that the time table at the time be centralized and all the ten classes taught in a central place at once. He concluded by saying that there will be savings in the use of space as well as savings in the use of teaching time, and thus led to greater economy of greater efficiency in the use of facilities.

Owolabi, (1993) reported that at Accra polytechnic there existed some degree of shared use of teaching space, but full potentialities of this arrangement had not been released. He further mentioned that some technological and secretarial courses were taught almost wholly in the workshops and studios, where the theoretical aspect could be delivered in the general lecture rooms. Thus Owolabi, concluded by saying that, all the teaching space were under-utilized and the apparent congestions that existed in some of the rooms appeared to be due to poor scheduling of course work. The report further revealed that:

The total utilization rate of 63.1% is, however, fair enough. The full use of general lecture rooms would suggest that enrollment could expand by some 622 more students. But there are a few uncompleted rooms which can accommodate some 400 more students (p.8)

The study stated that at University of Cape Coast the teaching space facilities were not fully utilized in time across the span and width of the university. He affirmed that most of the facilities were empty most of the time, while others were not being used at all. Owolabi argued that few facilities were also under- utilized in space. He suggested that, "to improve utilization rates there should be more students. The university is capable of accommodating more than 5000 students as far as teaching spaces were concerned"(p.10).

Owolabi (1994) posited that "in general the teaching spaces across the faculties at Legon were not of standard shapes. There are wide variations in the sizes of classrooms. In some faculties, rooms meant to be used as offices were being used as classrooms. The need for standardization in the construction of some classrooms was probably not apparent at the time the buildings were springing up"(p.11). He further recommended that, for future expansion it may be advisable to consider building large lecture rooms with capacities for 200 or more seats, but with moveable partitions.

On teaching space at Legon, he argued that the teaching spaces were also under- utilized in time across the length and breadth of the university. Some of the rooms were under- utilized in space most of the time. To improve utilization rate Owolabi recommended an increase in the students' enrollment. He further

stated that about 7000 students could be conveniently accommodated in the teaching space at Legon.

According to the research, some rooms, however, were over -utilized. These were offices that had been converted into classrooms, lecture rooms and conference rooms. Owolabi, recommended that since most lecture rooms were under- utilized in time, a well constructed time table could release all rooms that were supposed to be offices. To resolve the problem of overcrowding the report indicated that large classes could be split up by operating two or three classes (that is, using two or three rooms) simultaneously or at different times, and by offering the same courses in both semesters.

Owolabi concluded by saying that, "such arrangement will eliminate the problem of over utilizing space and its deleterious effects on learning environment and equipment used. It will also provide the much needed flexibility for their students in their choice of courses" (p.12).

Owolabi (1995) observed that at Kumasi Polytechnic the frequency of use factor was generally low. He indicated that:

This factor gets as low as 20% for some reasons. Splitting large classes would improve Time Utilization Rate but increase the use of teachers' time. The occupancy factor is high but may not be high enough to deserve splitting of classes. If intakes into the school of business and management studies are in the multiple of 40-50 (i.e. admitting not more than 50 students in a class or admitting not less than 80 students and having them grouped into 2 classes) the occupancy factor would improve and rooms would be efficiently utilized (p.13).

Owolabi, finally concluded that even though the general classrooms are rather poorly used, the special rooms were over-utilized in many cases. He attested to this fact by saying that:

> In general the workshop and labs are more intensively used than classrooms. Some workshops are less frequently used (furniture and Mechanical Engineering workshops, for example). But almost all workshops and laboratories are overcrowded whenever they are put into use. Students are sometimes about twice the installed number of work stations. The congestion is worse in the engineering workshop where the occupancy factor is as high as 151%. The laboratories have a total utilization rate of about 120%, the workshop, 84% and the classroom, 52% (p.13).

Table 1: Comparative analysis of Teaching space Utilization in Higher Institutions, Ghana 1993/94

Type of Space	UCC	UG Legon	UCEW	Accra Poly	Kumasi Poly
Lecturer Rooms	16.3	20.6	27.3	76.5	52.2
Laboratories	15.0	13.9	22.5	48.0	119.7
Workshop	-	-	24.7	60.0	83.9
Studies	-	-	22.7	32.0	99.7
Total	16.0	20.6	25.4	63.1	65.4

Source: Culled from Owolabi's Assessment Report, 1993/94

A research survey by Apori (1997), shows that, teaching space facilities at UCC were generally under-utilized.

He indicated that:

> The study shows that the total available teaching space facility could accommodate 7740 and 3870 students at 100% and 50% levels of global utilization respectively. The teaching space facilities were generally under- utilized with the observing average global utilization rate of 5.7%, 1.16%, 0.82%, 2.64% and 4.07%, respectively for lecture theatres of zoology, physical, chemistry, biology and botany laboratories per day for the 1992/93 academic year, instead of 80% for general purpose classroom and 40%-70% for laboratories recommended by the British Department of Education and Science (BES, 1992), p.75.

Apori (1997) further states that "the overall average low frequency of use of time utilization rate of the teaching spaces was identified as the primary causes of the under utilization of the teaching space facilities observed in the study" (p.75). He further notes that:

The low frequency of use of the teaching space facilities might be due primarily to low student Population of 2599, (UCC record, 1993) at the University of Cape Coast compared with the optimum Population of 7440 students that can utilize the teaching space at the science faculty building complex only (p. 76).

This shows that before and at the time of the study, the Population at UCC seemed to be very high, but after the study his result showed that the

science faculty alone could obtain an optimum population of 7440 students. This shows that the facilities were being underutilized.

Apori (1997) therefore recommended certain ways to increase the effective utilization of the science faculty. This includes, allowing non-university communities or organizations like Institute of Adult Education (university of Ghana), and the Non formal Education division (NFED) and other organizations for Education and training programmes. He further suggested the use of the lecture rooms after the regular lectures of the university students, extension of the school day to about 8.30 pm or the expansion of the university curricular to allow the other training programmes like remedial classes for SSS graduates, Post Graduates Diploma in Education and others.

A study carried out by Bannerman (2000) on Space Utilization Rate at Mfantsipim showed that l availability of teaching space facility in the school could accommodate 1780 students at 100% and 50% levels of Global Utilization respectively. It presupposes according to Barnnerman that, the 1999 school enrollment of 1434 was not too high as argued by staff and thus students could be comfortably accommodated in the school if the space facility were adequately utilized.

Bannernman (2000) stated that the weekly average global utilization rates of 4.70%, 49.3%, 50.2%, 38.2%, 40.2%, for form one, Balmer, Sarbah, Freeman and Lockhart blocks respectively in the school year were low as compared to the rate of 80% for general purpose classroom recommended by British Department of Education and Science (BDES, 1992). Bannerman also

suggested ways to increase the effective utilization of the teaching space in the school and these include the introduction of central time tabling, proper planning of the existing time tabling, the effective utilization of other buildings like laboratories, assembly hall and the technical blocks for general teaching purposes.

Another study carried by Akomaning (2001) on Space Utilization Rate at Takoradi polytechnic showed that total availability of teaching space for all the instructional rooms (excluding assembly Hall) could accommodate 10,908 students at 100% level of global utilization. The study indicated that teaching space facilities were underutilized with the observed average global utilization of 51.4%, 48.87%, 32.67% and 8.04% for classrooms, workshops, laboratories and assembly hall, respectively per day for the 1999/2000 academic year. According to him, the overall average Global Utilization Rate for all the instructional rooms was 49.17% which falls below the purposed norms of 53.36, recommended rate by the URC (1998). He also indicated that the SUR for classrooms and laboratory throughout the study period were 117.13%, 157,88% and 101,44% respectively, which were higher than the proposed Space Utilization Rate of 66% (URC, 1988). Akomaning (2001) indicated further in the study that, the GUR was much lower than the norm. The observed average times for all the instructional rooms were higher (38.09% to 62.23%) in the morning sessions than (7.17% to 46.08%) recorded in the afternoon and evening sessions (p 82).

Akomaning further stated that:

> Almost half of the instructional rooms were utilized between 6am – 12pm in a day and the afternoon 12pm-4pm less than half of them would be utilized. The situation was more serious in the evening 4pm-8pm. The low frequency of use of the instructional rooms might be due merely to low students population of 3,771(p.82).

According to Akomaning, teaching space facilities at Takoardi polytechnic are able to accommodate a maximum of 10,908 students at 100% utilization rate. Moreover, the large class sizes had in no small way contributed to the utilization rate.

Akomaning concluded that there were low TUR as well as GUR which signified under- utilization of instructional rooms. However, SUR was very high (over 100%). These meant instructional rooms were overcrowded. The overall average rate for 59 instructional rooms for 1999/2000 academic year was TUR-39.75%, SUR-123.72%, and GUR-49.17%. He further argued by saying that, the congestion of the instructional room was attributed to small sizes of instructional rooms, lack of furniture in some large instructional rooms, lack of teaching staff departmentalized timetable and preferred time of teaching. The low TUR of instructional room was due to certain courses carried outside the premises of the institution like industrial attachment of students' field and outside practical work and long theoretical time (14 hrs).

Summary

In this chapter a number of theories and concepts on space utilization have been looked at. The literature has revealed some empirical evidence on the utilization of teaching space in some developed and developing countries like Canada, Great Britain and Ghana.

In the literature, Russel and Doi (1957) emphasized that the availability of data on teaching space utilization was a condition for good management and efficient utilization of teaching space. UNESCO (1984, 1985) reported that teaching space may be assessed in respect to the conditions of the teaching spaces, social norms for provision of teaching spaces, the education spaces requirement in a given society and the efficiency of utilization of a teaching space.

Kenney and Foster (1983) defined utilization as, how spaces are actually used or how it is hoped and planned that the spaces should be used.

They further mentioned that utilization may be shown graphically or defined mathematically as the product of the frequency factor and occupancy rate. They indicated that teaching space utilization can be assessed by the static or dynamic method.

Owolabi (1992, 1993, 1994, and 1995) carried out a study on teaching space utilization in five higher institutions in Ghana. He reported that with exception of a few specialized rooms, all the teaching spaces were under-utilized in terms of space and time. As a result he recommended the introduction of central time tabling system in all the institutions. In his study, at UCC, UG

Legon, UCEW, Accra and Kumasi Polytechnics, a total utilization rate of 16.0%, 20.6% 25.4%, 63.1% and 65.4% respectively were obtained from the use of lecture rooms, laboratories, workshops, and studios.

The URC (1988) adopted the California Model of TUR, 80%, SUR, 67.7% and GUR, 53.36% to insure effective utilization of teaching space in Ghana.

CHAPTER THREE

METHODOLOGY

This section discusses the research design, population and sample. It also discusses the research instrument that was used to collect data, the procedure of data collection and the method for data analysis.

The purpose of this study, Teaching Space Utilization in the Central University College, Accra was to assess and evaluate the extent to which the physical teaching and learning environment at the university is currently being utilized and suggest ways and means for its optimal utilization. It is also to fill the gap in the literature of the use of Space Utilization of tertiary institutions especially in the private sector.

Research Design

The descriptive research design was used for this study. According to Gay (1984) descriptive survey design aims at collecting data in order to test the hypotheses or answer questions concerning the current status of the object of the study. Information gathered from the descriptive research can be useful in diagnosing a situation since it involves describing, recording, analyzing and interpreting conditions that exist. It also involves some type of comparison and attempted to discover relationship between some variables. Since this study is

basically aimed at describing the utilization of teaching space facilities at the Central University College, the descriptive survey design was used in order to achieve the purpose of this study.

The survey was done by taking physical measurement of all floor spaces at Central University College and also determine the ratio between the number of hours (or periods) during which a classroom is put into use per week and the theoretical number of hours (periods) available per week by convention. It also found out the ratio between the average sizes of the sector occupying the room, that is, the number of students in the classroom and the theoretical capacity of the room (Owolabi, 1996) comparison and attempt to discover relationship between some variables. This study was basically aimed at describing the utilization of teaching space facilities at Central University College. Thus this led the researcher to achieve the purpose of this study and draw meaningful conclusions for the study.

Population

The target population for this study included lecturers, administrative staff and technicians of Central University College. A total population of 152, comprising 62.full time lecturers and 25 adjunct (part time) lecturers, 4 senior technicians, 12 junior technicians and 49 administrators were considered as at the time of collecting data. Looking at the size of the population, the researcher should have used the entire population but decided to make the research work more practicable and manageable by using unbiased sample from the

population. This also agrees with Best and Kahn (1998) who opine that to study a large population to arrive a generalization would be impracticable, if not possible. The classrooms and the laboratories were also taken into consideration as they were measured for observation.

Sample and Sampling Procedure

The stratified sampling was used to select 60 lecturers, comprising 48 permanent lecturers and 12 part-time lecturers, out of 62 full time and 25 part time lecturers in the three schools of the University (School of Applied Arts and Sciences, School of Business and Management Studies and School of Theology and Missions). This method of sampling was more appropriate because the teaching population is noted to be in departments under three main schools. The departments and their population are; Department of Accounting and Finance - 13 lecturers, Department of Management -21 lecturers, Department of Social Studies -8 lecturers, Centre for Modern Foreign Languages -11 lecturers , Department of Theology -10 lecturers, Centre for Information Technology -6 lecturers and Science Department -8 lecturers . Thus to get a homogenous sample and for each department to be represented the population was divided into strata. In this research, all the lecturers and instructors were first grouped under their respective departments and further grouped under the three main schools

Considering the total population of the lecturers and instructors in each of the three schools, 70% across board for proportional representation of the

population of the 3 schools was used. The following sample sizes were derived. These are; 36 respondents from 52 lecturers of the School of Business and Management, 17 respondents from 25 lecturers of the School of Applied Arts and Sciences and 7 respondents from 10 lecturers of the School of Theology and Missions. The lottery method of the simple random sampling was used to select all the respondents. Therefore, the sample size of 60 respondents was obtained from the population of 87 lecturers.

In the case of administrators the purposive sampling technique was used. This is because not all the administrators are conversant with the teaching space utilization in the schools. Thus only those who have the needed knowledge were selected. In all, 30 senior administrative staff comprising the principal, vice principal, secretary, planning officer, Deans of the three schools and heads of departments and other administrative staff were selected from the total population of 49 administrators. The administrators are responsible for the day-to-day administration and maintenance of the teaching space facilities; hence data on their views helped to put in effective management system so as to improve upon the use of the teaching space facilities at Central University College.

Census selection was used to select all the 4 senior and 12 junior technicians from the various laboratories because their number was few and so there was no need to select some and leave others. The laboratory technicians were selected because they man the various laboratories and are aware of the space they use for the various equipment for lectures. In all 106 respondents

were used for the study. Using a sample size of 106 out of 152 which forms 69.7% of the population was considered better since Nwana (1992) states that, in selecting size, if the population is a few hundreds, 40% or more will do.

On the space facilities at the Central University College, Accra, all the teaching space facilities at the main campus were chosen, including the 3 laboratories for the study.

Research Instrument

Three instruments were used for this study, which are: observation, questionnaire and interview. The observation checklist(1 A) was used to collect quantitative data on the use of the lecture theatres, between 7.30 am and 9.30 pm from Monday to Friday that the spaces are scheduled for lectures and tutorials. The quantitative data were broken down into the period of the day the lecture theatre were in use (frequency of use) and the number of students who occupied the lecturer theatre when in use (occupancy rate).

Another observation checklist (1 B) was designed to collect data on the use of three laboratories, namely the language, Applied Science and the Information Communication Technology (I. C. T.) laboratories. Time, Space and global utilization rates of socialized rooms were computed using the data that were obtained from the observation checklist, questionnaire and interview.

The researcher adapted the instrument used by Apori (1997), to collect data on the Utilization of Teaching Space at The Science Faculty building complex, University of Cape Coast to collect data on the utilization of teaching

space at Central University College. Permission was sort and granted by Obeng Apori for the use of his instrument for this study. All the adopted instruments were modified to suit the conditions that pertain at the Central University College, especially the observation checklist, as seating capacities and type of buildings vary from institution to institution.

The second instrument was a questionnaire (2 A) which was designed for lecturers who utilize the teaching space facilities at the school. This helped in the collection of data on class size, number of hours put in for lecturing, tutorials, educational administration and other non-academic schedules, availability of teaching aids and possible factors that limit the optimization of use of teaching spaces.

Similarly, another set of questionnaire (2B) was administered to educational administrators such as the Vice Principal. Registrar, Departmental heads, Planning Officers, Finance Officers, Dean of students, Principal Administrators, Faculty Officers and Assistant Registrars. It helped to collect opinions on academic programme, educational administration, factors that may influence the current level of utilization of the teaching space at Central University College, Accra, and the prioritizing of the present and future educational facility needs of the institution.

Finally, an interview guide was administered to technicians who are closely related with teaching space (laboratories) at Central University College. The essence of this instrument was to help elicit information as regards time set for preparation for practical work at the laboratories as well as time used in

tidying up after practical. Moreover, the instrument helped the researcher to ascertain the frequency of use of laboratories in curriculum circle (i.e. one week) at Central University College.

Pilot testing of Instruments

To determine the validity and reliability of the instrument before the main study, the researcher sought the help of his supervisors to check the content and construct validity of the questionnaire before undertaking the pilot-testing. The testing of the Instruments can also reveal ambiguities and poorly worded questions. This therefore, helped the researcher to verify whether the items were easy to read and understand; and also to assess whether the questionnaire was appropriate for the study. Also, the pilot-testing enabled the researcher to find out whether, the tool being used will gather enough information to be able to use to answer the research questions.

The instruments for the study were adapted from Apori's (1997) study. The adapted observation checklist was designed by using the facilities at Central University College, Accra; samples of it were given to four competent and experienced research assistants for trial. They were trained on how to utilize the checklist to collect information. The trial observation which took two weeks was to acquaint them on the use of the observation checklist to indicate the time (frequency of use) a lecture theatre is used and the number of students that attend lecture at a particular period (occupancy rate). The adopted questionnaire for lecturers and administrators were given to a sample of lecturers,

administrators and educators of the University of Cape Coast to study and give their opinions. Their comments, suggestions, corrections and others were incorporated into the final instruments administered to the sample population. For reliability, the modified instrument was pre-tested at the Methodist University College, Accra. This is because it has similar characteristics in terms of the nature of the school, the population of staff and the administration with Central University College. After the pilot-testing of the instruments, the software Package for Social Science (SPSS), was used to enter the results. Cronbach Alpha coefficient was used to determine the internal consistency of the results. The overall alpha for the tested items was 0.8675. According to Darren and Mallery (2001), the alpha value which is >.8579 means the instrument is considered as good. Therefore, the overall alpha being .8675 indicates that the instrument is reliable.

Data Collection Procedure

Before embarking on the collection of the data, an introductory letter was collected from the Director of the Institute for Educational Planning and Administration of the University of Cape Coast. This was used to introduce the researcher and the work being undertaken. Permission was then sought from the Registrar, Deans of Schools and Heads of Academic Department who have administrative control over the teaching space facilities at Central University College, Accra. The study was carried out in the second month of the first semester, when every student was expected to have settled. Physical

measurements of floor spaces of the various lecture theatres were made and timetable of the school was used to study the frequency of use of the lecture theatres. Further, trained enumerators were used to observe the use of the 20 lecture theatres, and 3 laboratories, who recorded the use of the rooms on a checklist. In addition each research assistant was assigned to a number of General-Purpose Classrooms and Laboratories to observe and record the observation on the checklist. The main library and stores were not used for the study.

In addition to the physical measurement, observation and data recording, questionnaires were administered to academic staff to elicit their opinions on the Utilization of Teaching Space Facility at Central University College, Accra. Administrators also answered questionnaires to give their views on the utilization of teaching space facilities. The questionnaires consisted of both open-ended and closed-ended items which enabled the respondents to either tick or write out their views in spaces provided on the questionnaire.

Data Analysis

The quantitative descriptive method was used to analyse the data collected. Instrument (A) referred to as an observational checklist helped in computing the average time, space and global rate of 20 classrooms and two main laboratories. The time considers the proportion of time the teaching space (classrooms)were actually in use and the space considers the proportion of space put into use. The time element is referred to as Time Utilization Rate (TUR) and

the space element referred to as the Space Utilization Rate (SUR). The calculation for the TUR was the ratio of the number of the hours during which a teaching space was put out to use per day or week to the theoretical number of hours available by norm per day or week. The observed hours per day or week that lectures were held in the teaching space was the number of hours a teaching space was put to use. The theoretical hours per day or week by norm were the sum of hours in a day that time table stretches across in a day or for five days in a week that the teaching activity (lecture or practical) could be held in general. The Central University College organises three schools in a day namely, the Morning, Afternoon and Evening Schools. Each observational day was divided into morning school (7.30am to 11.35am) afternoon school (12pm to 4.05pm), and evening school (4.30pm to 9.35 pm) amounting to 13 theoretical hours sessions from Monday to Friday in the first and second semester in the whole academic year according to the university's time table at the time of data collection for teaching space facilities. The summary of average Frequencies of Use (TUR), Occupancy Rate (SUR) and Global Utilization Rate (GUR) of 20 classrooms and 3 main laboratories per day for first and second semesters of the whole 2005/2006 academic year was calculated. The theoretical hours of use for the 20 rooms and 3 laboratories used were 13.00 hours (7.30 am to 9.30 pm) for five days (i.e. From Monday to Friday).

Mathematically the TUR was expressed as:

$$\text{TUR (\%)} = \frac{\text{Actual number of hours of use x 100}}{\text{Theoretical number of hours use}}$$

Full utilization of teaching space is calculated based on TUR and the SUR; this will give the accurate picture of the use of space utilization. The space element in utilization of space which is called as Space Utilization Rate was calculated as the ratio of average size of a class occupying a room and the number of actual number of places available in a room.

Mathematically, the SUR was calculated as:

$$\text{SUR (\%)} = \frac{\text{Average number of students in attendance for a lecture x 100}}{\text{Actual number of students' places available}}$$

Since the TUR and the SUR in space utilization do not show the utilization of a given teaching space facility because of their limitations of considering the frequency factor and occupancy factor separately, there was the need for the Global Utilization Rate which calculates both frequency and occupancy factors of a teaching space facility. The GUR was mathematically calculated as:

$$\text{GUR (\%)} = \frac{\text{SUR x TUR}}{100}$$

The figures obtained from the observation checklists used to collect data on teaching space facilities were used to calculate the Time Utilization Rate (TUR), the Space Utilization Rate (SUR),and the Global Utilization Rate (GUR).

The responses to the various items in the questionnaires were coded, tabulated and statistically analyzed by the use of the Computer Software programme, Statistical Package for Social Science (SPSS). Since the study adopted a descriptive survey approach, the statistical analysis consisted mainly of the determination of frequencies, percentages and cumulative frequencies, among others, for the major variable used for the study.

CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of the study sought to fill the gap in the literature onthe use of Space Utilization of tertiary institutions especially in the private sector by providing information on quantitative data on the efficient utilization and use of teaching classroom and laboratory spaces at the Central University College, Accra and to assess and evaluate the extent to which the physical teaching and learning environment at the university is currently being utilized and suggest ways and means for its optimal utilization

This chapter considers the discussion of results of data collected and gathered from observation of the use of teaching space facilities at the Central University College, Accra. It also deals with the analysis of the data collected and collated from respondents for this study. Discussions are made on the salient issues raised in the responses of the lecturers, administrative staff and the technicians. The discussion also focuses on the computation of Time Utilization Rate (TUR), Space Utilization Rate (SUR) and Global Utilization Rate (GUR) of the teaching spaces for Mondays to Fridays. The time of the study took place during the first and second semesters of the 2005/2006 academic year. This chapter also discusses the analysis of the views of (a) the academic staff, (b)

administrators, and (c) technicians expressed on the use of the teaching space facilities at the Central University College campus in Accra.

The discussion and analysis of data gathered from the Central University College for the study are focused on the research questions that guide the studies. Pattern of average Time Utilization Rate, Space Utilization Rate and Global Utilization Rate formed for all the teaching space facilities during (a) morning sessions (7.30am -11.30am), (b) afternoon sessions (12pm – 4.05pm) and (c) evening sessions (4.30pm – 9.30pm) for Mondays to Fridays in the first and second semesters of the entire 2005/2006 academic year are shown (see Appendix F&G)

Research Question One

What is the Time Utilization Rate of General-Purpose Classrooms at the Central University College?

The Time Utilization Rates for the General-purpose Classrooms from Mondays to Fridays, Tables 2, 3, 4, 5 and 6 provide answers to research question 1 on the Time Utilization Rates for the General-Purpose Classrooms for the year 2005/2006 academic year for four (4) consecutive weeks.

Time Utilization Rate for General-Purpose Classrooms on Mondays

Table 2 portrays and presents findings on Time Utilization Rates for General-Purpose Classrooms for four (4) consecutive Mondays for first and second semester of the 2005/2006 academic year.

Table 2: Time Utilization Rate for General-Purpose Classrooms at Central University College, Accra for 2005/2006 Academic Year on Mondays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	73.6	70.1	71.85
	12.00-4.05	72.1	70.2	71.15
	4.30-9.30	71.25	68.1	69.68
	Whole day	72.31	69.46	70.88

The classroom space as shown in Table 2 had the morning sessions recording the highest average rates of Time Utilization of 73.6% and 70.1% for the first and Second Semesters respectively as compared to the afternoon sessions and the evening sessions. The least Time Utilization Rates of 71.25% and 68.1% were recorded in the evening sessions during the first and second semesters respectively. The high Time Utilization Rates as recorded in the morning sessions could be attributed to the lecturer's preference in teaching in the morning sessions to other sessions (see Table 34). It is also observed from the table that the difference between the highest Time Utilization Rates and the least Time Utilization Rates were just above 2% and this was attributable to the high number of workers who attend the evening sessions or schools after work which attract different set of lecturers from the morning and the afternoon sessions. The Time Utilization Rates of 70.88 in terms of whole day and whole

academic year were less than 80% as recommended by the University Rationalization Committee Report (URC 1988).

Time Utilization Rates for General-purpose Classrooms on Tuesdays

The Time Utilization Rates for four (4) consecutive Tuesdays for General-Purpose Classrooms for first and second semesters and the whole day and year are shown in Table 3.

Table 3: Time Utilization Rates for General-Purpose Classrooms at Central University College, Accra for 2005/2006 Academic Year on Tuesdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	71.9	70.2	71.05
	12.00-4.05	68.75	66.8	67.78
	4.30-9.30	67	65.7	66.35
	Whole day	69.2 1	67.57	68.39

The Time Utilization Rates as shown in Table 3 indicate that morning sessions for both first and second semesters were relatively higher than that of the afternoon and the evening sessions. The highest Time Utilization Rate of 71.9% was recorded in the morning session of the first semesters and the least of 65.7% was recorded at the evening sessions of the second semester. The Time Utilization Rates for the whole day for the first and second semesters were

69.21% and 67.57% respectively. The whole academic year recorded 68.39%. The rates recorded are less than the 80% rate recommended by the U.R.C report (1988).

The difference between the rates of the whole academic year's recording and the rate recommended by the URC Report (1988) implies that classrooms were not fully utilized on Tuesdays during the first and second semester, of the 2005/ 2006 academic year. It is observed from the table that the TURs for the first semester were slightly higher than that of the second semester in all the indicators. This trend attests to the fact that final year students during second semesters hardly use the classrooms for official lectures as they embarked on individual and group studies in preparation towards their final examinations.

Time Utilization Rates for General-Purpose Classrooms on Wednesdays

The Time Utilization Rate for four (4) consecutive Wednesdays for General-Purpose Classrooms for first and second semesters and the whole day and year are shown in Table 4.

Table 4: Time Utilization Rates for General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Wednesdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	73	70.20	71.6
	12.00-4.05	67.87	68.30	68.09
	4.30-9.30	63	62.40	62.70
	Whole day	67.95	66.96	67.46

Table 4 shows that classroom space had higher Time Utilization Rates during the morning sessions than the afternoon and the evening sessions, whiles the afternoon session also recorded relatively higher TURs than that of the evening session. The highest TUR of 73% was recorded in the morning session in the first semester.

The least TUR of 62.40% was recorded in the evening session of the second semester. The TURs for the whole day were 67.95% and 66.96% respectively for the first and the second semesters. The TURs for the whole academic year were 71.6% in the morning session, 68.09 in the afternoon and 62.70% in the evening sessions respectively. The average Time Utilization Rate for the whole academic year was 67.46%. This rate was less than the Time Utilization Rate of 80% recommended by the URC Report (1988)

Time Utilization Rate for General-Purpose Classrooms on Thursdays

The Time Utilization Rates for General-Purpose Classrooms for four consecutive Thursdays during the first and second semesters respectively as well as the whole 2005/2006 academic year is shown in Table 5.

Table 5: Time utilization Rates for General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Thursdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	70	71	70.50
	12.00-4.05	67.50	68.2	67.85
	4.30-9.30	66	64.5	65.25
	Whole day	67.83	67.9	67.87

As shown in Table 5, the highest Time Utilization Rate of 71% and the least Time Utilization Rate of 64.5% were recorded in the second semester respectively. Whilst the highest was recorded in the morning sessions, the least was recorded in the afternoon sessions. It should be noted that averagely the morning sessions recorded relatively higher TURs than the afternoon and the evening sessions. The whole day TURs of 67.9% recorded in the second semester was higher than that of the first semester of 67.83%. TUR of 67.87% was recorded for the whole academic year which was less than the recommended 80% by the URC report (1988).

Time Utilization Rates for General-purpose Classrooms on Fridays

Table 6 presents information on Time Utilization Rates for General-Purpose Classrooms for four consecutive Fridays at the Central University College, Accra during the first and second semesters as well as for the whole2005/2006 academic year.

Table 6: Time Utilization Rates for General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Fridays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	64.37	62.4	63.39
	12.00-4.05	63.75	63	63.38
	4.30-9.30	61.17	62.5	61.83
	Whole day	63.09	62.63	62.86

As indicated in Table 6, the highest Time Utilization Rate for the General-Purpose Classrooms of 64.37% was recorded in the morning sessions of the first semester while the least of 61.17% was recorded in the evening of the first semester. The highest Time Utilization Rate of 63% was recorded in the afternoon sessions during the Second Semester while the least of 62.4% was recorded in the morning sessions. The whole day Time Utilization Rates for the first and second semesters were 63.09% and 62.63% respectively. The TURs for the whole academic year for the morning, afternoon and the evening sessions

recorded 63.39%, 63.38% and 61.83% respectively. The Time Utilization Rates on Fridays were generally lower as compared to the other days. This can be attributed to the fact that most final year students spend much time at the library on Fridays to work on their project and research works. This also could be attributed to teacher apathy to lectures on Fridays as they see Fridays as the beginning of their weekend.

From Tables 2 to 6 it is shown that the highest Time Utilization Rate for the General-Purpose Classrooms of 73.6% was recorded in the morning sessions of Mondays during the first semester whilst the least Time Utilization Rate of 61.17% was recorded in the evening sessions of Fridays during the first semester. The tables further point out that the high Time Utilization Rates were recorded on Mondays.

Generally, Tables 2 to 6 portray that from Mondays to Fridays the general-purpose classrooms had high Time Utilization Rate during the morning sessions in both the first and Second Semesters in the 2005/2006 academic year. It is also observed that the highest Time Utilization Rate of 73.6% as recorded from Tables 2 to 6 is very high as compared to other studies on space utilization, but still less than the 80% recommended by the URC Report (1988). Kennedy and Foster (1983) argued that the recommendation of the target utilization level of 80% for General-Purpose Classrooms by the British Department of Education and Science (1971, 1972) is unrealistic and unachievable even with the help of computerized space allocation and timetabling system. This entails that the 80% Time Utilization Rate objective set by the "California Model for room

utilization and adopted and recommended by URC Report (1988) was utopia according to Kennedy and Forster (1983).

Research Question Two

What is the Time Utilization Rate of Laboratories at the Central University College?

The Time Utilization Rate for the Laboratories from Mondays to Fridays, Tables 7,8,9,10 and 11 provide information to answer research question two on time Utilization Rate for the laboratories for the Year 2005/2006 academic year for four (4) Consecutive weeks.

Time Utilization Rates for Laboratories on Mondays

Table 7 shows results and findings on Time Utilization Rate for laboratories for four (4) consecutive Mondays (i.e. from 5^{th}– 8^{th} weeks) for first and second semesters for the 2005/2006 academic year and the TUR on Mondays for the whole academic year.

Table 7: Time Utilization Rates for Laboratories at the Central University College for 2005/2006Academic Year on Mondays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classroom	7.30-11.30	70.0	71.5	70.75
	12.00-4.05	64.4	66.8	65.6
	4.30-9.30	64.5	64.2	64.35
	Whole day	66.96	67.5	67.23

The information shown in Table 7 indicates that Time Utilization Rates for morning sessions for the laboratories were relatively higher than that of the afternoon and the evening sessions during the whole academic year. The highest Time Utilization Rates of 70% and 71.5% were recorded in the morning sessions of the first and the second semesters respectively whilst the lowest Time Utilization Rates recorded in the first and second semesters were 64.4% and 64.2% respectively in the evening sessions.

The whole day Time Utilization Rates of 67.5% recorded in the second semester was slightly higher than that of the first semester which recorded 66.96%. The highest Time Utilization Rate of 71.5% recorded in the morning sessions of the second semester and the Time Utilization Rate in terms of whole academic year were not as much of the 80% rate recommended by the

University Rationalization Committee Report (1988) and also fell short of the 100% rate which Owolabi (1993) described as utopia.

Time Utilization Rates for Laboratories on Tuesdays

The Time Utilization Rate for four (4) consecutive Tuesdays for Laboratories for first and second semester for the year 2005/2006 are shown in Table 8.

Table 8: Time Utilization Rates for Laboratories at the Central University College for 2005/2006Academic Year on Tuesdays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classroom	7.30-11.30	70	72.5	71.25
	12.00-4.05	66	66.5	66.25
	4.30-9.30	64.5	64.2	64.35
	Whole day	66.83	67.73	67.28

As indicated in Table 8, the Time Utilization Rates for the laboratories were higher in the morning sessions than that of the afternoon and the evening sessions during the first and the second semesters respectively. The whole day Time Utilization Rate for the whole academic year was 67.28%. The highest TUR of 72.5% on Tuesday was recorded in the morning sessions of the second semester whilst the lowest TUR of 64.2% was recorded in the evening sessions

of the second semester. The whole day TUR of 67.73% in the second semester was relatively higher than that of the first semester which recorded TUR of 66.83%. The Time Utilization Rate for the laboratories in terms of whole day and whole academic year of 67.28% was less than the 80% recommended by the URC Report (1988) but was within the range of 40% - 70% recommended by the British Department of Education and Science (BDES) (1971,1972).

Time Utilization Rates for Laboratories on Wednesdays

The Time Utilization Rate for Laboratories for four (4) consecutive Wednesdays during the first and second semester as well as the whole of 2005/2006 academic year are shown in Table 9.

Table 9: Time Utilization Rates for Laboratories at the Central University College for 2005/2006 academic Year on Wednesday

Space	Period	First Semester	Second Semester	Whole Academic Year
Classroom	7.30-11.30	72.2	70.2	71.2
	12.00-4.05	68.2	68	68.1
	4.30-9.30	68.5	68.2	68.35
	Whole day	68 .96	68.8	68.88

As shown in Table 9, 72.2% TUR recorded was the highest in the morning session of the first semester and the highest TUR 70.2% recorded in the morning session during the second semester was slightly lower than that of TUR

recorded during first semester of 2005/2006 academic year. The lowest rate of 68% was recorded in the afternoon session during the second semester whilst the lowest TUR recorded during the first semester was 68.2% in the afternoon sessions.

In the whole academic year, the laboratories recorded relatively a higher TUR of 71.2% in the morning sessions than that of the afternoon sessions' TUR of 68.1% and the evening sessions' TUR of 68.35%. The whole day TUR of 68.96% recorded during the first semester was relatively higher than that of the whole day TUR for the whole academic year for the laboratories but was less than the 80% as recommended by the URC Report (1988).

Time Utilization Rates for Laboratories on Thursdays

The Time Utilization Rate for laboratories for four (4) consecutive Tuesdays during the first and second semesters as well as the whole 2005/2006 academic year are shown in Table 10.

Table 10: Time Utilization Rates for Laboratories at the Central University College for 2005/2006 academic Year on Thursdays

First Space	Second Period	Whole Semester	Semester	Academic Year
Classroom	7.30-11.30	72	71.5	71.75
	12.00-4.05	64.2	64	64.1
	4.30-9.30	65.4	66	65.7
	Whole day	67.2	67.16	67.18

As indicated in Table 10, the highest Time Utilization Rate of 72% was recorded in the morning sessions of the first semester and the least Time Utilization Rates of 64% was recorded in the afternoon sessions during the second semester. The whole day, Time Utilization Rates of 67.2% and 67.16% were recorded during the first and the second semesters respectively. In the whole academic year as shown in table 10, Time Utilization Rate of 71.75% as recorded in the morning sessions was relatively higher than that of the afternoon sessions' Time Utilization Rate of 64.1% and the evening sessions' TUR of 65.7%. The average Time Utilization Rate of the whole academic year of 67.18% was within the range of 40% - 70% recommended by the British Department of Education and Science (BDES) (1971,1972), but was less than the 80% Time Utilization Rates recommended by the URC Report (1988)

Time Utilization Rates for Laboratories on Fridays

Table 11 shows the Time Utilization Rates for laboratories for teaching and learning process for four (4) consecutive Fridays during the first and second semesters and the whole day and the whole academic year for the 2005/2006 academic year.

Table 11: Time Utilization Rates for Laboratories at the Central University College for 2005/2006 Academic Year on Fridays

Space	First PeriodSemester		Second Semester	Whole Academic Year
Classroom	7.30-11.30	64.5	66.8	65.65
	12.00-4.05	64.2	67.5	65.85
	4.30-9.30	64.2	66.4	65.3
	Whole day	64.3	66.9	65.6

Information gathered from the previous tables generally suggested that the Time Utilization Rates recorded in the morning sessions during the first and the second semesters were relatively higher than the highest Time Utilization Rate of 67.5% recorded in the afternoon sessions during the second semester and the least of 64.2% recorded in the evening sessions in the first semester. The highest Time Utilization Rate of the whole academic year of 65.85% was recorded in the afternoon sessions whilst the lowest Time Utilization Rate of the

whole academic year of 65.3% was recorded in the evening sessions. Contrary to the earlier suggestions that Time Utilization Rates in morning sessions were higher than that of the afternoon and the evening sessions, information in Table 11 suggest otherwise. This could be inferred that more practical work was engaged in the afternoon session in the laboratories on Fridays by the final year students who are making preparation towards their final examination. Again it is from the table that Time Utilization Rates for the laboratories on Fridays were lower as compared to the other days. The highest Time Utilization Rate of 68.88% for the whole academic year was recorded on Wednesdays, whilst the least Time Utilization Rates of 65.6% was recorded on Fridays. This phenomenon may be attributed to the academic staff preference to the use of Mondays-Thursdays than Fridays.

The relatively low frequencies of use of the laboratories, as observed from Tables 7-11, are in agreement with results obtained from other studies on the topic (Kenny and Foster, 1983 ; University Rationalization Committee Report, 1988 ; Akomaning, 2001 and Quansah, 2006). Kenny and Forster (1983) state that, the use of laboratories by students constitutes one aspect of load put on them. For, time ought to be set aside for preparing and cleaning the place after experimental work. It is quite noticeable that generally, from Mondays to Fridays, the Time Utilization Rates in the morning sessions are relatively higher than that of the afternoon and the evening sessions and this could be attributed to the preference of academic staff's preference for morning sessions as depicted in

academic staffs response to the time they prefer to have their classes (Refer to Table 34).

Research Question Three

What is the Space Utilization Rate for General-Purpose Classrooms at the Central University College?

The Space Utilization Rates for General-Purpose Classrooms from Mondays to Friday

The Space Utilization Rates for the General-Purpose Classroom from Mondays to Fridays as presented in Tables,12,13,14,15 and 16 for the 2005/2006 academic year for four (4) consecutive weeks gives answers to Research Question 3

Space Utilization Rate for General-Purpose Classrooms for four (4) consecutive Mondays during the first and second semesters for the 2005/2006 Academic Year is presented in Table 12

Table 12: Space Utilization Rates for General-purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year Mondays

Space	Period	First Semester	Second Semester	Whole Academic year
Classrooms	7.30-11.30	139.32%	136.42	137.87
	12.00-4.05	131.18	129.28	130.23
	4.30-9.30	122.50	118.58	119.54
	Whole day	130.33	128.09	129.21

The information drawn from table 12 indicates that the highest SUR of 139.32% was recorded in the morning sessions in the first semester and the lowest SUR of 118.5% was recorded in the evening sessions of the second semester. It is also observed from the table that the classrooms had higher SURs of 139.32% and 136.42% respectively in the morning sessions than the afternoon sessions of 131.18% and 129.28% respectively. The whole academic year had high Space Utilization Rate of 137.87% in the morning sessions, 130.23% in the afternoon sessions and Space Utilization Rate of 119.54% in the evening sessions. The whole day SUR for the whole academic year of 129.21% which was more than 100% indicates that the number of occupants of students attending lessons at the various classrooms in all the three sessions were more than the space available for use.

Space Utilization Rates for General-Purpose Classrooms on Tuesdays

Table 13 shows results and findings on Space Utilization Rates for four (4) consecutive Tuesdays in the General-Purpose Classrooms during the first and second semesters for the 2005/2006 Academic Year.

Table 13: Space Utilization Rates for General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Tuesdays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classroom	7.30-11.30	139.20	137.55	138.47
	12.00-4.05	132.40	130.20	131.3
	4.30-9.30	122.25	119.50	120.88
	Whole day	131.28	129.10	130.19

As indicated in table 13, Space Utilization Rate of 139.2% was recorded as the highest in the morning session of the first semester whilst the least SUR of 119.50% was recorded in the evening sessions of the second semester. It is also noticeable that the first semester recorded relatively higher Space Utilization Rates of 131.28% as against Space Utilization Rates of 129.10% recorded in the second semester. The whole academic year SURs of 138.47% as recorded in the morning sessions was the highest and the least Space Utilization Rate of 120.88% was recorded in the evening sessions. The whole day Space Utilization Rate for the whole academic year of 130.19% was higher than the 66.7% recommended by the URC Report (1988) on classroom space.

The Space Utilization Rates for General-Purpose Classrooms on Wednesdays

Table 14 presents findings of Space Utilization Rates for General-Purpose Classrooms for four (4) consecutive Wednesdays during the first and second semesters for the whole of 2005/2006 Academic Year

Table 14: Space Utilization Rates for General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Wednesday

Space	Period	First Semester	Second Semester	Whole Academic Year
Classroom	7.30-11.30	137.5	136.5	137
	12.00-4.05	133.25	130.0	131.63
	4.30-9.30	120.80	118.5	119.65
	Whole day	130.51	128.33	129.46

As shown in Table 14, the highest Space Utilization Rate of 137.5% was recorded in the morning session of the first semester whilst the least Space Utilization Rate of 118.5% was recorded during the evening sessions of the second semester. The whole day SUR of 131.51% recorded during the first semester was slightly higher than the whole day Space Utilization Rate of 128.33% recorded during the second semester. The whole academic year Space Utilization Rate of 137% recorded in the morning sessions was the highest whilst the least whole academic year Space Utilization Rate of 119.65% was recorded in the evening sessions. The whole day SUR for whole academic year

was 129.46% which was above the 100% recommended by Owolabi (1993) for tertiary institutions. This could be attributed to the fact that at the Central University College all the three (3) sessions, i.e. the morning, the afternoon and the evening sessions are classified as Morning school, Afternoon school and the Evening School with different sets of students.

The Space Utilization Rates for General-Purpose Classrooms on Thursdays

Space Utilization Rates for General -Purpose Classrooms for four (4) consecutive Thursdays during the first and second semesters as well as for the whole of 2005/2006 academic year are depicted in Table 15.

Table 15: Space Utilization Rates for General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Thursdays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	138.64	135.90	137.27
	12.00-4.05	132.56	130.26	131.41
	4.30-9.30	120.4	119.50	119.95
	Whole day	130.53	128.50	129.54

From table 15, the whole day Space Utilization Rate for the whole academic year on Thursdays recorded 129.54% which was way above the 66.7% recommended by the URC Report (1988) and the 100% recommended by Owolabi (1993) for tertiary institutions. The highest whole academic year Space

Utilization Rate for the first and second semesters of 120.4% and 119.50% were recorded in the evening sessions. The whole day SUR of 130.53% recorded in the first semester was slightly higher than the whole day SUR of 128.5% recorded during the second semester. From the Table 15, SURs for the whole year were relatively higher in the morning sessions than that of the afternoon and the evening sessions.

The Space Utilization Rates for General-Purpose Classroom on Fridays

Table 16 presents the findings on Space Utilization Rate for the entire General-Purpose Classroom for teaching and learning purposes for four (4) consecutive Fridays during the first and second semesters as well as the whole academic year for the 2005/206 academic year

Table 16: Space Utilization Rates for General-Purpose Classroom at the Central University College, Accra for 2005/2006 Academic Year on Fridays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	137.8	135.4	136.6
	12.00-4.05	132.4	130.0	131.2
	4.30-9.30	120.2	117.90	119.05
	Whole day	130.13	127.76	128.95

The highest Space Utilization Rate of 137.8% as shown in Table 16 was recorded in the morning sessions during the first semester and the lest of 117.90% was recorded in the evening session during the second semester. As shown in the table it was also observed that the Space Utilization Rates were higher in the first semester than the second semester. The whole day Space Utilization Rate of 130.13% was recorded during the first semester and Space Utilization Rate of 127.76% was recorded in the second semester. The whole academic year's Space Utilization Rate of 136.6%, 131.2% and 119.05% were recorded in the morning, afternoon and evening sessions respectively. The Space Utilization Rate of 128.95% was recorded for the whole academic year.

Averagely the Space Utilization Rates in the evening sessions and on Fridays were lower as compared to other sessions and days. These record trends could be interpreted to academic staff's preference for lectures in the morning and afternoon sessions and other days than on Fridays (Table 34).

From Table 12-16 it was generally observed that classroom space had relatively lower SURs during the evening sessions than that of the afternoon and the morning sessions from Monday to Friday and the highest SUR being recorded in the morning sessions. This trend aptly supports the Reports by Russel and Doi (1975), Owolabi (1993) and Apori (1997) that there is a better utilization of teaching space at tertiary institutions in the morning than hours after 12.00 p.m.

It was also observed that the classroom spaces and teaching facilities were over- utilized in terms of space in 2005/2006 academic year as the Space

Utilization Rates for classroom spaces in terms of the whole day for the whole academic year were higher than 66.7% as recommended by the URC Report (1988). It must be emphasized that the Space Utilization Rates for Classroom Space in terms of the whole day for the whole academic year 2005/2006 in terms of space in 2005/2006 academic year were also higher than the 100% rate to contradict Owolabi's (1993) argument that utilization rate of 100% is impracticable in tertiary institutions.

Research Question Four

What is the Space Utilization Rate for Laboratories at the Central University College?

The Space Utilization Rates for Laboratories from Mondays to Fridays

Tables 17,18,19,20 and 21 provide answers to Research Question 4 on Space Utilization Rate for the Laboratories for the year 2005/2006 academic year for four (4) continuous weeks.

The Space Utilization Rates for Laboratories on Mondays

Table 17 provides findings and results on Space Utilization Rates for Laboratories for four (4) continuous Mondays for first and second semesters for the 2005/2006 academic year and the SURs on Mondays for the whole academic year.

Table 17: Space Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Mondays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	166.66	158.4	162.53
	12.00-4.05	152.17	150.75	151.46
	4.30-9.30	142.25	140.25	141.25
	Whole day	153.69	149.8	151.75

As recorded in Table 17, the Space Utilization Rate for the whole day of 153.69% was recorded during the first semester whilst 149.8% was recorded during the second semester.

The highest Space Utilization Rate of 166.66% was recorded in the morning sessions during the first semester and the lowest Space Utilization Rate of 140.25% was recorded during the second semester. The Space Utilization Rates for the whole year of 162.53%, 151.46% and 141.25% were recorded in the morning, afternoon and the evening sessions respectively. The whole day Space Utilization Rate of 151.75% for the whole academic year was way and above the target of 40 – 70% recommended by the British Department of Education and Science (BDES 1971, 1972). The seemingly high Space Utilization Rates may be attributed to the high usage of the computer laboratories at the college where all the students have equal and unlimited access.

The Space Utilization Rates for Laboratories on Tuesdays

Table 18 gives findings and results on Space Utilization Rate for Laboratories for four (4) continuous Tuesdays for Laboratories in the first and second semesters as well as the 2005/2006 Academic Year.

Table 18: Space Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Tuesdays

Space	Period	First Semester	Second Semester	Whole Academic **Y**ear
Classrooms	7.30-11.30	165.95	160.4	163.17
	12.00-4.05	150.75	148.2	149.47
	4.30-9.30	141.5	140.75	141.12
Whole day	152.73		149.78	151.25

The highest SUR of 165.95% as presented in Table 17 was recorded in the morning session during the first semester and the lowest SUR of 140.75% was recorded in the evening session during the second semester. The first semester recorded the higher SUR of 152.73% for the whole day whilst the second semester recorded SUR of 149.78% for the whole day. The morning sessions' Space Utilization Rate for the whole year of 163.17% was the highest whilst the afternoon and evening sessions recorded whole year SUR of 149.47% and 141.12% respectively. The whole day Space Utilization Rate for the whole academic year of 151.25% recorded were more than 100% of the recommended rate of 66.7% by the URC Report (1988) and the range of 40 – 70% targets

recommended by the British Department of Education and Science (BDES 1971, 1972).

This scenario of very high Space Utilization Rates at laboratories is in support of the recommendation by the URC Report that states that comprehensive sharing and usage of educational facilities among departments or facilities will improve maximum utilization of instructional facilities.

Space Utilization Rates for Laboratories on Wednesdays

Table 19 presents information and findings on the Space Utilization Rate for four (4) consecutive Wednesdays for Laboratories in the first and second semesters as well as the 2005/2006 academic year

Table 19: Space Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Wednesdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	167.2	160.2	163.7
	12.00-4.05	152.45	150.2	151.33
	4.30-9.30	140.25	140.4	140.33
Whole day	153.3	150.26	151.78	

As indicated in Table 19 the first semester recorded the highest whole day Space Utilization Rate of 153.3% as against the whole day Space Utilization Rate of 150.26% recorded during the second semester. It is also indicated from

the table that the highest SUR of 167.2% was recorded in the morning sessions during the first semester and the lowest of 140.25% was also recorded in the first semester in the evening sessions. Space Utilization Rate for the whole year of 140.25% was also recorded in the evening sessions and the highest Space Utilization Rate for the whole year of 163.7% were recorded in the morning sessions. Again it is indicative from Table 19 that the whole day Space Utilization Rate of 151.74% for the whole academic year for specialized rooms was more than double of the recommended rates by URC Report (1988) and BDES (1971 – 1972). The high Space Utilization Rate at the laboratories at the Central University College, Accra, is an indicative of congestion and over-utilization which contradicts what Russell and Doi (1957) state that a room should be so spacious that a student can write and occasionally shift his seat without jostling the student next to him.

The large space that should be in front of every instructional room as suggested by Russell and Doi, for an academic staff to move about freely during lectures was non-existing in the laboratories.

Halstead (1974) in support of Russell and Doi, stated that "A student in the classroom is properly seated if he has a clear view of the instructor, is provided with suitable writing surface and a place for books storage, is situated that persons going to and from will not disturb him" (p.506-507).

Space Utilization Rates for Laboratories on Thursdays

Table 20 indicates the results and finding on SUR for four (4) consecutive Thursdays for Laboratories for the first and second semesters as well as the whole 2005/2006 Academic Year.

Table 20: Space Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Thursdays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	165.8	159.25	162.52
	12.00-4.05	154.2	150.4	152.3
	4.30-9.30	142.35	140.3	141.32
Whole day	154.11	149.98	152.04	

From Table 20, the highest Space Utilization Rate of 165.8% was recorded in the morning sessions during the first semester. The lowest of 140.3% was however recorded in the evening sessions during the second semester. The SUR of 154.11% and 149.98% were recorded in the first and second semesters respectively. The highest SUR of 162.52% for the whole academic year was recorded in the morning session whilst the afternoon sessions and evening sessions recorded SUR of 152.3% and 141.32% for the whole academic year. Space Utilization Rate of 152.04% was recorded for the whole day SUR for the whole academic year

The Space Utilization Rates for Laboratories on Fridays

Results and finding on SUR for laboratories for four (4) consecutive Fridays for the first and second semesters as well as the whole academic year in 2005/2006 academic year are presented in Table 21.

Table 21: Space Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Fridays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	166.20	158.4	162.3
	12.00-4.05	153.8	149.8	151.8
	4.30-9.30	140.4	138.8	139.6
	Whole day	153.46	149	151.23

The Space Utilization Rates as presented in Table 21 indicated that the morning sessions recorded the highest SUR of 166.2% and 158.4% during the first and second semesters with SUR of 162.3% recorded for the whole academic year. The afternoon sessions recorded SUR of 153.8% and 149.8% in the first and second semesters respectively with Space Utilization Rate of 151.8% recorded for the who;e year. The evening sessions recorded the lowest SUR of 140.4% in the first semester and 138.8% during the second semester. Space Utilization Rate of 139.6% was however recorded in the whole academic year in the evening session. The classrooms in the first semester recorded the highest Space Utilization Rate of 153.46% for the whole day whilst the second

semester recorded 149%. From the table Space Utilization Rate of 151.23% was recorded for the whole day for the whole academic year.

From Tables 17 – 21 it was indicative generally that laboratories had relatively higher Space Utilization Rate in the morning sessions than the afternoon and the evening sessions form Monday to Friday. This trend support academic staff preference to lecture in the morning sessions to the afternoon and the evening sessions (Table 34).

It was also recorded from Tables 17 – 21 that the high whole day Space Utilization Rate for whole academic year was above 100% defeated the assertion by Owolabi's (1993) argument that utilization rate of 100% is impracticable in tertiary institution. The high SURs for the laboratories above 100% was an indication of overcrowding in the laboratories during teaching and learning process due to medium and small sizes of the rooms relative to the large number of student population using the laboratories

Research Question Five

What is the Global Utilization Rate for General-Purpose Classroom Space at the Central University College in Accra?

Global Utilization Rate for the General-Purpose Classrooms from Mondays to Fridays

The Global Utilization Rate (GUR) for the General-purpose Classrooms from Mondays to Fridays as presented in Tables, 22, 23, 24, 25 and 26 for

2005/2006 academic year for four (4) continuous weeks provide answers to research question 5.

Global Utilization Rate for the General-Purpose Classrooms from Mondays

The Global Utilization Rate for the General-Purpose Classrooms in the first and second semesters of 2005/2006 academic year is presented in Table 22.

Table 22: Global Utilization Rate for the General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year Mondays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	102.53	95.63	99.08.
	12.00-4.05	94.6	90.75	92.68
	4.30-9.30	85.85	80.75	83.3
Whole day	94.24	88.97	91.61	

As shown in table 22, The General-Purpose Classrooms had relative higher Global Utilization rates in the mornings than the afternoon and the evening sessions. The highest Global Utilization Rates of 102.53% and 95.63% recorded in the first and second semesters respectively were in the morning sessions. The least Global Utilization Rate of 85.85% was recorded in the evening sessions during the first semester and the lowest Global Utilization Rate of 80.75% was also recorded in the evening sessions in the second semesters for the 2005/2006 academic year. The General- Purpose Classrooms in the first

semester recorded Global Utilization Rate of 94.24% for the whole day whilst 88.97% Global Utilization Rate for the whole day was recorded in the second semester. The Global Utilization Rates for evening sessions of the whole academic year recorded the lowest of 83.3%. The GUR for afternoon sessions of the whole academic year was 92.68% while Global Utilization Rate for the morning session of the whole academic year recorded the highest of 99.08%. A very high Global Utilization Rate of 91.61% was recorded for the whole day for the whole academic year at the General-Purpose Classrooms. This rate was over and above the 53.36% and 60% rate recommended by the URC Report (1988) and Kenny and Forster (1983) respectively. This clearly points toward over-utilization of the General-Purpose Classrooms at the Central University College on Mondays.

Global Utilization Rate for the General-Purpose Classrooms from Tuesdays

Table 23 provides information on the Global Utilization Rates (GUR) in General –Purpose Classrooms for four (4) consecutive Tuesdays for first and second semesters in the 2005/2006 academic year.

Table 23: Global Utilization Rate for the General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year Tuesdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	100	96.56	98.28
	12.00-4.05	91	86.97	88.98
	4.30-9.30	81.91	80.32	81.12
Whole day	90.85	87.23	89.04	

The highest Global Utilization Rates of 100% as indicated in Table 23 was recorded in the morning sessions in the first semester while the least Global Utilization Rate of 80.32% was recorded in the evening sessions in the second semester. The Global Utilization Rates of 90.85% for the whole day in the first semester was higher than the Global Utilization Rates of 87.23% for the whole day recorded during the second semester. The General-Purpose Classrooms recorded a higher Global Utilization Rate of 98.28% for the whole year in the morning sessions while 88.98% and 81.12% Global Utilization Rate for the whole year were recorded in the afternoon and the evening sessions respectively. The Global Utilization Rates of 89.04% recorded for the whole day and for the whole academic year was over the rates recommended by the URC Report (1988) and Kenny and Forster (1983). This also suggest over crowdedness in the General-Purpose Classrooms on Tuesdays at the Central University College in Accra for 2005/2006 academic year.

Global Utilization Rates for General-Purpose Classrooms on Wednesdays

Global Utilization Rates for General-Purpose Classrooms as shown in table 24 for four (4) consecutive Wednesdays during the first and second semester as well as for the whole of 2005/2006 academic year.

Table 24: Global Utilization Rate for the General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year Wednesdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	100.37	95.82	98.10
	12.00-4.05	90.43	88.79	86.61
	4.30-9.30	77	73.94	75.47
Whole day	88.68	85.92	87.31	

As presented in Table 24, Global Utilization Rates recorded in the morning sessions for the first and second semesters were relatively higher than that of the afternoon and the evening sessions. The highest Global Utilization Rate of 100.37% for the General-Purpose Classroom was recorded in the morning session of the first semester and the least global Utilization Rate of 77% was recorded in the evening session of the first semester. The first semester's Global Utilization Rate of 88.68% for the whole day was relatively higher than the whole day Global Utilization Rate of 85.92% recorded in the second semester. The Global Utilization Rate for the whole day for the whole academic year of 87.3% of the General-Purpose Classroom on Wednesdays was

higher than the Global Utilization Rate of 60% recommended by Kenny and Foster (1983). This trend was an indicative of over utilization of the General-Purpose Classroom at the Central University College.

Global Utilization Rates for General-Purpose Classrooms on Thursdays

Table 25 presents findings on Global Utilization Rates for all the General-Purpose Classrooms for teaching and learning process for four (4) consecutive Thursdays during the first and second semesters as well as the whole academic year for the 2005/2006 academic year

Table 25: Global Utilization Rate for the General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Thursdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	97	96.49	96.75
	12.00-4.05	89.47	88.83	89.15
	4.30-9.30	79.46	77.07	78.27
Whole day	88.53	87.25	87.89	

From Table 25, the GUR of 97% recorded in the morning session during the first semester was highest and the GUR 77.07% recorded in the evening session in the second semester was the lowest. The Global Utilization Rate of 88.53% for the whole day was relatively higher in the first semester than the GUR of 87.25% recorded in the second semester. The Global Utilization Rate for the whole academic year of 96.75% recorded in the morning session was the

highest while the GUR for the whole academic year of 89.15% and 78.27% were recorded in the afternoon and the evening sessions respectively. The low Global Utilization Rates recorded in the evening sessions in the General-Purpose Classrooms were due to the relative low Global Utilization Rates (see Tables 2 to 6) recorded at the evening sessions in the classrooms. The Global Utilization Rate of 87.89% for the whole day for the whole academic was relatively higher than the URC Report (1988) norm of 53.36% for tertiary institutions. This phenomenon suggests that there was over-utilization of the General Purpose Classroom on Thursdays, contrary to the assertion of the academic staff that general-purpose classrooms in Central University College is adequate.

Global Utilization Rates for General-Purpose Classrooms on Fridays

Table 26 shows the Global Utilization Rates for the General-Purpose Classrooms for four (4) consecutive Friday s during the first and second semesters as well as the whole academic year for the 2005/2006 academic year Global Utilization Rate year.

Table 26: Global Utilization Rate for the General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Fridays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	88.70	84.48	86.59
	12.00-4.05	84.40	81.90	83.15
	4.30-9.30	73.52	73.68	73.6
Whole day	82.09	79.58	80.84	

As presented in Table 26, the highest GUR of 88.70% was recorded in the morning session of the first semester while the least (73.52%) was recorded in the evening session of the first semester. The first semester recorded a relatively higher GUR of 82.09% for the whole day than the second semester's recording of 73.58% was recorded in the evening session while the highest of 86.59% was recorded in the morning session. The afternoon session recorded a moderate GUR of 83.15% for the whole year.

The GUR for the whole day for the whole academic year was 80.84%; though the GURs recorded on Fridays were relatively lower as compared to the other days it was still higher than the 53.36% recommended by the URC Report (1988).

Research Question Six

What is the Global Utilization Rate of Laboratories Space at the Central University College?

The Global Utilization Rates for Laboratories from Mondays to Fridays

Tables 27,28,29,30 and 31 on Global Utilization Rates for Laboratories from Mondays to Fridays for the 2005/2006 academic year for four (4) consecutive weeks provide answers to research question 6.

Global Utilization Rates for Laboratories on Mondays

Table 27 presents findings and results on Global Utilization Rates for four (4) continuous Mondays for Laboratories at the Central University College, Accra for the 2005/2006 academic year.

Table 27: Global Utilization Rate for the General-Purpose Classrooms at the Central University College, Accra for 2005/2006 Academic Year on Mondays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	110.66	105.81	
	108.24			
	12.00-4.05	98.14	96.78	97.46
	4.30-9.30	99.57	100.27	99.92
Whole day	102.91	101.11	102.01	

Global Utilization Rates for Laboratories for Mondays as presented in Table 27 indicates that the highest GUR of 110.66% was recorded in the morning session during the first semester. The lowest Global Utilization Rate of 96.78% was recorded in the afternoon session in the second semester. The first semester recorded Global Utilization Rate of 102.91% for the whole day while GUR Global Utilization Rate of 101.11% was recorded in the second semester for the whole day.

The highest Global Utilization Rate of 108.24% for the whole academic year was recorded in the morning session. The lowest Global Utilization Rate of 97.46% was recorded in the afternoon sessions while the evening sessions recorded Global Utilization Rate of 99.92% for the whole academic year. The whole day Global Utilization Rate for the whole academic year of 102.01% was almost 100% higher than the recommended rate of 53.36 by the URC Report (1988). This high whole day Global Utilization Rate for the whole academic year implies that the laboratories were over utilized on Mondays at the Central University College for the 2005/2006 academic year.

Global Utilization Rates for Laboratories on Tuesdays

Table 28 looks at the Global Utilization Rates for the Laboratories for the first and second semester for four (4) conceptive Tuesdays for the 2005/2006 academic year.

Table 28: Global Utilization Rate for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Tuesdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	109.52	106.66	
	108.09			
	12.00-4.05	97.23	95.14	96.19
	4.30-9.30	99.05	102.04	100.55
Whole day	102.06	101.44	101.75	

As shown in Table 28, there were relatively higher Global Utilization Rates in the morning sessions than the afternoon and the evening sessions in the laboratories for the 2005/2006 academic year.

The highest Global Utilization Rates of 109.52% and 106.66% during the first and the second semester respectively were recorded in the morning sessions. The afternoon sessions recorded the lowest Global Utilization Rates of 97.23% and 95.14% respectively during the first and the second semesters.

The whole day Global Utilization Rate for the laboratories of 102.06% and 101.44% were recorded in the first and second semesters for the 2005/2006 academic year. The whole academic year Global Utilization Rate of 108.09% recorded in the morning session was the highest and the least Global Utilization Rate of 95.14% was recorded in the afternoon sessions. The whole day Global Utilization Rate of 101.75% for the whole academic year recorded was more than double the recommended range of 40.70% (BDES, 1971, 1972) for

specialized rooms which indicated that the laboratories in terms of whole day for the whole academic year of 2005/2006 were over utilized on Tuesdays.

The Global Utilization Rates for Laboratories on Wednesdays

Table 29 presents findings of Global Utilization Rates for Laboratories for four (4) consecutive Wednesdays during the first and second semesters for the whole of 2005/2006 academic year

Table 29: Global Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Wednesdays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	114	108.93	111.47
	12.00-4.05	101.37	102.43	101.9
	4.30-9.30	101.26	98.56	99.91
Whole day	105.71	103.37	104.54	

As shown in Table 29, the highest Global Utilization Rate of 114% was recorded in the morning session of the first semester whilst the least Space Utilization Rate of 98.56% was recorded during the evening sessions of the second semester. The whole day Global Utilization Rate of 105.71% recorded during the first semester was slightly higher than the whole day Global Utilization Rate of 103.37% recorded during the second semester. The whole academic year Global Utilization Rate of 111.47% recorded in the morning

sessions was the highest whilst the least whole academic year Global Utilization Rate of 99.91% was recorded in the evening sessions.

The whole day Global Utilization Rate for whole academic year of 104.54% was above the 53.36% recommended by the URC Report for tertiary institutions and was also higher than the recommended range of 40-70% by (BDES, 1971, 1972) .The high Global Utilization Rate recorded for the whole day for the whole academic year indicated over-utilization of laboratories available in the Central University College.

The Global Utilization Rates for Laboratories on Thursdays

Global Utilization Rates for Laboratories for four (4) consecutive Thursdays during the first and second semesters as well as for the whole of 2005/2006 academic year are depicted in Table 30.

Table 30: Global Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Thursdays

Space	Period	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	108.43	105.10	
	106.77			
	12.00-4.05	98.99	96.25	97.62
	4.30-9.30	102.49	100.31	101.4
Whole day	103.56	100.72	102.14	

From table 30, the whole day Global Utilization Rate for the whole academic year of 102.14% recorded on Thursdays was way above the 53.36% recommended by the URC Report (1988) and the recommended range of 40-70% by (BDES, 1971, 1972). The highest whole academic year Global Utilization Rate of 106.77% was recorded in the morning sessions. The whole day Global Utilization Rate of 103.56% recorded in the first semester was slightly higher than the whole day Global Utilization Rate of 100.72% recorded during the second semester. From the table Global Utilization Rates for the whole year were relatively higher in the morning sessions than that of the afternoon and the evening sessions.

The Global Utilization Rates for Laboratories on Fridays

The findings and results on Global Utilization Rate for all the Laboratories for teaching and learning purposes for four (4) consecutive Fridays during the first and second semesters as well as the whole academic year for the 2005/206 academic year as presented in Table 31

Table 31: Global Utilization Rates for Laboratories at the Central University College, Accra for 2005/2006 Academic Year on Fridays

Space	Periods	First Semester	Second Semester	Whole Academic Year
Classrooms	7.30-11.30	107.19	105.17	106.18
	12.00-4.05	98.13	101.11	99.62
	4.30-9.30	90.13	92.71	91.42
Whole day	98.67	99.68	99.18	

The highest Global Utilization Rate of 107.19% as shown in Table 31 was recorded in the morning sessions during the first semester and the least of 90.13 was recorded in the evening session during the same semester.

As shown in the table it was also observed that the Global Utilization Rates were higher in the first semester than the second semester. The whole day Space Utilization Rate of 98.67% was recorded during the first semester and Space Utilization Rate of 99.68% was recorded in the second semester. The whole academic year's Global Utilization Rate of 106.18%, 99.62% and 91.42% were recorded in the morning, afternoon and evening sessions respectively. Global Utilization Rate of 99.20% was recorded for the whole academic year.

Averagely the Global Utilization Rates in the evening sessions and on Fridays were lower as compared to other sessions and days. These trends could be interpreted to academic staff's preference for lectures in the morning and afternoon sessions and other days than on Friday.

From table 26-31 it was generally observed that Laboratories had relatively lower Global Utilization Rates during the evening sessions than that of the afternoon and the morning sessions from Monday to Friday and the highest Global Utilization Rate being recorded in the morning sessions. This trend aptly supports the Report by Russel and Doi (1975) Owolabi (1993) and Apori (1997) that there are better utilization teaching spaces at tertiary institutions in the morning than hours after 12.00 p.m.

From tables 12 to -16 it was also observed that the classroom spaces and teaching facilities were over utilized in terms of space in 2005/2006 academic

year as the Space Utilization Rates for classroom spaces in terms of the whole day for the whole academic year were higher than 66.7% as recommended by the URC Report (1988). It must be emphasized that the Space Utilization Rates for Classroom Space in terms of the whole day for the whole academic year 2005/2006 in terms of space in 2005/2006 academic year were also higher than the 100% rate to contradict Owolabi's (1993) argument that utilization rate of 100% is impracticable in tertiary institutions.

Average Utilization Rates of all the Entire General-Purpose Classrooms at the Central University College

The average utilization rates of the teaching space facilities for the first and second semester as well as the whole 2005/2006 academic year is presented in Table 32. The rates depicted in table 31 were obtained from tables 2-6, 12-16 and 22-26. The various utilization rates of Time, Space and Global (i.e. TURs, SURs and GURs) were summed up and averaged to derive Time Utilization Rate, Space Utilization Rate and Global Utilization Rate for first and second semesters of 2005/2006 academic year. The Time Utilization Rate, Space Utilization Rate and Global Utilization Rate of the whole academic year were also summed up and averaged to obtain whole academic year rates.

Table 32: Average Utilization Rates of the Entire Classrooms at the Central University College

Space		1st Semester			2nd Semester			Whole Academic Year		
Classrooms	PERIOD	SUR	GUR	TUR	SUR	GUR	TUR	SUR	GUR	
	TUR	138.49	97.73	68.7	136.35	93.78		137.42	95.76	
	7.30-11.30	69.64						131.12	88.67	
	70.57	132.3	89.9	67.31	29.94	87.44		120.16	78.30	
	12.30-4.05	67.65						129.45	87.38	
	67.99	120.83	79.36	64.64	119.49	77.23				
	4.30-9.30	65.16								
	65.68	130.55	88.90	66.90	128.35	85.866				
	WHOLE	67.53								
	68.10									
	DAY	108								

The average Time Utilization Rates for the entire classrooms for the first semester as portrayed in table 31 were higher than that of the second semester. The whole day Time Utilization Rates of 68.10% recorded during the first semester was higher than the 66.90% recorded in the second semester. It is also observed that the average Space Utilization rates and Global Utilization Rates for the entire classrooms for the first semester were higher than that of the second semester. This is shown from the whole day Space Utilization Rates of 130.55% and Global Utilization Rates of 88.90% recorded during the first semester as against the whole day Space Utilization Rates of 128.35% and Global Utilization Rates 85.86% recorded in the second semester respectively.

The overall average Time, Space and Global Utilization Rates per day for the 20 classrooms during the morning session were higher than that of the afternoon and evening sessions of the day throughout the whole of the 2005/2006 academic year. This is depicted from the rates recorded in the morning sessions as against the rates recorded in the afternoon and the evening sessions during the first and second semesters as well as the rates for the whole academic year., For instance the Time and Space Utilization rates of 70.57% and 138.49% in the first semester and the rates of 68.78% and 136.35% recorded during the second semester in the morning sessions were higher than the Time Utilization Rates and Space Utilization Rates of 67.99% and 132.35% in the first semester and the rates of 67.3% and 129.94% recorded during the second semester in the afternoon sessions while the least Time Utilization Rate and SURs of 65.68% and 120.83%(first semester),and rates of 64.64% and

119.49(second semester) were recorded in the evening sessions. The Time Utilization Rate for the whole academic year of 69.64% was recorded for the morning session while 65.16% was recorded for the evening session with 67.65% recorded in the afternoon sessions. Also, Space Utilization Rate of 137.42% and Global Utilization Rate of 95.76% were recorded in the morning sessions while Space Utilization rate of 120.16% and Global Utilization Rate of 78.30% were recorded in the evening sessions. Deductions made as presented in table 31connotes that the average Time Utilization Rate of 67.53% recorded per day for all the general-purpose classrooms for the whole academic year attests to the fact that 14 classrooms (67.53% of 20) were utilized each hour out of 20 classrooms which were made available throughout the official scheduled opening of the classrooms for 13 hours in a day while about 6 of the classrooms out of 20 were not put into use for teaching purposes throughout the 13 hours per day for the 2005/2006 academic year.

The average Space Utilization rate of 129.45% per day for the 20 classrooms obtained during the study suggests that an equivalent of 313 (129.47 of 1052) additional seats are needed for each hour throughout the day as the seating capacity of 1052 seats provided at the classrooms per hour for prospective students are woefully inadequate in contrast to the views held by the administrators and the teaching staff that seating capacity at the Central University College is adequate. This clearly suggests that seating capacity at the Central University College is over utilized during the hours that the teaching spaces are available for use.

The average Global Utilization Rates of 87.38% of 20 classrooms of the teaching space facilities for the first and second semester as well as the whole 2005/2006 academic year as presented in Table 32 was higher than the target rate of 80% set by the British Departments of Education and Science (BDES, 1971, 1972). The GUR of 8738% recorded was higher than all the established norms including GUR of 60% set by Kenny and Foster (1983) , a GUR of 53.36% as recommended by the URC Report (1988) . Kenny and Foster (1983) asserted that achieving GUR of 80% is unrealistic and could not be achieved even with the use of computerized time scheduling and space allocation. The result of this research on space utilization on private university has proven that the attainment of GUR of 80% and above is possible provided workable Time tabling is designed. This scenario suggests overutilization of the classrooms at the Central University College during the whole of 2005/2006 academic year. .

Average Utilization Rates of all the Laboratories at the Central University College

Table 33 presents the average utilization rates of the Laboratories for the first and second semester as well as the whole 2005/2006 academic year. The rates shown in table 33 were obtained from tables 7-11, 17-21 and 27-31. The various utilization rates of Time, Space and Global (i.e. TURs, SURs and GURs) were summed up and averaged to derive Time Utilization Rate, Space Utilization Rate and Global Utilization Rate for first and second semesters of 2005/2006 academic year. Time Utilization Rate, Space Utilization Rate and

Global Utilization Rate of the whole academic year were also summed up and averaged to obtain whole academic year rate.

Table 33: Average Utilization Rates of Laboratories at Central University College

1st Semester				2nd Semester			Whole Academic Year		
Period	TUR	SUR	GUR	TUR	SUR	GUR	TUR	SUR	GUR
7.30-11.30	65.74	166.36	109.36	70.5	159.33	112.32	68.12	162.84	114.3
12.30-4.05	65.80	152.67	100.45	66.56	149.87	99.75	66.18	151.05	99.96
4.30-9.30	65.42	141.35	92.47	66.82	140.83	94.10	65.44	140.72	92.08
WHOLE DAY	66.85	153.45	102.58	67.62	150.01	101.43	67.23	151.60	101.92

Averagely, the Time Utilization Rates for the whole day of 67.62% recorded for the laboratories for the second semester as in table 32 were higher than that of the first semester's TURs of 66.85%. It is also shown that the average Space Utilization Rates and Global Utilization Rates for the Laboratories for the first semester were higher than that of the second semester as the whole day Space Utilization rates of 153.45% and Global Utilization Rates of 102.58% recorded during the first semester were higher than the whole day Space Utilization Rates of 150.01% and Global Utilization Rates 101.43% recorded in the second semester respectively.

The overall average Time, Space and Global Utilization Rates per day for the laboratories during the morning session were higher than that of the afternoon and evening sessions of the day throughout the whole of the 2005/2006 academic year. This is portrayed by the rates recorded in the morning sessions as against the rates recorded in the afternoon and the evening sessions respectively during the first and second semesters as well as the rates for the whole academic year. For example the Time and Space Utilization rates for the whole academic year of 68.12% and 162.84% recorded in the morning sessions were higher than the Time Utilization Rates s and Space Utilization Rates of 66.18 and 151.05% recorded respectively in the afternoon sessions. The evening sessions however recorded the lowest Time Utilization Rates of 65.44% and Space Utilization Rates of 140.72%. Also, Global Utilization Rate of 114.3% for the whole academic year were recorded in the morning sessions as against Global Utilization Rates for the whole academic year of 99.96% and 92.08%

recorded respectively in the afternoon and the evening sessions. As presented in Table 32, the average Time Utilization Rate of 67.23% recorded per day for all the laboratories for the whole academic year presents the fact that 1.3 (approximately 1 of the laboratories) (32.77% of 4) out of 4 were not put into use for teaching purposes throughout the 13 hours per day while 2.7 (approximately 3 of the laboratories) (67.23% of 4) were utilized each hour out of 4 laboratories which were made available throughout the official scheduled opening of the laboratories for 13 hours in a day for the 2005/2006 academic year.

Similarly, the average Space Utilization Rate of 151.60% for laboratories indicates that about 105 (151.60% of 69) students reported for practical lessons each period in the laboratories as compared with the 69 total seating capacities of the laboratories. The average Global Utilization Rates of 101.92% for the laboratories recorded for the whole academic year for the 2005/2006 academic year was higher than the recommended range of 40-70% for specialized rooms by (BDES 1971, 1972) and far exceeded the recommended rate of 53.36% by the URC Report (1988). These findings presuppose that the laboratories were over -utilized as it may suggest that some of the students shared the seating capacities with their colleagues during practical lessons or did not have access to seats at the laboratories at all during the 2005/2006 academic year.

It is observed from Table 33 that, the overall average Time Utilization Rate, Space Utilization Rate and Global Utilization Rate per day for the laboratories for the first semester were relatively higher than those for the

second semester. The relatively low rates in the second semester of the 2005/2006 academic year might be attributable to students' attrition due to students' inability to continue to pay high fees and the fact that some final year students wrote their final examinations and for that matter the facilities they were using were no more in use.

Research Question Seven

What Factors Currently Affect the Use of Teaching Space Facilities at the Central University College?

Factors that Affect the Utilization of Teaching Space Facilities

From the data collated, it was established that the Time Utilization Rates (TUR), Space Utilization Rates (SUR) and the Global Utilization Rates (GUR) for the instructional rooms were relatively high during the first semester than the second semester. The observation data also established that the Time, Space and Global Utilization Rates were generally higher in the morning sessions than that of afternoon and the evening sessions from Monday's to Fridays and low on Fridays. The researcher, in order to explain the phenomenon tried to solicit the view of academic staff, administrators and technicians for the factors that affect the level of utilization of the instructional rooms at the Central University College. Tables 34 to 47 depict the findings.

Responses on Factors that Affect Time Utilization Rates for General-purpose Classrooms

Time Utilization Rate is generally influenced by the preferred time for teaching by lecturers. Below are the views of lecturers on time utilization rates of General-Purpose Classrooms.

Table 34: Academic Staff's Preferred Time of Teaching at the Central University College for 2005/2006 Academic Year

Time	F	%	C f%
7.30am- 10.00am	23	38.3	38.3
10.30a.m-12.00p.m	17	28.3	66.7
12.00p.m-2.00p.m	9	15.0	81.7
2.00p.m-6.00p.m	7	11.7	93.3
6.00p.m-9.30p.m	4	6.7	100
Total	**60**	**100**	

Results in Table 34 show that most lecturers were interested teaching during the morning as 40 (66.7%) of the lecturers indicated that they preferred teaching between 7.30am -12.00 noon which is the morning session. Only 11 (18.4%) indicated that they wanted to teach in the afternoon (2pm-9.30pm). This high percentage of responses which are in favor of the morning session is in agreement with the observation results in Table 33 and confirms earlier studies by Owolabi (1993) on space management in some universities in Ghana. Other studies by Apori (1997), Akomaning (2001) and Turkson (2006) portray that

teaching in the mornings is most lecturers' preserve. The URC Report (1988) on utilization of instructional facilities also confirms the above findings. It is therefore obvious that academic staff's predilection for teaching in the morning sessions contributed to jamming in the lecture rooms resulting in high Global Utilization Rates in the morning sessions as compared to the afternoon and the evening sessions. This jamming in the lecture rooms in the morning sessions is as results of some academic staff whose lecture times fall after the hours of 12:00pm rescheduled their contact hours with their students to the morning sessions. The rescheduling of such classes by some academic staff conflict with normal time-tabling for the morning sessions thereby creating automatic congestion and over-crowding.

However, when the academic staff were asked whether they wanted their lecture time rescheduled when the lecture time on the school's time table does not correspond to their wish, most of them, especially those who lecture in the afternoon and the evening sessions, 35(58.3%) responded yes on condition that their contact hours with their students should be in the morning sessions.

On the maximum number of credit hours that the lecturer can cope with within a week, 5 making (8.3%) of the academic staff indicated 9-11 credit hours a week their preferred choice while the majority of the academic staff 37(61.7%) and administrators 27(90%) indicated that 12-13 hours a week is acceptable as their choice were in conformity with the norm of the12 credit hours per week or little above the norm. The results are shown in table 35

Table 35: Academic Staff and Administrators' View on the Maximum Credit Hours Lecturers can cope with at the Central University College for 2005/2006 Academic Year

Academic Staff				Administrators		
Credit Hours	F	%	C f%	F	%	C f%
9-11	5	8.3	8.3	-	-	-
12-13	37	61.7	70.0	27	90	90
14-15	17	28.3	98.0	3	10	100
16+	1	1.7	100	-	-	-
Total	**60**	**100**		**30**	**100**	

Further, when respondents were asked if they would accept extra teaching in addition to the normal teaching duties if their maximum lecturing schedule in a week is less than what has been specified by the university, 41 (68.3%) of the lecturers indicated their readiness to do so, but 17(31.7%) of the administrative staff who answered the questionnaire said they would not if payment of overtime arrangements are not made.

Responses on Factors That Affect Time Utilization

Rates for Laboratories

In order to understand how time is utilized in the laboratories, the researcher tried to find out the number of hours taken by technicians to prepare for practical lessons and clean up after practical work. This is because, one factor that affects the Time Utilization of specialized rooms is the time taken to

prepare for practical and clean up of rooms. For instance, the observation data reveals that TUR is generally high in all the sessions (morning, afternoon and evening schools). The result from the interview is shown in Table 36.

Table 36: Time Taken by Technicians to Prepare for Practical Work and Clean up at the Laboratories at the Central University College for 2005/2006 Academic Year

	Set up Room for Practical			Cleaning Rooms		
Time taken	F	%	C f %	F	%	C f%
Less than1hr	13	92.9	92.9	13	92.9	92.9
1hr	1	7.1	100	1	7.1	100
2hrs	-	-		-	-	
Total	**14**	**100**		**14**	**100**	

Table 36 presents the views of technicians whose responsibilities are to prepare the laboratories for practical work and to clean them after practical. Almost all the respondents 13 (92.9%) expressed that they usually use less than an hour to prepare and clean the laboratories for practical lessons. This short time taken by the technicians for the preparation of the laboratories and other factors such as availability of constant electricity and water supply contributed to the high Time Utilization Rate recorded in the laboratories (see Table 33). This confirms Kenny and Foster's (1983) assertions that an hour or more used

for setting up a place for practical lessons and tiding up the place after practical work can be used to increase the hours (periods) used for practical lessons.

Another factor that affects Time Utilization Rates of the laboratories is the number of practical lessons that can be held in a day and number of hours used. Table 37 gives useful information to TURs recorded in the morning, afternoon and the evening sessions.

Table 37: Technicians Responses on the Number of Practical Lessons Held in a Day and the Number of Hours Used in the Laboratories at the Central University College for 2005/2006 Academic Year

No. of Hrs per day	**F**	**%**	**C f**
. 8-10	10	71.4	71.4
5-7	4	28.6	**100**
No. of Pr. Lessons			
Per day	**F**	**%**	**CF**
4	7	50	50
3	4	28.6	78.6
2	3	21.4	**100**

It was revealed from the results of the data that, at least four (4) practical lessons are held in a day as indicated by 7 (50%), three (3) practical lessons by 4 (28.6%) and minimum of two (2) practical lessons in a day by 21.4% of the respondents. Averagely, 8-10 hours are spent at the laboratories for each day as revealed by 10 (71.4%) of the technicians interviewed. It was also indicated in the Table 36 that, the minimum hours used at the laboratories for practical lessons were 5 to 7 hours as revealed by 4 (28.6%) respondents. It is also indicative to note from the result that each practical lesson on the average is allotted at least two (2) hours. The result as shown in Table 36 indicates that, the number of practical lessons held in a day and the hours used were high as compared to Turkson's (2006) Utilization of Teaching Space at Cape Coast Polytechnic. These results indicate high TURs at the laboratories (see Table 33)

Factors that Affect Space Utilization Rates (SUR) at the Laboratories at the Central University College

The Space Utilization Rates are generally affected by adequacy of floor area and the number of occupancy at a particular lesson and time. It can also be affected positively or negatively by time tabling, laboratory equipment, furniture and availability of technicians. To find the factors that influence space utilization at the laboratories at the Central University College the technicians expressed their views as captured in Table 38

Table 38: Technicians' Views on Factors that affect Space Utilization of the Laboratories at the Central University College for 2005/2006 Academic Year

Factors	V. adequate		Adequate		Inadequate		V. inadequate		Total	
	F	%	F	%	F	%	F	%	F	%
Furniture	2	14.3	6	42.8	6	42.8	-	-	14	100
Mat & equip	6	42.8	7	50	1	7	-	-	14	100
Floor space	2	14.3	6	42.8	4	28.5	2	14.3	14	100
Time table	4	35.7	8	57.1	2	14.3	-	-	14	100

Table 38 depicts the various expressions by the technicians as factors that influence the efficient utilization of the laboratories at the Central University College. On availability and adequacy of furniture in the laboratories, 2 (14.3%) of the respondents stated that the furniture are very adequate and 6(42.8%) also stated that furniture in the laboratories are adequate. However, 6(42.8%) of the respondents expressed the view that furniture at the laboratories was inadequate. On materials and equipment, 13(92.8%) were of the view that they were adequate. Another issue that was considered was the floor area (space) per student in the laboratories, as much as 42.8% of the technicians were of the view that the laboratories have limited space, while 28.6% stated that the time tabling and availability of technicians were inadequate. These and other factors might have contributed to the very high Space Utilization Rates recorded at the laboratories.

Factors that Affect Space Utilization Rates (SUR) for the General-Purpose Classroom at the Central University College

The space utilization rates for the general-purpose classrooms are generally affected by adequacy of floor area and the number of occupancy at a particular lesson and time.

Respondents' View on Factors that affect Space Utilization Rates for the General-Purpose Classrooms

The Space Utilization Rates are generally affected by adequacy of floor area and the number of occupancy at a particular lesson and time. It can also be affected positively or negatively by time tabling, furniture and availability of teaching and learning materials and teachers. To find the factors that influence space utilization at the laboratories at the Central University College, Table 39 provides useful information on the Space Utilization Rates during the observation of the usage of General-Purpose Classrooms at the Central University College.

Table 39: Academic Staff and Administrators' Opinions on the Minimum Class Size at the Central University College for 2005/2006 Academic Year

	Academic Staff			Administrators		
Class size	F	%	C f%	F	%	C f%
less than 50	14	23.3	23.3	9	30	30
50-100	21	35	58.4	21	70	100
100-150	12	20	78.4			
150-200	13	21.7	100			
Total	**60**	**100**		**30**	**100**	

For instance, when the academic staff were asked to state the minimum number of students they teach, 14(23.3%) of them indicated that their class size

was less than 50. On the minimum number of students/ academic staff ratio, 21 (71%) of the administrators stated that the minimum number of students/ academic staff ratio should be between 50 and 100. Table 39 shows the results from the data.

On the maximum number of students / academic staff ratio, respondents however, presented different opinions 9 (15%) of the academic staff indicated that they lecture between 250- 300 students, 17 (28.3%) of them also indicated that they lecture between 200-250 students whilst the rest revealed that they teach from 50-200 students. Most of the administrators 17(56.7%) on the other hand said the maximum class size academic staff should handle was 50-100. The results are shown in Table 40

Table 40: Academic Staff s and Administrators' Views on the Maximum Class Size at the Central University College for 2005/2006 Academic Year

	Academic Staff			Administrators		
Class size	F	%	C f%	F	%	C f%
250-300	9	15	15	-	-	-
200-250	17	28.3	43.3	-	-	-
150-200	12	20	63.4	-	-	-
100-150	9	15	78.4	13	43.3	43.3
50-100	13	21.7	100	17	56.7	100
Total	**60**	**100**		**30**	**100**	

However, when the academic staffs were asked to state the number of students they would like to comfortably handle if they have the choice, 43

(71.1), of the staffs stated that they would contentedly like to teach between 25-50 students. When they were asked the reasons of their choice, they stated that small class size makes class management efficient which caters for individualized attention and supervision. They also stated that it would enable them to conduct more class assignments as marking of scripts would be a lot easier. The rest of the academic staffs, making 23.3%, however opted for a class size between 50-100 students. They stated that small class size is ideal but very expensive as it would demand additional number of teachers to cope with the work load. Table 41 depicts the detail results.

Table 41: Views on Choice of Class Size the Academic Staff would like to Handle per Course at the Central University College for 2005/2006 Academic Year

	Academic Staff		
Class size	F	%	C f%
150+	-	-	-
100-150	-	-	-
50-100	17	28.3	28 .3
25- 50	43	71.7	100
Total	60	100	

Concerning the issue of class size being above the capacity of classrooms, a factor which affects the space utilization rates, Table 42 provides academic staffs and administrators' opinions on policy of dividing large classes into smaller groups to suit seating capacity of classrooms. .

Table 42: Academic Staff & Administrators' Opinions on the Policy of Dividing Large Classes into Smaller Groups to Suit Seating Capacity at the Central University College for 2005/2006 Academic Year

	Academic Staff			Administrators Response		
Response	F	%	C f %	F	%	C f%
Yes	36	60	60	30	100	100
No	24	40	100	-	-	-
Totals	**60**	**100**		**30**	**100**	**100**

As shown in Table 42, 36 (60%) of the academic staffs and the entire administrators support the idea of dividing large classes into smaller groups to suit the seating capacity of the instructional rooms to prevent congestion which leads to very high space utilization.

However, when academic staffs were asked whether they would like to top up their class size if the maximum number of students in a class is below the seating capacity of the room, 63.3% of the academic staff said 'NO'. The reasons given were that, it would enable them to speed up marking of students scripts and also give individual attention to students. The administrators on the other hand agreed to the question as 100% answered YES; though they did not give any reason. The result from the data is shown in Table 43.

Table 43: Respondents' Views on increase of Class Size to fill the Capacity if the Class Sizes are below the Capacity of the classrooms at the Central University College for 2005/2006 Academic Year

	Academic Staff			Administrators		
Response	F	%	C f%	F	%	C f%
Yes	22	36.7	36.7	30	100	100
No	38	63.3	100	-	-	-
Totals	60	100		30	100	100

On the issue of students having problems with classroom accommodation, Table 44 provides answers to the question.

Table 44: Academic Staff and Administrators' Views on Students' problems on Classroom Accommodation at the Central University College for 2005/2006 Academic Year

	Academic Staff		
Responses	F	%	C f%
YES	30	50	50
NO	15	25	75
SOMETIMES	15	25	100
Total	60	100	

On respondents Views on Students' problems on Classroom accommodation at the Central University College 50% of the lecturers said 'YES', 25% said 'NO', and 25% said 'SOMETIMES'. However 61.7% of the respondents indicated that students did not have accommodation problems at the laboratories'. This was also supported by the technicians who were interviewed since all of them 100% said that the spaces of the laboratories are adequate for the students who come for practical lessons except the computer laboratory.

Another factor that influences Space Utilization Rates is quality of instructional rooms. Tables 45 and 46 present the responses of academic staff and administrators on the quality of general – purpose classrooms and laboratories respectively.

Table 45: **Responses of Academic Staff and Administrators on the Quality of General- Purpose Classroom at the Central University College for 2005/2006 Academic Year**

	Academic Staffs			Administrators		
Responses	F	%	C f%	F	%	C f%
Very good	5	8.3	8.3	8	26.7	26.7
Good	20	33.3	41.6	12	40	67.7
Satisfactory	28	46.7	88.3	6	20	86.7
Poor	7	11.7	100	4	13.3	100
Very poor	-	-	-	-	-	-
Total	**60**	**100**		**30**	**100**	

As indicated in Table 45, 28 (46.7%) of the academic staff and 6 (20%) of administrative staff stated that the quality of General – Purpose Classrooms were satisfactory. Also 20 (33.3%) of the academic staff and majority of the administrators (67.7%) positively responded that the quality of the General – Purpose Classrooms were good. However, 7 (11.7%) members of the academic staffs and 4 (13.3%) members of the administrative staff differ from the rest of the staff as they asserted that the quality of the General – Purpose Classrooms were poor (see Table 32). On the quality of the state of the laboratories the results are depicted in Table 46.

Table 46: Academic Staff and Administrative Staff's Views on the Quality of Laboratories at the Central University College for 2005/2006 Academic Year

	Academic Staff			Administrators		
Responses	F	%	C f%	F	%	C f%
Very good	13	21.7	21.7	10	33.3	33.3
Good	20	33.3	55	9	30	63.3
Satisfactory	23	38.3	93.4.3	7	23.3	86.6
Poor	4	6.77	100	4	13.3	100
Very poor	-	-	-	-	-	-
Total	**60**	**100**		**30**	**100**	

As indicated in Table 46, the quality of the laboratories was very good according to 21.7% of the academic staff and 33.3% of the administrative staff. Again a whopping 71% and 53.3% of academic and administrative staff admitted that the quality of the laboratories were good and satisfactory, but these views differ sharply from the observation data (see Table 32 & 33). From the observation data, Space Utilization Rates recorded for both the general-purpose classrooms and the laboratories were very high which depicts congestion. The response from some of the respondents indicated that they are not on top of issues and might be unaware of the problems of poor nature of some of the instructional rooms as only 6.77% and 13.3% of both the academic and the administrative staff acknowledged the fact that some of the laboratories were pitiable.

It is an undisputed fact that, the availability of adequate and appropriate furniture, materials and equipment and teaching personnel affect the maximum utilization of teaching space. When the academic staffs were quizzed about the availability of the above mentioned facilities, their responses were captured in Table 47.

Table 47: Academic Staff View on the Availability of Furniture, Materials and Equipment and Teaching Personnel at the Central University College for 2005/2006 Academic Year

	Very adequate		Adequate		Inadequate		Very inadequate		Total	
Facilities	F	%	F	%	F	%	F	%	F	%
Furniture	13	21.7	28	46.7	15	25	4	6.6	60	100
Mat & equipt.	9	15	26	43.3	15	25	10	16.6	60	100
Teaching Personnel	18	30	21	35	8	13.3	13	21.6	60	100

In Table 47, 41(68%) of the respondents revealed that there were sufficient (i.e. very adequate and adequate) furniture in the general-purpose classrooms and the laboratories at the Central University college. These were probably the academic staffs that lecture small class sizes and are unaware of huge problem of inadequate furniture in other instructional rooms. Concerning materials and equipment as well as teaching personnel in the Central University College, 58.3% and 65% respectively of the academic staff answered very adequate and adequate. The above average of adequacy of facilities at the University especially the teaching personnel is mainly due to attractive working condition as condition of service of most private universities are most favourable.

The use of departmental time table is also another factor that affects Space Utilization Ratio and so lecturers were asked to give their impressions on the extent to which it affects the use of teaching space at the Central University College. Table 47 shows the results of the opinions of the academic staff.

Table 48: Academic Staff's Responses on the Effects of Departmental Time Table on the Use of Teaching Space at the Central University College for 2005/2006 Academic Year

Responses	Frequency	%	C f%
Very serious	18	30	30
Serious	23	38.3	68.3
To some extent	8	13.3	81.6
Not serious	11	18.3	100
Total	60	100	

The results from Table 48 show that as many as 68.3% of the lecturers see departmental time tabling as very important factor in the use of Teaching Space at the Central University College. They are of the opinion that Departmental Time Tabling plays a crucial role in the use of Teaching Space as it is used for time scheduling for a particular lessons and classroom.

To find out the facilities (classrooms and laboratories, lecturers teaching and learning materials equipment and library) that are essential in the use of Teaching Space at the Central University College that needed to be expanded for increased students' intake, the academic staffs' levels of priority are shown in table 49

Table 49: Academic staffs View on the Level of Priority of Educational Facilities to be expanded for Increased Students Intake at Central University College for 2005/2006 Academic Year

Levels	Very high		High		Low		Very low		Total	
Facilities	F	%	F	%	F	%	F	%	F	%
Classrooms & labs.	43	71.7	12	20	3	5	2	3.3	60	100
Academic staffs	21	35	33	55	4	6.7	2	3.3	60	100
TLM/equipt.	26	43.3	31	51.7	2	3.3	1	1.7	60	100
Library	21	35	33	55	2	3.3	4	6.7	60	100

From Table 49, it can be realized that respondents placed high premium on all the factors listed above, but they however want much priority to be given to classrooms and laboratories as 71.75 of the respondents gave high level priority to these facilities. In view of the relatively high average Time Utilization Rates recorded (Table 31) both in the Classrooms and the Laboratories and it's attendance of congestion, the respondents considered these facilities as a high priority which needs to be expanded as far as students enrolments are concerned, though 8.3% did not see them as very important factors in the increase in enrollment. The high premium put on infrastructural development by the academic staffs of the Central University College has necessitated the planned move of the College to a new Campus at Prampram, this is because the large students enrolment at the Central University College over the years have overwhelmed the infrastructural facilities at the present site in Accra.

Summary of Results

From the computerization of results based on tables 2- 33 two distinctive findings emerged. One of the findings follows the trend set by earlier empirical studies undertaken by Russell and Doi (1957) on Utilization of Instructional Rooms in USA, Owolabi (1993) on Space Management at the University of Ghana, Legon, Apori (1977) on Utilization Of Teaching Space Facilities at the Science Faculty Building Complex, University of Cape Coast, Akomaning (2001) on Utilization Of Teaching Space at Takoradi Polytechnic and Turkson(2006) on Utilization of Teaching Space at Cape Coast Polytechnic. That the teaching space facilities from Mondays to Friday was skewed towards the morning sessions as shown by the Time Utilization Rate, Space Utilization Rate and Global Utilization Rate indicators for the first and second semesters as well as the whole 2005/2006 academic year as against the afternoon and evening sessions as depicted in Table 2 to 31.

For instance, Akomaning (2001) on Utilization of Teaching Space Facilities at Takoradi Polytechnic recorded for its morning session's Global Utilization Rate (GUR) between 58.38% and 82.18% for lecture theatres while the afternoon session was between 27.03% and 53.35%. Similarly, Turkson (2006) on utilization of teaching space at Cape Coast Polytechnic recorded global utilization rate (GUR) between 4.04% and 60.82% for classrooms and the auditoriums in the morning session while global utilization rate recorded for the afternoon and the evening sessions were between 1.4% - 31.82% and 0.17%-6.39% respectively. The trend of relative higher utilization rates recorded in the

morning sessions as opposed to the afternoon and the evening sessions is due to the students and faculty preference for morning classes.

The second findings that emerged was contrary to the findings and trends set by empirical studies earlier taken by Owolabi (1993) on Space Management at the University of Ghana, Legon, Apori (1977)) on Utilization of Teaching Space Facilities at the Science Faculty Building Complex, University of Cape Coast , Akomaning (2001) on utilization of teaching space at Takoradi Polytechnic and Turkson(2004) on Utilization of Teaching Space at Cape Coast Polytechnic where all the Global Utilization Rates (GUR) recorded for all instructional facilities fell below or within the recommended norms of 80% for general purpose classrooms and between 40-70% for specialized rooms by British Department of Education and Science (BDES,1971,1972) and the 53.36% by the URC Report(1988).

Contrary to the established norm, the Global Utilization Rate of 87.43% for General-Purpose Classrooms and the average Global Utilization Rates of 101.92% for the laboratories recorded in this research were higher than all the established norms including the recommended rate of 80% set by the British Departments of Education and Science (BDES, 1971, 1972) for General-Purpose Classrooms, Global Utilization Rate of 60% set by Kenny and Foster (1983), a Global Utilization Rate of 53.36% as recommended by the URC Report (1988) . Kenny and Foster (1983) asserted that achieving Global Utilization Rate of 80% is unrealistic and could not be achieved even with the use of computerized time scheduling and space allocation. The result of this

research on space utilization on private university has proven that the attainment of Global Utilization Rate of 80% and above is possible but with its consequences of over crowdedness and possibly poor quality of teaching.

Table 32 and 33 give summaries of average Time and Space Utilization Rates and Global Utilization Rate for whole day and the whole academic year for all the instructional rooms at the Central University College.

Table 32 gives summary of average Time Utilization Rate, Space Utilization Rates and Global Utilization Rates for whole day and the whole academic year for all the general purpose classrooms and Table 33 gives summary of average Time Utilization Rate, Space Utilization Rate and Global Utilization Rate for whole day and the whole academic year for all the laboratories. Diagrammatical presentations has been made to show the pattern of average time utilization rates, space utilization rates and global utilization rates of the general-purpose classrooms and the laboratories during the morning (7:00a.m-11:30), afternoon (12:00noon-4:05p.m) and evening (4:30p.m-9;30pm) sessions for the whole of the academic year (See Appendix A).

The trend of use of the teaching space facilities from Mondays to Fridays as shown by the TUR, SUR and GUR indicators for the first and second semesters as well as the whole 2005/206 academic year during the days of the week was uneven but very low on Fridays (see tables 5, 10, 15, 20, 25 and 30) in all the instructional rooms at the Central University College. This trend is similar to studies carried out at other tertiary institutions by Apori (1997) on utilization of teaching space facilities at the Science Faculty Building Complex,

University of Cape Coast and Turkson (2006) on utilization of teaching space facilities at the Cape Coast Polytechnic. The pattern of time utilization rates, space utilization rates and global utilization rates of the general-purpose classrooms during the days of the week for the whole of the academic year are shown diagrammatically (See Appendix F). Similarly, Time Utilization Rates, Space Utilization Rates and Global Utilization Rates for the Laboratories are also shown (See Appendix G).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This chapter presents an overview of the various chapters in this thesis i.e. summary, conclusions and recommendations. The purpose of this study, Teaching Space Utilization in The Central University College was to assess and evaluate the extent to which the physical teaching and learning environment at the university is currently being utilized and suggest ways and means for its optimal utilization.

On 22nd July, 1961, the University of Ghana Act 1961 (Act 79) was passed to usher in the first independent university in Ghana; the University of Ghana with powers to grant its own degree and to be governed by a council. This paved the way for the establishment of two new universities, the Kwame Nkrumah University of Science and Technology by an act of parliament in August 1961 and the University of Cape Coast, under the University of Cape Coast Act 1971 (Act 390) with power to confer its own degrees.

With the inception of the 1987 Educational Reforms, enrolment at all the various levels of education in Ghana increased over the period. These increases in enrolment did not correspond to increases in the physical facilities of tertiary institutions in the country.

In 1993, the Government of Ghana created the National Council for Tertiary Education to oversee the administration and improvement of tertiary education in the country and the National Accreditation Board to oversee accreditation of new private institutions which the Churches and individuals took the initiative in the establishment of private universities in the country to fill the void left by a deteriorating public university system.

Studies on Space Utilization in our educational institutions are not new but this is the first time a study on Space Utilization has been conducted in a privately owned tertiary institution in Ghana. This study, the Utilization of Teaching Space at Central University College in Accra was conducted specifically to find out the key challenges private universities face in the use of space and time in the day to day administration of their facilities. The study was also conducted to assess the Utilization of Teaching Space at Central University College and also provide information on Time, Space and Global Utilization Rates.

The researcher sought answers to the following questions.

1. What is the space utilization rate of classroom space at the Central University College?
2. What is the space utilization rate of laboratories at the Central University College?
3. What is the time utilization rate of classroom space at the Central University College?

4. What is the time utilization rate of laboratories space at the Central University College?
5. What is the global utilization of classroom space at the Central University College?
6. What is the global utilization of laboratories space at the Central University College
7. What factors currently affect the use of teaching space facilities at the Central University College?

The descriptive research design was used for this study. The descriptive survey design was adopted in order to achieve the purpose of this study since this study is basically aimed at describing the Utilization of Teaching Space Facilities at the Central University College in Accra.

Data were collected through the use of questionnaires and guided interviews. Academic activities in the various general-purpose classrooms and the laboratories were also observed and recorded. Physical measurements of the floor space of the various general-purpose classrooms and the laboratories were recorded. Students present in the various lessons during the study were also enumerated for computation and analysis of Time Utilization Rates (TURs), Space Utilization Rates (SURs) and Global Utilization Rates (GURs) at Central University College in Accra for the 2005/2006 academic year. Questionnaires were used to solicit information concerning academic and administrative staffs 'opinions on the quality of teaching space, facilities and equipment and also the impact of Departmental Time Tabling on Time Utilization Rates at the Central

University College. Guided interviews were also used to gather information from the technicians who work directly in the laboratories to find their views on time taken to prepare and clean the laboratories before and after practical lessons. The statistical tool used for the analysis was Software Package for Social Sciences (S.P.S.S.).

In all 60 Academic staff, 30 Administrators and 14 Technicians making a total of 104 respondents were involved in the study. Presentations have been made to show the pattern of average time utilization rates, space utilization rates and global utilization rates of the general-purpose classrooms and the laboratories during the morning (7:00a.m-11:30), afternoon (12:00noon-4:05p.m) and evening (4:30p.m-9;30pm) sessions for the whole of the academic year (See Appendix A).

Main Findings

The study came out with a number of findings regarding the utilization of teaching space facilities at Central University College, Accra. The findings are as follows:

1. The General-Purpose Classrooms at the Central University College for the 2005/2006 academic year were over-utilized. The result was dissimilar to the findings and trends set by empirical studies conducted by earlier researchers on space utilization where the Global Utilization Rates (GUR) recorded for all instructional facilities fell below or within the recommended norms of 80% for General-Purpose Classrooms and

between 40-70% for Specialized Rooms by British Department of Education and Science (BDES, 1971, 1972) and the 53.36% by the URC Report (1988). Contrary to the established norms, the Global Utilization Rate (87.43%) for General Purpose Classrooms and the average Global Utilization Rates (101.92%) for the Laboratories recorded in this research were higher than all the established norms including the recommended rate of 80% set by the British Departments of Education and Science (BDES, 1971, 1972) for General-Purpose Classrooms, Global Utilization Rate of 60% set by Kenny and Foster (1983), a Global Utilization Rate of 53.36% as recommended by the URC Report (1988). The results of this research on space utilization at the Central University College, Accra (private university) proved that the attainment of Global Utilization Rate of 80% and above is possible. The attainment of the average Global Utilization Rates of 101.92% above all the established norms was as a result of congestion and over crowdedness in the General-Purpose Classrooms and the Laboratories which could affect the quality of teaching and learning.

2. The average Space Utilization Rate for the General- Purpose Classrooms and Laboratories throughout the study period were 129.47%, and 151.6% respectively. These rates were higher than the proposed Space Utilization Rate of 66.7% recommended by the U.R.C Report (1988). However, the average Time Utilization Rates of 67.53% and 67.23% respectively for

General-Purpose Classrooms and Laboratories were lower than the recommended rate of 80% by the same report for tertiary institutions.

3. One of the findings follows the trend set by earlier empirical studies undertaken by Russell and Doi (1957) on utilization of instructional rooms in USA; Owolabi (1993), on Space Management at the University of Ghana, Legon; Apori (1977), on Utilization of Teaching Space Facilities at the Science Faculty Building Complex, University of Cape Coast; Akomaning (2001), on Utilization of Teaching Space at Takoradi Polytechnic and Turkson(2004) on Utilization of Teaching Space at Cape Coast Polytechnic. The trend was that, the teaching space facilities from Mondays to Fridays tilted towards the morning sessions as shown by the Time Utilization Rates (TURs), Space Utilization Rates (SURs) and Global Utilization Rates (GURs) indicators for the first and second semesters as well as the whole 2005/2006 academic year as against the afternoon and evening sessions as shown in Table 31&32. This implies that more instructional rooms were utilized in the morning sessions (7.30am – 11:30 noon) than the afternoon (12:00 noon – 4:05pm) and in the evening's sessions (4:30pm – 9:30pm). The low rates during the evening hours of the day might be due to the academic staff preference for teaching in the morning hours and non-commitment to regular class attendance of student-workers who normally patronized the evening sessions after the day's hard work.

4. Teaching space facilities from Mondays to Fridays as shown by the Time Utilization Rates (TURs), Space Utilization Rates (SURs) and Global Utilization Rates (GURs) indicators for the first and second semesters as well as the whole 2005/206 academic year during the days of the week were uneven but very low on Fridays which indicates generally low utilization rates of instructional rooms on Fridays (see Tables 6, 11,16,21,26 31) at the Central University College which conforms with the findings by Owolabi etal (1993). . This was primarily because Fridays are mostly used by academic staff and students for sports, church services, field trips, project works and general clean-ups among others.

Summary of Major Findings

The study adopted the descriptive survey design and data were collected through the use of questionnaire, observation of academic activities and interview guide for the various indicators as Space, Time and Global Utilization Rates as well as information concerning academic and administrative staff preference on teaching and the quality of teaching space, facilities and equipment. On Space Utilization on General-Purpose Classrooms and the Laboratories, it was established that the facilities were over-utilized resulting in congestion and overcrowding.

The findings also portrayed that the average Time Utilization Rates of 67.53% and 67.23% respectively for General-Purpose Classrooms and Laboratories were lower than the recommended rate of 80% by the URC Report

(1988). This indicates that, the Time Utilization Rates at the Central University College, Accra were not efficiently utilized.

Finally, it was established through the responses from the questionnaire and the interviews that additional academic staff needed to be recruited to take care of the evening schools and the infrastructural facilities and equipment at the Central University College, Accra, needed expansion to solve the problem of congestion experienced in most of the instructional rooms in the university.

Conclusions

From the findings of the study, the following conclusions were arrived at.

1. The General-Purpose Classrooms and the Laboratories were generally over-utilized contrary to the assumption by the academic and the administration staffs that classroom accommodations were okay. This means the University College's proposed relocation to Prampram where modern and expanded facilities have been put up to cater for ever increasing students' enrolment at the Central University College is justifiable.
2. The study also found out that the Space Utilization Rates for the General-Purpose Classrooms and the Laboratories were more than 100% higher than the recommended rates of 66.7% by the URC Report (1988). The very high Space Utilization Rates meant for the General-Purpose Classrooms and the Laboratories were jammed. This could be attributable to insufficient furniture, inadequate academic staff, flexible adherence of timetable, small size of rooms among others.

3. The study also discovered that the URC Report (1988) recommended Time Utilization Rate of 80% was higher than the average Time Utilization Rates of 67.53% and 67.23% for the General-Purpose Classrooms and the Laboratories respectively. The low Time Utilization Rates of the teaching space facilities recorded during the 2005/2006 academic year could be accredited to extra – curricular activities carried out outside the approved instructional rooms. Consequently, in terms of average Time Utilization Rates, the teaching space facilities at Central University College were not efficiently utilized during the 2005/2006 academic year.
4. Finally, the seemingly low utilization rates on Fridays and in the evening sessions of the days recorded in all the General-Purpose Classrooms and the Laboratories are clear indication of ineffective exploit or not so good use of the teaching space facilities at Central University College

Recommendations

Based on the findings and the conclusions of this study the following recommendations are deducted.

1. The high Global Utilization Rates recorded at the Central University College at some of the instructional rooms, especially the laboratories which suggested congestion could be solved by dividing large class sizes to accommodate the seating capacity or expanding the existing infrastructures to accommodate the ever increasing students' enrolment.

2. Secondly, large multi-purpose classrooms with small class sizes could be partitioned not with cement blocks to serve not only small class sizes but large class sizes when the need arises.
3. The relatively low utilization rates recorded during the afternoon and the evening schools/sessions could be mitigated by first taking into consideration the strict adherence of the existing timetable and lecturers implored to stick to the dictates of the timetable.
4. The overcapacity in the instructional rooms due to the undersized instructional rooms which led to over-utilized laboratories especially the general computer laboratory which is open to all could be resolved if more of such facilities are provided to cater for the large number of students who use these services.
5. Again the era of engagement of part-time lecturers to teach in the afternoon and the evening sessions should give way for the recruitment of permanent, dedicated and professional academic staff who would engage the students around the clock. In addition intensive enrolment drive should be made to romp in working students who normally patronized the afternoon and the evening schools/sessions because of their working schedules.
6. Another result derived from this study was that the infrastructural facilities of the university needed to be expanded to solve the problem of (high space utilization rate) congestions in most of the instructional rooms
7. The considerably lower Time and Space Utilization Rates recorded on Fridays as compared to the rest of the days which might be due to lecturers' fatigue as some of them work throughout the morning, afternoon and the evening

schools/sessions could be solved by recruitment of additional permanent academic staff to augment the academic staffs to take care of some of the numerous tasks as far as teaching is concerned.

8. Lastly, allocation of teaching spaces for classes should be computerized based on class size, course requirements in respect of teaching materials, equipment and furniture needs. This will make the usage of the instructional rooms more efficient and more often by different groups of learners based on their needs

Area for Further Research

Further studies should be conducted in some of the privately owned tertiary institutions to determine the trend of space utilization as compared to the public tertiary institutions.

REFERENCES

Akomaning, E. (2001) *Utilization of teaching space facilities at Takoradi Polytechnic*. Unpuplished M.Phil Thesis, University of Cape Coast, Cape Coast.

Amuzu-Kpeglo, A. (1988). The two faces of the Higher National Diploma. *Journal of Educational Management,* l (1).

Atta-Boison (1995) *Human and facility resources utilization at the University of Education, Winneba.* Unpublished M.Phil Thesis, University of Education, Winneba.

Apori, S.O. (1997). *Utilization of teaching space facilities at the Science Faculty building complex,* University of Cape Coast". Unpublished M.Phil Thesis, UCC, Cape Coast.

Bernaman-Mensah, S. (2000). *Utilizations of teaching space facilities at Mfantsipim Senior Secondary School, Cape Coast*. Unpublished M.Phil Thesis, UCC, Cape Coast.

Best, J.W,. & Khan, J.V. (1995). *Research in Education*., Englewood Criffs, N.J.: Printice-Hall, Inc.

Bradley, Report (1946). *Development in higher education in the Gold Coast.* Accra

British Department of Education and Science (BDES, 1971). *Notes on Producers for the approval of Polytechnic Project.* London: HMSO.

British Department of Education and Science (BDES, 1972). *Notes on Producers for the approval of further education projects other than polytechnics.* London: HMSO.

British Department of Education and Science (BDES, 1992). *The efficient and effective use of space in colleges.* London: HMSO.

Castalidi, B. (1969). *Creative planning of education facilities.* , Chicago, Illinois: Rand Mc Nally and company.

Council of Education Faculty Planners (CEFP, 1976). *Manual on Planning Education Facilities in Canada.*

Council of Education Facility Planners (CEFP, 1976). *Guide for Planning Education Facilities in Canada.*

Darren, G,. & Mallery, P. (2001). *SPSS for windows: Step by step*, (A simple guide and reference 10.0 update) (3rd Ed)

Farojalla, S.B (1993). *Educational planning for development* London: Macmillan Press Limited

Gay, L.R. (1987). *Education research competences for analysis & Application (3rd Ed)* Columbus, Ohio: Maril Publishing Company Co.

Glenn, D.D., & Rourke, F.E. (1966). *The managerial revolution in higher education.* Maryland, USA:, The Johns Hoopkins Press.

Hallak, J.K. (1977). *Planning the location of school,* In Sanyal, B.C. l, Institutional Management in Higher Education in Western Africa, Paris: UNESCO.

Kennedy, G., & Foster K., (1983). *Managing space in further education staff college.* Coombe Lodge, Blagdon, Bristol BS186R6.

McWilliam H.O.A. (1962). *The development of education in Ghana*. London: Longmans Green and Co Ltd.

Odoi, V. (1999, March (2nd). *Poor responses to Legon's appeal*. Daily Graphic (P.17).

Owolabi, S.O. (1993). *Utilization of teaching space and time at UCEW*, Report No.1 Accra: Ministry of Education

Owolabi, S.O. (1993). *Utilization of teaching spaces and teaching time at Accra Polytechnic.*, Repot No. 2, Accra, Ministry of Education.

Owolabi, S.O. (1994). *Utilization of teaching space at University of Ghana – Legon*. Report No. 3, Accra: Ministry of Education.

Owolabi, S.O. (1994). *Utilization of teaching space and time at University of Cape Coast.* Report No. 4. Accra; Ministry of Education.

Owolabi, S.O. (1995) *Utilization of teaching space and time at Kumasi Polytechnic.* Report No. 5, Accra; Ministry of Education

Owolabi, S.O. (1995). *A case study in space management in the University of Ghana,* U.G Ministry of Education.

Owolabi, S.O. (1996). *School mapping and facilities Analysis Department of Education and Management*, university of Ibadan.

Owolabi, S.O. (1996). *School mapping and facilities analysis* Ibadan: Freeman Publishing.

Owolabi, S.O. (1998). Improving Management of Teaching Spaces in Higher Institutions: The Winneba Model. *Journal of Educational Management* .1. (1)

Sarpong, R. (1999 March 30) *Increase budgetary allocation to Koforidua Poly*. Daily Graphic (p.17).

Rawlingson, C.A. (1977). *Space utilization and management in higher educational building.* Paris, OECD

Rawlingson, C.A. (1973). *Activity/Space Management*. Unpublished doctoral Thesis. Univrsity of London, London.

Rogers, D (1993). *Space, time and research management system. An introduction to Time Tabling system* London: HMSO.

Russel, D. L. & Doi, J.J. (1957) *Manual for studies of space utilisation in collegiate registrars and admissions office.* USA.

Turkson (2006) *Utilization of Teaching Space Facilities at Cape Coast Polytechnic*. Unpuplished M.phil Thesis, University of Cape Coast.

UNESCO, (1984) *Management and maintenance in use of educational buildings and equipment, training materials in educational planning, administration and facilities.* Modules I, II, III and IV. Paris: Division of Educational Policy and Planning.

UNESCO. (1985) *Norms and standard of educational facilities training materials in educational planning, administration and facilities* Modules I, II, and III. Paris: Division of Educational Policy and Planning.

UNESCO. (1985) *Needs of Education Facility*: *Teaching Materials in Education Planning and Administration*__ Module I, II, III, and IV. Paris: Division of Educational Policy and Planning.

University Rationalization Committee (1988). *URC Report study Vol. II*, Accra, Ghana, Ministry of Education and Culture.

University of Cape Coast's Data Processing Unit. March 2005, Cape Coast, University of Cape Coast.

APPENDICES

APPENDIX A

OBSERVATION CHECK LIST

TEACHING SPACE UTILISATION AT THE CENTRAL UNIVERSITY COLLEGE.

SPACE UTILISATION: FREQUENCY OF USE OF GENERAL-PURPOSE CLSSROOMS

Class Rooms	**Mlt i**	**Mlt2**	**Mlt3**	**Mlt4**	**Mlt5**	**Mlt6**	**Mlt7**	**Mlt 8**	**Mlt 9**	**Mlt1 0**	**M Mtl5**	**Mtl 5**
Area in Sq. Metre	42.2	62.6	38. 9	38.9	222.7	110	241	77	77	77	110	110
Seating Capacity	23	34	21	21	124	60	131	42	42	42	60	60
			NO. OF STUDENTS PRESENT									
7.30am-830am												
8.30am-9.30am												
9,30am-10.30am												
10.30am-11.35am												
12.00pm-1.00pm												
1.00pm-2.00pm												
2.00pm- 3.00pm												
3.00pm- 4.05pm												
4.30pm- 5.30pm												
5.30pm- 6.30pm												
6.30pm- 7.30pm												
7.30pm- 8.30pm												
8.30pm- 9.05pm												

Norm for Seating Capacity: 1.84msq/students

TEACHING SPACE UTILISATION AT THE CENTRAL UNIVERSITY COLLEGE, ACCRA

INSTRUMENT ONE: OBSERVATION CHECK LIST

SPACE UTILISATION: FREQUENCY OF USE OF LECTURE THEATRES

Class Rooms	**ABT1**	**ABT2**	**ABT3**	**ABT4**	**ABT5**	**ABT6**	**ABT7**	**ABT8**
Area in Sq. Metre	62.6	62.6	110	110	110	77	77	110
Seating Capacity	34	34	60	60	60	42	42	60
			NO. OF STUDENTS PRESENT					
7.30am-830am								
8.30am-9.30am								
9,30am-10.30am								
10.30am-11.35am								
12.00pm-1.00pm								
1.00pm-2.00pm								
2.00pm- 3.00pm								
3.00pm- 4.05pm								
4.30pm- 5.30pm								
5.30pm- 6.30pm								
6.30pm- 7.30pm								
7.30pm- 8.30pm								
8.30pm- 9.35pm								

Norm for Seating Capacity: 1.84msq/students

APPENDIX B

TEACHING SPACE UTILISATION IN CENTRAL UNIVERSITY COLLEGE, ACCRA

INSTRUMENT ONE: OBSERVATION CHECK LIST

SPACE UTILISATION: FREQUENCY OF USE OF LABORATORIES

Class Rooms	**LANGUAGE LABORATORY**	**ICT LAB**	**APPLIED SCI LAB**
Area in Sq. Metre	54.7	465	195
Seating Capacity	7	62	26
№ OF STUDENTS			
7.30am-830am			
8.30am-9.30am			
9,30am-10.30am			
10.30am-11.35am			
12.00pm-1.00pm			
1.00pm-2.00pm			
2.00pm- 3.00pm			
3.00pm- 4.05pm			
4.30pm- 5.30pm			
5.30pm- 6.30pm			
6.30pm- 7.30pm			
7.30pm- 8.30pm			
8.30pm- 9.35pm			

Norm for Seating Capacity: 7.50msq/students

APPENDIX C

INSTRUMENT 2 (A)

QUESTIONNAIRE FOR ACADEMIC STAFFS

1. Please indicate your school/faculty and department in the space provided

School

…….

Faculty

……..

Department

……

2. Which time of the day would you like to hold your lectures?

8am - 10am

10am - 12am

12pm - 2pm

2pm - 4pm

4pm - 6pm

6pm - 8pm

3. If your lecture schedule does not correspond to your wish (Reference to question 2) would you reschedule it with your students? Yes [ ] No [ ]

4. If yes, (ref to question 3) to which other period?

……

5. Do you teach a class size over and above the capacity of your lecture theatre or classroom? Yes [ ] No [ ]

6. Would you recommend dividing the class size into groups to suit the seating capacity and lecture the various groups at different times? Yes [ ] No [ ]

7. If No, then what would you recommend?

.....

.....

.....

8. Assuming that you have the choice, what is the maximum number of students would you like to lecture? a) 25- 50 [ ] b) 50 - 100 [ ] c) 100 - 150 [ ] d) Above 150 [ ]

9. What is minimum class size you have been lecturing in the current academic year per course? ……...

10. What is the maximum class size you have been lecturing in the current academic year per course?

11. What are the maximum credit hours that you can cope with within a week for lecturing?

9-11 [ ] 12-13[ ] 14-15 [ ] 16+ [ ]

12. To ensure that the lecture theatre is filled to capacity, would you recommend for the increase in size of your class if your minimum class size is below the capacity of the classroom?

Yes [ ] No [ ]

13. If No, what are your reasons? ……

……

……

14. If your normal classroom where you lecture is occupied, would you be prepared to look for the next available classroom? Yes [ ] No [ ]

15. If No please give reason(s) ……..

……...

16. Assuming that your minimum lecturing schedule in a week is less than what has been specified by the University (12 credit hours per week), would you accept any teaching responsibility you are capable of, outside your normal teaching duties to make up for the shortfall?

Yes [ ] No [ ]

17. If No, please explain ……

18. Do the students in your class have problems with classroom accommodation?

Yes [ ] No [ ] Sometimes [ ]

19. If Yes, please explain the nature of the problems …….....

……

20. Do you have problems in the use of the laboratories for effective teaching?

Yes [ ] No [ ]

21. If yes please explain the nature of the problem(s)……

……

22. What is the quality of accommodation for teaching purposes in the classroom?

a) Excellent b) satisfactory c) poor d) very deficient

23. What is the quality of accommodation for teaching purposes in the laboratories?

a) Excellent b) Satisfactory c) Poor d) Very

To what extent can the following factors affect the use of teaching space at the Central University College?

	Very serious	Serious	To some extent	Not serious
24. Furniture				
25. Material and Equipment				
26. Departmental Time tabling				
27. Teaching Personnel				

28. Please, what can you say about the adequacy of furniture in the instructional rooms

a) Very adequate

b) Adequate

c) Inadequate

d) Very inadequate

Assuming the Central University College wants to increase its intake, what kind of priority should be given to?

	Very high	High	Low	Very lo w
29. Classroom and Laboratories				
30.Personnel(lecturers)				
31. Teaching –learning materials/equipment				
32. Library				

APPENDIX D

INSTRUMENT 2 (B)

ADMINISTRATORS

1. Kindly indicate your faculty/school and department where applicable……

2. What is the maximum number of students you expect a lecturer to handle per course?

a. Less than 50

b. 50 - 100

c. more than 100

3. What is the minimum number of students you expect a lecturer to handle per course?

a. Less than 10

b. 10 - 20

c. 21 - 30

d.31 - 40

e.41 - 50

f. more than 50

4. What is the number of courses you expect a lecturer to handle per semester?

a. less than 3 [ ] b. 3 [ ] c. more than 3 [ ]

5. What is the number of credit hours you expect a lecturer to handle per semester?

a. 9 - 11 [ ] b. 12- - 13 [ ] c. 14 -15 [ ] d. 16+ [ ]

6. Would you support the policy of dividing large class size which exceeds seating capacity into smaller units to enable lectures to be delivered to the different groups at different times?

Yes [ ] No [ ]

7. If No, give reasons……..

……

8. If yes, would you support payment of overtime allowance, if dividing up a larger class leads to more time being used by lecturer than the required minimum time expected by the University?

Yes [ ] No [ ]

9. Give reasons to your answer to question (8).

……..... .....…… ……..

10. Would you support the idea of allocating courses to lecturers outside their respective faculties?

Yes [ ] No [ ]

11. Should the movement of a lecturer from his/her faculty to another faculty to render services attract overtime payment, if his/her minimum load at the faculty is less than what is specified by the University? Yes [ ] No [ ]

12. Give reasons…… ……..

13. What is the maximum hours of overtime do you expect a lecturer to meaningfully put in per week? a) Less than 9 hours [ ] b) 9 hours [ ] c) 12 hours [ ]

14. Would you agree to the quantification of hours put in for a practical course/tutorial on the same basis as for lecturing? Yes [ ] No [ ]

15. Should hours used in supervising a project work/dissertation/thesis be quantified on the same basis as those for lecturing? Yes [ ] No [ ]

16. Give reasons for your answer to question (15)……..

17. In your opinion, which hours of the day would you want lectures to take place?

a) 6.00am to 2.00 pm [ ] b) 6.00am to 6.00 pm [ ] c) 8.00 am to 6.00 pm [ ] d) 8.00 am to 8.00 pm.[ ]

18. Please give reasons for your answer to question (17)

…… …….

19. Do you agree that, to ensure efficient use of classroom, the various classrooms should be filled to their capacities throughout the time for which classes are held? Yes [ ] No [ ]

20. How often do you expect the laboratories to be used?

a) Very often [ ] b) Quite often [ ] c) Often [ ] d) Occasionally [ ]

21. How many students do you expect to occupy a laboratory at a particular session?

a) more than 50 [ ] b) 40 -- 50 [ ] c)30 -- 50 [ ] d) less than 30 [ ]

22. What in your opinion are the main problems facing the department?

……

……

23. In your opinion, what is the adequacy of floor area (instructional room) per student?

a) Overcrowded room [ ] b) Space tightly used but adequate [ ] c) Comfortable amount of space [ ] d) More space than necessary [ ]

24. What is the quality of accommodation for teaching purposes in the classroom?

a) Excellent [ ] b) Satisfactory [ ] c) Poor [ ] d) Deficient [ ]

25. What is the quality of accommodation for teaching purposes in the laboratories?

a) Excellent [ ] b) Satisfactory [ ] c) Poor [ ] d) Deficient [ ]

APPENDIX E

INSTRUMENT 3

INTERVIEW GUIDE FOR TECHNICAL PERSONNEL

1. Interviewee's Department…….
2. Status ……
3. Job schedule……..
4. Number of years worked in the department……..
5. Hours of work per day (average)……..
6. Number of hours used to prepare practical lessons……...
7. Number of hours used to tidy a laboratory after practical lessons……
8. Is the number of personnel in your laboratory adequate for the practical lesson organized per week?.....
9. Number of practical lesson that can be held per day……
10. What can be done to improve the current level of utilization of the Laboratory…….....

    ……

    ……...

    ……

    …….

APPENDIX F

AVERAGE UTILIZATION RATES OF THE ENTIRE CLASSROOMS AT THE CENTRAL UNIVERSITY COLLEGE

SPACE		1ST SEMESTER			2ND SEMESTER			WHOLE ACADEMIC YEAR		
Classrooms	PERIOD	TUR	SUR	GUR	TUR	SUR	GUR	TUR	SUR	GUR
	7.30-11.30	70.57	138.49	97.73	68.7	136.35	93.78	69.66	137.44	95.74
	12.30-4.05	67.99	132.3	89.9	67.31	29.94	87.44	67.64	131.17	88.72
	4.30-9.30	65.68	120.83	79.36	64.64	119.49	77.23	65.27	119.81	78.19
	WHOLE DAY	68.10	130.55	88.90	66.90	128.35	85.866	75.3	129.47	87.43

APPENDIX G

Average Utilization Rates of Laboratories at Central University College

SPACE		1ST SEMESTER			2ND SEMESTER			WHOLE ACADEMIC YEAR		
LABS	PERIOD	TUR	SUR	GUR	TUR	SUR	GUR	TUR	SUR	GUR
	7.30-11.30	65.74	166.36	109.36	70.5	159.33	112.32	70.09	162.84	114.3
	12.30-4.05	65.80	152.67	100.45	66.56	149.87	99.75	66.18	151.05	99.96
	4.30-9.30	65.42	141.35	92.47	66.82	140.83	94.10	65.44	140.72	92.08
	WHOLEDAY	66.85	153.45	102.58	67.62	150.01	101.43	67.23	151.60	101.92