UNIVERSITY OF CAPE COAST

UTILIZATION OF TEACHING SPACE FACILITIES IN COLLEGES OF EDUCATION IN GHANA: A CASE STUDY OF OLA COLLEGE OF EDUCATION, CAPE COAST

MICHAEL BOSOMTWE

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BY

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Thesis Submitted to the Institute for Educational Planning and Administration of Faculty of Education, University of Cape in Partial Fulfillment of the Requirements for the Award of Master of Philosophy Degree in Education Planning

JULY, 2010

DECLARATION

Candidate's Declaration

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

Candidate's Signature…… Date……..……

Name: Michael Bosomtwe

Supervisors' Declaration

We hereby declare that the preparation and the 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

The purpose of the study was to assess the utilization of teaching space facilities at Our Lady of Apostle College of Education at Cape Coast in the 2006/2007 academic year. The study sought to provide information on time, space and global utilization rates in order to plan for short and long term admissions of student into the College. The research design adopted in the study was the case study. Purposive, stratified and simple random sampling techniques were used to select samples for the study. Two sets of questionnaire were used to collect data on teaching space facilities and an interview guide was also used to collect data on the number of times the rooms were in use by the students. The methods used in analyzing data were frequencies and percentages presented in tables. Furthermore, various indicators such as time, space and global utilization rates were computed and the rates were compared with the recommended target rates set by the University Rationalization Committee (URC, 1988) Report on the efficient use of teaching space facilities in colleges and universities in Ghana.

The study revealed that the special rooms were over-utilized in terms of space, but they were under-utilized in terms of time during teaching and learning sessions. Further, the general classrooms were efficiently utilized throughout the period of the study. The study recommends that new special rooms should be built to ease congestion of students during teaching and learning sessions. It is recommended that from time to time, seminars or workshops on timetabling and space allocation should be organized for principal and tutors who are responsible for time-table preparation at the College.

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DEDICATION

To the memory of my late father, Kobina Twi, my mother, Georgina Fynn -Akins, my sister, Ama Bosomtwe, and my supervisor, Mr. J.M. Dzinyela.

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CHAPTER ONE

INTRODUCTION

Background to the Study

Education is acclaimed as the driving force for every economy as it helps to develop, shape and sharpen its human resource base. As such, education constitutes a vital sector that requires the attention and commitment of any government for national progress. Indeed, education is a crucial national issue for our future and must be accorded the necessary attention if Ghana's economic,

social and political development is to be guaranteed. However, the education industry is found to be competing with other sectors of the economy such as health and defence for financial support from the meagre resources of the nation. It stands to reason that education resources should be optimally used.

The teacher who is the central figure of the education process must be seen as the key agent in the development of a nation. Hence, the nation's development is in the hands of the teacher. Therefore, there is the need to ensure increase in teacher trainee enrolment at the Colleges of Education. According to Antwi (1992), the first nationalist government under the Nkrumah administration embarked upon the expansion of education at all levels. This was done through the implementation of the Acceleration Development Plan (ADP) for education in 1951. One of the objectives of the ADP was to expand facilities at the colleges in order to increase admission of students created by the increase in basic school enrolments in the country.

In 1987, the Provisional National Defence Council (PNDC) government embarked upon a comprehensive programme of education reforms designed to modify the educational system. The objective was to improve the quality of education, increase access, ensure quality and adequate provision of school resources, ensure efficiency in the management of school and ensure that the physical facilities are maintained and rehabilitated (FCUBE Document, 1996). In 1996, the government launched the Free Compulsory Universal Basic Education (FCUBE) to enable all children of school going age to be in school by the year

2005. One major objective of this policy was to improve the quality of Basic Education in Ghana. It also saw to the expansion of Colleges of Education in the country as well as restructuring of teacher training programmes.

Colleges of Education in the country have specific areas of specialization or concentration. However, the mode of training in these institutions takes two broad forms: Academic and Professional. Until recently, teaching practice formed the professional aspect of training and was divided into on-campus and off-campus practice teaching. The on-campus practice teaching involves micro and peer-teaching carried out on the College's campus. The off-campus practice teaching is where teacher trainees are sent out to various basic schools in the towns where the College is located and its environs to practice training for four weeks during each of the three terms of the final year. This form of teacher training shifted focus since October, 2001 to a new system dubbed "IN-IN-OUT. The "IN-IN" segment caters for the first two years training on campus where trainees are taught using the conventional face-to-face methods. The "OUT" segment of the "IN-IN -OUT" programme covers the third (3^{rd}) year when teacher trainees are posted to basic schools where they undertake school focused training to develop their practical skills. It is a year long attachment and an opportunity to learn to teach within a period of about 30 weeks. With this programme in place, the public and some educational administrators are of the view that the teaching spaces at the College would be under -utilized as a result of the "OUT" segment. Or will the "OUT" segment lead to increase in admissions of teacher trainee at the College? This has called for the study to assess how the teaching space facilities

at the OLA College are being utilized. This is because the Government is making effort to make education accessible to all with its meagre resources from tax-payers money. Again, the Basic schools face shortages of teachers in the country. For example, in the 2000/2001 academic year, there were 19, 141 vacancies for teachers at the Basic level in the country. Only 6,285 were filled and with the drive towards universal basic education there will be the need for more or additional teachers (Report on Review of Education Reforms, 2002).

Colleges of Education have been established in the country primarily to produce professionally trained and certified teachers who are well equipped academically and pedagogically to teach at the Basic school level. OLA College was established in 1924 to produce teachers for primary schools in the country. The College has a strong Christian tradition which places a lot of emphasis on character building of the teacher trainees. The College receives financial support and other educational materials from the Association of Past Students, District Assemblies, Ministry of Education, Non-Governmental Organizations and other benevolent individuals and societies. OLA College of Education has well-constructed buildings, which include 17 general classrooms and three special rooms, (a science laboratory and two workshops). It has seven departments, five students' dormitories, assembly hall/dining hall and 18 masters' bungalows.

Over the years, there has been a tremendous increase in enrolment of students in pre-tertiary and tertiary institutions in the country. This is still inadequate due to the number of qualified applicants who are denied admission

every year. The Report on Review of Education Reforms (2002) states that a sizeable number (about 60%) of qualified applicants do not gain admission into the Universities and other tertiary institutions due to inadequate facilities. Owolabi (1998) notes that as enrolment keeps expanding in tertiary institutions, teaching spaces become a scarce commodity. This is often so because expansion in teaching and laboratory spaces are not keeping pace with increase in student enrolments. Efficiency in the management of available teaching spaces becomes the watchword for institutions seeking to expand students' intake. From the result of a survey conducted by the Facility Utilization Sub-committee of the University Rationalization Committee Report (URC, 1988), it was observed among other things, that the bulk of educational facilities in most teacher training institutions in the country were built or installed between 1951 and 1966. Many of these facilities are now old, obsolete and grossly inadequate for their original purpose. Moreover, lack of maintenance culture and provision of more facilities in response to increasing needs are prevalent in most of these institutions.

The problem of inadequate space is a general impression among statesmen, principals and administrators of colleges that their colleges cannot admit qualified applicants due to inadequate infrastructure. This and other factors such as paucity of information on the utilization levels of teaching space facilities at the Colleges in Ghana have hindered admission of qualified applicants. To ensure that teacher training colleges in Ghana use their facilities with a reasonable degree of efficiency, the University Rationalization Committee (URC, 1988) Report has established minimum utilization standard (norms) for instructional

rooms. These are yardsticks against which teacher training colleges should measure their facilities to see how efficiently they use their classrooms/lecture theatres and teaching laboratories. These standards are important tools that will help institutions to manage their campus building, and also give the government and educational administrators some important information when making funding decisions about constructing new instructional buildings. Conforming to the standards may reduce the need to construct new buildings and allow scarce state resources to be devoted to other high priority needs in the country.

Factors that limit increase in accessibility to teacher education in Ghana are non-availability or inadequate classrooms, laboratories, libraries, personnel and student housing facilities. Of these factors, the Government of Ghana through the Ministry of Education and the Ghana Education Service has improved and expanded primarily academic infrastructure like lecture theatres/classrooms and secondly teaching/learning materials and personnel in the existing colleges in the country. The improvement will meet the need for more trained teachers in the classrooms and to reverse the trend of limited access to teacher education that has been observed in Ghana. In the short term, it has been suggested that teacher education institutions should be able to provide quality education for increasing numbers of students through increase efficiency in the utilization of existing teaching space, personnel and other resources.

Kenny and Foster (1983) state that a study on efficiency of utilization of teaching space facility is a major factor of enrolment and it is a resource very

much difficult to provide within a short time. Currently, information on the efficiency of utilization of' teaching space facilities at the OLA College is not available. Moreover, information like time utilization rate (frequency of use) and space utilization rate (occupancy factor) which is needed for making short, medium and long-term admission plans were also not available. In addition, the assessment of qualitative change in education in areas such as curriculum, instructional methods and evaluation of students' (learners') performance is dependent on quantitative information like space, time and global utilization rates obtained through assessment of the utilization of teaching space facilities.

Statement of the Problem

Colleges of Education have a vital role to play in the country's education. They produce teachers for the country's basic schools. With the introduction of Capitation Grant Scheme at the basic education levels in the 2004/2005 academic year, it was hoped that enrolment at the basic schools would increase. However, it was discovered that the basic education levels in the country faced shortages of teachers. For example, Badu (2008) reported that about 15,000 teachers at the basic school levels leave classrooms for further studies every year thereby creating shortages of teachers which affect teaching and learning. With the drive towards Education For All by the year 2020, there is the need to assess the utilization of existing teaching space facilities at the Colleges of Education in order to plan for short and long term admissions of students.

With the **"IN-IN-OUT"** progrannme at the Colleges, there is the need to have information on the utilization of teaching space facilities in order to ensure efficient and effective use of the facilities. Thus, information on how teaching space facilities are utilized when the final year students are out is crucial to ensuring increase in student enrolment in the Colleges. According to Owolabi (1995), excessive over-utilization and under-underutilization of rooms, in terms of space (occupancy) is undesirable. Low space utilization rate leads to economic waste while congestion leads to discomfort, uncongenial learning environment and high rate of equipment destruction. This study intends to assess the efficiency of the utilization of teaching space facilities at the OLA College in order to for forestall over- utilization and under – utilization of rooms.

The assessment of teaching facilities has also been very brief as a result of inadequate data collection and processing machinery of the Ministry of Education. The URC (1988), therefore, made several recommendations among which was the fact that a detailed case by case assessment should be undertaken to provide exact percentages of utilization rates of educational facilities at the various institutions of higher learning. Based on the URC (1988) recommendation, this research was undertaken to find out the extent to which the teaching space facilities at OLA College are being utilized and to suggest strategies for its optimal utilization.

Purpose of the Study

The main purpose of this study was to assess the utilization of teaching space facilities at OLA College of Education and to provide quantitative baseline data on efficient utilization of such facilities. The study sought to provide information on time, space and global utilization rates of teaching space facilities and to suggest strategies for optimal utilization of these facilities at the College. The study would further provide information on the problems associated with the utilization of teaching space facilities at OLA College and find out the best means to curb the problems associated with the utilization of these facilities.

Research Questions

The following research questions were formulated to guide the study:

1. What is the time utilization rate of teaching space facilities at OLA College of Education at Cape Coast?
2. What is the space utilization rate of teaching space facilities at OLA College of Education at Cape Coast?
3. What is the global utilization rate of teaching space facilities at OLA College of Education at Cape Coast?
4. What are the problems associated with the utilization of teaching space facilities at OLA College of Education at Cape Coast?

Significance of the Study

The findings of the study would be beneficial in several ways by adding to the knowledge on utilization of teaching space facilities in tertiary institutions. The information provided from the findings can be used to plan the short, medium and long-term admissions to the various departments of' the College, so as to forestall under-utilization or over-utilization of teaching space facilities.

The information obtained could be used as a basis for planning teaching space utilization of other similar teacher training institutions and to project teaching space requirements of new institutions, which are yet to be brought into the education institutions. The study would project whether there is the need for new teaching facilities in OLA College or not. The above information is dependent on quantitative information like space, time and global utilization rates obtained through assessment of the utilization of teaching space facilities.

Delimitation of the Study

The study was delimited to only teaching space facilities (17 general classrooms, science laboratory and two workshops) located at OLA College. The utilization of auxiliary spaces such as library, students resource room, dining hall/ assembly hall and information technology centre were not included in the calculations of space utilization. The study was also delimited to the College's official hours (from 7:20am to 2:30pm) that teaching space facilities were scheduled for use. The use of periods (hours) extended after 2:30pm and Preps

that fall outside the official contact hours were not taken into consideration. The study was delimited to teaching space facilities at the College. Hence, conclusions that may be drawn are not to be extended beyond the use of physical facilities studied.

Limitations of the Study

The use of questionnaire to collect information from the respondents at the College imposed a limitation. For instance, some respondents could not complete the items in the questionnaire for the analysis of the data. This was because some respondents felt that the study was meant to reveal the flaws in the administration of the College. Even though, the researcher explained the purpose of the study to the respondents. This situation might affect the reliability of the responses.

Another constraint to the study was that the data of class attendance were collected only during the official class hours between 7: 20am to 2: 30pm. This meant that periods outside the College's official hours that teaching space facilities were in use were not included in the study. Hence, the actual utilization of such facilities could not be obtained for the analysis of the data.

Definition of Terms

For the purpose of the study, certain terms will assume specific meaning as indicated below.

General Classroom: a room designed to house all subjects without a specific

activity.

Special Room: a room designed to house a specific subject activity.

Teaching Space: a room or area specially set aside for teaching and learning purposes.

Utilization of a Teaching Space: is the number of hours of use of the space per week.

Space Utilization Rate: this is an indicator which evaluates the extent to which the average size of the classes occupying a classroom with its theoretical capacity.

$$SUR = \frac{\text{The average number of students in attendance}}{\text{The theoretical number of student places available}} \times 100$$

Time Utilization Rate: it measures the percentage of effective teaching hours over theoretical hours of use.

$$TUR = \frac{\text{Actual number of hours of use of rooms}}{\text{Theoretical number of hours of use of rooms}} \times 100$$

Global Utilization Rate: it combines both frequency of use and occupancy rate of teaching space facility.

$$GUR = \frac{TUR \times SUR}{100}$$

Organization of the Study

The study was organized into five chapters as follows:

Chapter one dealt with the Introduction, the background to the study, the problem, purpose of the study and the research questions. It also considered the significance of the study, limitation of the study and definition of terms.

Chapter two covered a literature review relevant to the study and included; theoretical and empirical studies done on the utilization of teaching space facilities in Ghana and elsewhere.

Chapter three focused on methodology of the study, research design, population and sample used for the study. It also discussed the instrument used to collect data as well as the procedure for the collection of the data and analysis of the data.

Chapter four was on data analysis and discussions of data collected and finally, Chapter five is the summary, conclusion and recommendations of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter is aimed at providing a focus for the study as well as basis for the assessment of the findings. Literature was reviewed on the theoretical perspective and empirical studies on the utilization of teaching space facilities.

Literature on the utilization of teaching space facilities in Colleges of Education is woefully inadequate. This is clearly stated in the University Rationalization Committee Report (URC, 1988) that there is the non-availability of adequate data on the utilization of educational facilities in tertiary institutions and colleges in Ghana. Literature review was therefore, based on studies done in Canada, Great Britain and United States of America. Other studies and surveys carried out by United Nations Educational Scientific and Cultural Organization (UNESCO, 1984, 1985), Council for Educational Facilities Planners (CEFP, 1976), Russel and Doi (1957) and David Rogers (1993) were cited.

In Ghana, studies on teaching spaces include the one at the University of Ghana, Legon on space management (Owolabi, 1993), at the Kwame Nkrumah University of Science and Technology, Kumasi (Owolabi, 1994). The others are: Apori (1997), Bannerman-Mensah (2000), Akomaning (2001) and Turkson (2006).

Theoretical Review

The theoretical review dwelt mostly on the assessment of teaching space facilities, key elements that affect utilization of teaching space facilities, elements that affect time utilization rate and elements that affect space utilization rate.

Assessment of Teaching Space Facilities

The theory of utilization, according to Kenny and Foster (1983), is how spaces are actually used or how the spaces should be used. The report goes on to

say that utilization rate may be shown graphically or defined mathematically as the product of the frequency factor and the occupancy rate. To Kenny and Foster (1983), Time Utilization Rate (TUR) compares the frequency of use of rooms (i.e. the actual number of hours used as percentage of the theoretical hours of use). The Space Utilization rate (SUR) however compares average occupancy (the average number of students in attendance as the percentage of actual number of student places available against capacity of the rooms). The TUR and SUR have limitation and do not show the frequency of use of given teaching space facility. Therefore, the British Department of Education and Science (DES, 1992) came up with the idea of the Global Utilization Rate (GUR) as an indicator for assessing the level of use of teaching space facilities. The GUR is the product of space and time utilization rates. The GUR, therefore, combines the use of space with the use of time.

The mathematical representation of Utilization Rate is as follows:

$$TUR = \frac{\text{Actual number of hours of use of rooms}}{\text{Theoretical number of hours of use of rooms}} \times 100,$$

$$SUR = \frac{\text{The average number of students in attendance}}{\text{The theoretical number of student places available}} \times 100$$

$$GUR = \frac{TUR \times SUR}{100}$$

Owolabi (1994) identified two dimensions to the use of teaching space. The time dimension looks at the percentage of time for which a room space is put into use and the space dimension looks at the percentage of room space put into use. Furthermore, he observed that statistical means have been devised to quantify time and space utilization of classroom. According to him, time utilization of an institution's space is measured in hours of use in a day. He explained that if a room, for example, is actually used for nine (9) hours and the expected hour of use is 12 hours, the time utilization rate (TUR) = 9/12 ×100 = 75%. He also indicated that space utilization of a room is measured by the number of students occupying the room against the expected number of student places available. According to him, if 41 students are in a room with a seating capacity accommodating 90 students, the space utilization rate is 41/90 ×100 = 45.6%. He also explained that it is possible to combine the two parameters and come up with global utilization rate that puts time and spaces into consideration.

Owolabi (1994) postulated that global utilization rate of a college room is measured in student hours. For example, he observed that if 41 students use a room for 9 hours in a day, 41 ×9 students hours of use are obtained. In addition if the room can seat 90 students for 12 hours, 90 ×12 students hours are obtained. He further mentioned that if the real utilization is compared with the potential utilization and expressed in percentage terms, GUR would be (41 × 9) / (90 × 12) ×100 = 34.2%. He however, stated that unlike the situation in the Elementary

schools, at the Tertiary level, the size of class occupying college rooms varies from hour to hour. Thus, instead of multiplying 9 by constant size of 41 students, all the 9 classes must be added up and the sum compared with the theoretically possible student hours.

The United Nations Educational, Scientific and Cultural Organization (UNESCO, 1984, 1985) reported that teaching spaces may be assessed in respect of conditions of the teaching spaces, social norms for provision of teaching spaces, the educational requirement in a given society and the efficiency of utilization of the teaching spaces.

The British Department of Education and Science (DES, 1992) suggested two modes of assessing the utilization levels of a given teaching space facility. These modes are static and dynamic methods. The static method is a paper exercise, which uses existing information to compare the seating capacity of a teaching space facility with load (students), which is put in it. The report said that the load is expressed in Space Full Time Equivalent Students (SFTES) based on either the number of hours students are in contact with teaching staff or the number of students enrolled. According to the report, the dynamic method measures how people use the teaching space areas given to various activities over time. The report further showed that the method requires researchers to make up-to-date inventory of the existing accommodation and to count the number of students using it over a typical period or time (e.g. one week or curriculum cycle).

In an attempt to estimate the extent of space utilization, Glenn and Rourke

(1966) pointed out that a careful estimate is made of the number of hours rooms are used per week and the number of students' station filled when the rooms are in use. The data thus obtained, according to them, are then set against the standards of efficient space utilization derived as a rule from the practice of other institutions. The result would decide whether further use should be made of existing space or whether the amount of space in certain categories should be actually reduced.

Rawlingson (1973) also reported that the most effective and efficient method of assessing a teaching space facility is to station observers (surveyors) in the space to be monitored to note the number of users and activities performed over a given period (or time). He suggested the snap-round occupancy method as the most appropriate mode in order to cover a wide range of space types. This method consists of identifying spaces to be studied and visiting each one of them over a period of pre-determined interval and noting the number of people present. The report went on to say that the use of the dynamic method and the snap-round occupancy count procedure is expected to provide statistics on space utilization and a pattern that will enable any over- or under-provision of various kinds of space to be recognized for necessary action taken. Rawlingson further observed that the diagnosis is also necessary for the assessment and priority ranking of needs in the various institutions under the management of an agency.

Kenny and Foster (1983) contended that there are two different methods of survey, for the kind of activity that goes on in the space under study. These

methods are known as "Untime-tabled and Time–tabled" activities. To them, Untime-tabled activities are referred to as those activities that are not fixed in terms of time (except constrained by the availability of the necessary facilities, e.g. refectory opening hours) and include reading, eating, playing sports and chatting. The spaces open for such activity include libraries, refectories, bars, common rooms, reading rooms, games rooms and so on. The snap-round occupancy method is recommended for this. According to Kenny and Foster (1983), Time-tabled activities are the regularly scheduled meetings between staff and students. Spaces used for Time-tabled activities will include general classrooms and specialized classrooms. Similarly, the method of survey of Time-tabled and Untime-tabled activities can be used for each other. A variety of methods are available.

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. 222). In this respect, Owolabi (1998) stated that a computerized data system showing the number of students in class per each of the course taught in each room and each period in the week facilitates the storing of data for assessing utilization of teaching spaces. He further explained that such assessment should be carried out before new teaching spaces are constructed.

The University Rationalization Committee (URC,1988) commenting on space utilization Universities in Ghana, noted that there was a general lack of

standardization within and between institutions for classrooms, lecture theatres, workshops, studios, laboratories, furniture and equipment. It further stated that the use of academic space was generally unrelated to class size and was also characterized by a low seat occupancy rate attributable in part to inappropriate or inadequate furniture.

Owolabi (1993) argued that at the lower levels of schooling, a 'home classroom' is assigned to each class. The size of room and size of class are predetermined. As a result, the percent of time a room is put to use is known as the "Utilization Factor or Use Factor" (UF), that is, the actual number of periods per week used as a percentage of the theoretical number of periods per week. The mathematical representation is:

$$UF = \frac{\text{Actual number of hours}}{\text{Theoretical number of hours}} \times 100$$

The assessment of the use made of Basic, Secondary and to some extent College of Education buildings is based on the UF concept because the seating capacities of these rooms and class enrolments usually tally. Owolabi (1993) further stated that at the higher level of education (tertiary, including universities), the use of classrooms is shared among classes that far outnumber the rooms. He therefore supported the assertion of Kenny and Foster (1983) that to assess the

utilization rate of teaching spaces at higher level, we need to consider the percent of time when the room in use as well as the percent of seating spaces occupied when the room is in use. Since the classes in universities are not of uniform sizes, the use of UF concept is inadequate for assessing room utilization in higher institution.

In a study conducted at the University of Ghana, Legon, Owolabi (1994) reported that the number of student seats a room can accommodate at a given time is functionally related to such variables as the level of institutions, the type of learning activity, size of class and subject-field. According to him, based on such variables, the University Grant Commission of Great Britain came out with space standards that are popular in the high institutions of learning in the Commonwealth Countries. Owolabi thus indicated the following as the required space standards for higher institution:

1. 84 square metres for lecture room/seminar hall

6.00 square metres for biology practicals

6.45 square metres for chemistry practicals

8.50 square metres for workshops and

14.33 squares metres for advanced individual research (p. 5)

The URC (1988) also indicated the following extract from the institutional space allocation norms (Ghana, 1988).

1.84 square meters for lecture / classrooms

7.5 square meters for workshops

0.93 square meters for conference room (p. 214).

Key Elements that affect Utilization of Teaching Space Facilities

Studies conducted by the British Department of Education and Science (DES, 1992), UNESCO (1984, 1985), Kenny and Foster (1983), Russel and Doi (1957) and the Council for Educational Facility Planners (CEFP, 1976) identified time tabling and space allocation, educational structure, content and method of delivery, educational programmes being offered and student enrolment as the major factors that influence teaching space utilization.

In addition, the UNESCO Report (1984, 1985) maintained that educational policies on funding, provision of infrastructure like teaching space facilities and adjoining auxiliary space, hiring and maintenance of human resources, norm on student to lecturer ratio and acceptable ergonomic standard, all of which have been designated as non-academic issues, also affect the utilization of teaching spaces. Rogers (1993) emphasized that both academic and non-academic factors have effect on time and space utilization rates, which are the multipliers that determine the global utilization rate.

Elements that affect Time Utilization Rate

Academic Factors

Rogers (1993) observed two main academic factors that affect time utilization rate as timetabling and space allocation. To Rogers, timetabling and space allocation could be done either manually or with computers. He mentioned two main modes of timetabling as departmentalized and centralized timetabling. Departmentalization, according to the report, is the assignment of teaching space facilities to year groups or classes in a department or faculty. To ensure effective and efficient departmentalized timetabling, Rogers outlined some advantages associated with departmentalization as patriotism in students, retention of permanent seats, storage of school materials in available lockers and reduction of movement by student between classrooms which eliminate time wasted during change over. The report also stated some disadvantages associated with this method of timetabling which include boredom, inefficient use of space resources and the need for inexhaustible financial resources for the prompt provision of teaching space facilities, for any plan extension of further and higher education. The report further stated that a continued practice of departmentalized timetabling might lead to lower time utilization rate of teaching space facilities. The report also explained that the reduced time utilization rate associated with departmentalized timetabling and space allocation to the year group in departments or faculties might lead to the limited use of available space. In order to optimize the utilization of space facilities, Rogers (1993) recommended the use of centralized timetabling and the use of computers in order to ascertain optimum utilization of teaching space facilities. He further said that when centralized

timetabling 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 (1993) were to ensure that high time utilization rates for teaching space facility were obtained. The paper concluded that an increased use of centralized timetabling in higher and further educational institution in Britain was due to the cost-effective use of expensive teaching space and the accommodation of more students within existing teaching space facilities which increase their time utilization rates. The Britain Department of Education and Science (DES, 1992) defined centralized timetabling 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. Similarly, Kenny and Foster (1983) made a recommendation on the use of centralized timetabling as a measure of achieving efficient use of teaching space facilities. In the same vein, at the University College of Education Winneba, Owolabi (1993) supported the use of centralized timetabling system.

Owolabi (1998) defined timetable as a list that makes a conspicuous display of time and places for course works and helps to organize institutional activities in a manner that ensures economy in the use of time space. He further explained timetabling as a decision support task that assists in no small measure, the process of managing teaching space in tertiary institution to achieve educational objectives. Owolabi (1998) further indicated that central timetabling

is based on the principle of efficiency in the utilization of scarce resource. This shows that the introduction of central timetabling in our higher institutions would result in efficiency in the utilization of teaching spaces. Commenting on efficiency, Owolabi (1998) reported on the optimal relation between inputs and outputs. An activity is said to be efficient when a given quantity of output is obtained with minimum inputs or if a given quantity of inputs is able to yield maximum output. In the case of under-utilization in time, Owolabi (1996) suggested increasing course offerings, increasing number of sections, introducing preparation periods (Prep Periods), organizing coaching classes and extending the use of school building to community members for organizing meetings and ceremonies. He however indicated that over - utilization of classroom in terms of time, is also a management problem, thus having more than one lesson period in a room is an unusual phenomenon. But when different grade levels make use of a room at the same time, all the grades are referred to as multi-grade section. Therefore, there cannot be over- utilization in time.

United Nations Educational, Scientific and Cultural Organization (UNESCO, 1985) reported that academic parameters like educational structure, content, methods of delivery and number of programmes offer in an educational institution were determinants of time utilization rates of teaching space facilities. It explained that educational structure prescribes the duration a learner has to be in school, number of courses to take and credit hours to be obtained for each course. The report continued that educational structure directly determines the frequency a learner will have to be in contact with a teacher at a particular

teaching space facility depending on type of instructional delivery, audiovisual, teaching aids and ergonomic requirements of teachers and learners. On course content and method of delivery, the UNESCO Report (1985) indicated that they act together to determine scheduling of teaching space facilities for specific course which indirectly influence their time utilization rates within a given period of time (other factors held constant). It continued that the method of delivery which might be lecturing, play acting, discussing or simulating suggests whether an outdoor or indoor teaching space facility with requisite space per student, audio visuals, teaching aids and ergonomic needs for students and teacher should be scheduled for given course. In addition to the above studies by UNESCO, the report found direct relationship between the number of academic programmes, timetabling and student to teacher ratio which is an indicator of teaching time. The report indicated that the combination of student to teacher ratio norm for a programme and class size, determined the frequency a teacher would have to teach the same material to groups of students on the same programme repeatedly which influenced the time utilization rates of teaching space facilities. Surveys carried out by UNESCO (1985) found out that the time utilization rates of teaching space facilities could be reduced through the assignment of large class size to teachers by educational administrators in order to reduce unit cost per student and make education cost effective. However, the studies showed that at higher level of education, students to teacher ratio which resulted in low time utilization rate, there was a reduction in teaching quality due to ineffective supervision for effective instructional delivery.

Peat, Marwick and Mclintock (1992) cited in Apori (1997) studied how educational policies could be used to increase time utilization rate of teaching space facilities in Britain. They found out that most educational colleges in Britain had plans to increase the time utilization rate of their teaching space facilities by cutting down their activities to few teaching space facilities out of those they owned and hiring out the rest to needy organizations to make use of them.

Russel and Doi (1957) cited in Akomaning (2001) stated that the designation of building is another factor that seems to affect the rate of utilization of seven new Mexico States supported institution's buildings that were named after the subject-field taught in them, such as "Chemistry Building", "Home Economics Building or Education Building", generally had a lower rate of use than buildings that were named after persons, such as heroes of the past or donors. They also stated that there is no reason why a general lecture room located in Chemistry or Education building cannot be used for classes in other than inscribed name on the building. But they contended that the mere fact that a building is named under a subject-field tends to restrict the use of facilities to one department. They concluded that it is usually only through a policy of a full use of all the instructional facilities that, a full use can be made of classrooms located in such a building.

Non Academic Factors

UNESCO Report (1985) listed the condition of teaching space,

ergonomics and auxiliary space provided alongside teaching space facilities as non-academic elements that affect time utilization rates. The report indicated that teaching space facilities with higher rates of depreciation were utilized maximally to reduce to a minimum unit cost of education which arose from increased maintenance cost. The optimum utilization according to them, led to increased time utilization.

The UNESCO (1985) reported that hot environments with extreme variation in temperature, rusts, decay from corrosion which is prevalent in coastal areas, oxidation and erosion which accelerated deterioration rate of buildings are factors which caused teaching space facilities to be depreciated at high rate and utilized at high frequencies. The report underlined the above factors as the cause of low time utilization rate values for such space facilities.

Owolabi (1993) maintained that overtime, developed properties including school buildings get damaged not only because they are put into use by human beings, because cracks are created by expansion and contraction during temperature changes. He stated that rusts and decay are brought in by corrosion and oxidation; wall bases are dug by erosion and other agents. He also indicated that agents of weathering are more active in hot climate where lizards, spiders, rats and birds take possession of unused rooms. Owolabi further noted that 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. As a result institutions that have more programmes

are likely to have greater time utilization of the resources.

Studies conducted by CEFP (1976), Beshire (1974) and UNESCO (1985) cited in Apori (1997) on ergonomic factors like illumination, thermal comfort, acoustics and provision of comfortable furniture respectively, showed that they act independently or interact to determine the extent of use of teaching space within a given period which is directly related to the teaching space and teaching time utilization rate.

Beshire (1974), an occupational health expert reported on the reduced performance of sedentary, physical and mental task as humans' physiological response to heat, stress outside the preferred temperature zone of 20^0 C to 25^0 C. The report stated that it was necessary to restrict working hours to periods of the day when workers (learners) will be subjected to stress in the absence of environmental modifiers which will lead to reduced time utilization rate in respect of teaching space facilities. UNESCO Report (1985) maintained that the use of environmental modifiers and acoustically designed buildings and materials were prevalent in countries with developed economies, that is, countries where the public subventions for education and learners could pay for acquisition for modifiers, energy and maintenance cost for gadgets used to provide the congenial environment for teaching and learning purposes. In developing countries with low per capital income, the UNESCO Report mentioned that cost of tertiary education was borne by meagre public funds which could not meet the cost of providing and maintaining environmental modifiers. The report concluded that

education administrators in the developing countries were therefore compelled to schedule lectures mainly day time with adequate thermal, acoustics and illumination comfort to reduce cost which led to low time utilization rates for their teaching space facilities.

UNESCO (1985) recommended that in the use of furniture, suitable chairs in classrooms should be those which allow the learners to sit with their feet flat on the floor without any pressures on the underside of the thigh. The report concludes that such chairs will enable students to perform mental tasks sitting down for many hours to have contact with teachers and thus eventually lead to increased time utilization rate. The Council for Education Facility Planners (CEFP, 1976) stated in their reported, that furniture provided in teaching space should be movable to provide flexibility so as to enable available teaching spaces to be put to multi-purpose use in order to increase their time utilization rates. The CEFP (1976) argued that such chairs will enable learners to perform mental tasks by sitting down for many hours to have contact with teacher which will lead to increase time utilization rate for teaching space facility. School furniture, the reports concluded, should therefore be designed to produce healthier and more comfortable posture.

On the use of acoustics, UNESCO (1985) reported that the optimum permissible sound level in a teaching space environment without acoustic design and materials was 60 decibels. The UNESCO Report recommended that a student in a discussion group in a workshop, laboratory or classroom should not be at a

distance of more than 7m (seven metres) from the teacher in the absence of audio-visual teaching aids. UNESCO (1985) Report on educational planning explained that acoustics influenced time utilization rate by predetermining size and shape of a teaching space facility to ensure that sound does not hinder verbal communication. The report went on to say that the size and shape of the teaching space in relation to the student flow and class size for various academic programmes then determine the frequency of use of the facility (other factors held constant).

Regarding the use of auxiliary spaces, CEFP (1976), advocated the use of spaces provided alongside teaching space facility to maximize time utilization rate. The Council indicated that high time utilization rate could be achieved through the reduction in periods, which the teaching space could have been utilized on teaching and learning activities. UNESCO (1985) listed support of instructional programmes, accommodation out of classrooms, needs of both students and staff, like food, house, drinking water, health and sanitary, postal, telecommunication and faculty facilities as the probable use of auxiliary space. The report concluded that the use of auxiliary spaces enable the facilities of teaching space to be utilized for teaching activities over a long time within a given period which enables space and time utilization rate to be high.

Elements that affect Space Utilization Rate

UNESCO (1984) reported that space utilization rate of teaching space

facilities is influenced by timetabling, mode of instructional delivery, educational policies, provision of auxiliary space alongside the teaching space and ergonomic factors. The report showed that in timetabling and space allocation, when teaching space is allocated to class sizes based on seating capacity of the teaching facilities as practised in centralized timetabling, it leads to high space utilization rate. The report further explained 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 facilities and the spaces permissible to seating capacities. This, according to the report, resulted in high space utilization rate for the space facilities. The report further stated that under -utilization is experienced when the teaching space facilities have little or no variation in their seating capacities and is aggravated in departmentalized timetabling and space allocation.

With regard to ergonomics, UNESCO (1984) listed illumination and acoustics as factors that act together to determine the class size in given teaching space facility (other factors held constant). The report explained that illumination controls class size because the level of illumination sets the limit on the number of students that should be in teaching space facility to make viewing on the blackboards possible when the print media is being used for teaching purposes. The report explained that acoustics determine the number of people that should be in the class to enable efficient verbal communication to take place between instructors and learners where audio equipment is not available.

Halstead (1974) stated that the design of the physical environment of the learning task is often neglected yet science has established a close correlation between the amount of work people do and where they do it. It stands to reasons that a student sitting in an unbearably hot, stuffy room hastening to a lecture in cryogenics would not learn as much as he would in a cool, comfortable space. Unfortunately, most college buildings have been planned to impress people from the outside not incessantly to provide comfort of the users.

Owolabi (1996), commenting on under-utilization of space, argued that space under-utilization will require extension of environment overtime to obtain larger class size. He also argued that sections that are becoming small in number could also be combined to save space. Owolabi further explained that the problem of over-utilization is more serious in the developing world, partly because of population explosions (expanding bases of the population pyramid) and partly because of national efforts to universalize education at the first level. He lamented that new intakes are often more than the existing number of student places and also, children as many as hundred are sometimes placed in rooms originally designed for forty children. Thus moving around to supervise children's work becomes practically impossible for the class teacher. Children are neither free to write nor are comfortable to attend properly to the teacher. According to him such situations have deleterious effect on the teaching and learning process. As a result, Owolabi suggested some alternative solutions to the problem. He suggested that more classrooms could be built as emergency, as well as holding classes under sheds and shady trees to offer temporary release. He however mentioned that

breaking classes into more sections would require increased staff strength and could lead to educational space requirement problem. Conversely, Owolabi noted that admission could be restricted to the number of available student places. Finally, Owolabi lamented that unless the school plants are previously being under-utilized, increase in the student enrolments will appear to require expansion of facilities.

Empirical Review

The empirical perspectives also cover issues mostly on the assessment of teaching space facilities, key elements that affect utilization of teaching space, elements that affect time utilization rate and elements that affect space utilization rate.

Assessment of Teaching Space Facilities

The British Department of Education and Sciences (BDES, 1971, 1972) recommended target utilization level of 80% and 40% - 70% for general-purpose teaching room and specialized rooms respectively. However, empirical studies by Kenny and Foster (1983) revealed that the utilization level recommended by BDES (1971, 1972) was unrealistic and unachievable, even with the help of a computerized space allocation and time-tabling system. They further argued 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 (1983) 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 circumstances they operate.

Studies by Russel and Doi (1957) on the utilization of instructional room in USA, Owolabi (1993) on space management at University of Ghana and Kwame Nkrumah University of Science and Technology, Kumasi and Apori (1997) on utilization of teaching space at University of Cape Coast all show that utilization of space at tertiary institution has far better usage of instructional spaces in the morning than the hours after 12:00noon. Apori (1997), for instance, recorded in the morning session, global utilization rate between 7.11% and 20.51% for the lecture theatres whilst the rates of the afternoon sessions were between 1.06% and 3.79%.

Owolabi (1994) argued that the determination of student enrolment is one of the factors that determine the assignment of teaching space. Commenting on student enrolment at Accra Polytechnic in 1993/94, Owolabi reported of 3,256 full time equivalent students as the maximum number of students the Polytechnic could enrol if everybody was to be comfortably seated for lectures. At the University of Cape Coast, he also reported on potential Full Time Equivalent number of Student (FTES) of 9,717 students. Owolabi stated that the FTES of teaching places can accommodate, is equal to the number of hours teaching spaces available for use in a week divided by the average number of credit hours registered for by each student and multiplied by the number of seating places in

the teaching spaces. Owolabi (1994) therefore explained the FTES of 9,717 students by indicating that normally the teaching spaces at the University of Cape Coast were opened for 12 hours of use in a day, and for 5 days in a week, thus giving 60 hours of use of room in a week. He further indicated that, the students register courses for an approximated average of 20 hours. He therefore obtained the FTES of 9717 students by dividing the 60 hours by registered 20 hours and multiplied by the total seating capacity at the time that is 3239. Owolabi (1994) however indicated that the calculation of FTES is based on assumption that all the teaching spaces would have a utilization rate of 100%. That is, every room would be filled to its maximum capacity for every minute of the sixty hours the room remains open in a week. According to him, the assumption that teaching spaces would have utilization rate of 100% is impracticable. He mentioned that the size of classes is not tailor-cut to the size of room as in elementary school where the number of courses offered may not tally with the number of rooms. He further mentioned that the California Model of Room Utilization stipulates a time utilization rate of 80% and a space utilization rate of 66.7% as norms of room utilization in higher institutions against which performance can be measured. These norms give a global utilization rate of 53.3%. According to Owolabi, for practical purposes, at the University of Cape Coast for instance, the enrolment capacity in 1993/94 should have been 5179 students (i.e. 53.3/100× 9717 = 5179 students).

Owolabi (1993) finally concluded that if all the teaching space could be centrally pooled or regionally grouped, for shared use by all, and the schedule for

course could be computerized to maximize space allocation. The teaching space at University of Cape Coast could conveniently accommodate 5179 students instead of the 3190 students who were enrolled at that time.

Elements that affect Space and Time Utilization Rate

Academic Factor

According to Roger (1993), one of the major factors that affect time utilization rate is the use of computerized and centralized timetabling. Empirical studies carried out at Dumont Fort and Bourne Mouth University in Britain on the use of computerized and centralized timetabling between 1990-1991 and 1992-1993 showed an increase in Full Time Equivalent Students (FTES) of 47% and 54% respectively with just concurrent increase in teaching space facilities by 9% and 8%. He attributed the improvement of the FTES to the increased time utilization rate or frequency of use of available teaching space facilities. He concluded that when the computerized and centralized timetabling was used for timetabling and space allocation, it enabled more students to be accommodated within the existing teaching space facilities.

Research on space utilization at the then University College of Education, Winneba, conducted by Owolabi (1998) recommended the introduction of centralized timetabling that brought about efficiency of space and time and also enhanced efficient use of resources. According to him, before the introduction of the centralized timetabling in the institution, each of the ten

former departments was offering education as a course, in ten different rooms with ten different teachers. But when the central timetabling system was introduced, the ten classes were combined and taught in two large theatres. Kenny and Foster (1983) supported the use of centralized timetable system and empirically showed the ineffectiveness of the manual timetabling for teaching space facilities, when utilization rate target of at least 60% was expected to be achieved.

Rogers (1993) showed that educational policies that enhance enrolment of students into various academic programmes and space facility management to ensure cost-effective use of teaching accommodation, led to improve use of space resources. The report concluded that improved use of space resources resulted in the accommodation of more students within the existing buildings.

Empirical studies carried out by the University Rationalization Committee (URC, 1988), suggested the California Model of Room Utilization already stated. The report further mentioned that normally a global utilization rate of less than 50% indicates under utilization of teaching space facility. They also mentioned that it is always important to diagnose each dimension of utilization, as a room apparently under- utilized globally may actually be heavily underutilized only in one dimension, but violating acceptable limits of utilization in the other dimension.

A survey by Apori (1997) showed that teaching space facilities at the University of Cape Coast were generally under-utilized. For example, he stated

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 facility were generally under utilized with the observing average global utilization rate of 5.70%, 1.16%, 0.82%, 2.64% and 4.07% respectively for lecture theatres, Zoology, Physical, Chemistry and Botany laboratories per day for the1992/93 academic year as set against the British Department of Education and Science (DES, 1992) recommended rates of 80% for general purpose classroom and 40%-70% for laboratories (p. 75).

Apori (1997) further stated 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 added that:

> the low frequency of use of the teaching space facilities might be due primarily to low student population of 2599 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).

Apori's result shows that before and at the time of the study, the population at the University of Cape Coast seemed to be very high, but after the study, his result showed that the Science Faculty could obtain an optimum population of 7440 students. The results of the study thus, appeared to suggest that the facilities were being underutilized. Apori therefore recommended certain ways to increase the effective utilization of the Science Faculty. These included: allowing non-university communities or organizations like Institute of Adult Education (University of Ghana), the Non-Formal Education Division (NFED) and other organizations for Education and training programmes to make use of the space after the official teaching periods. He further suggested the use of the lecture rooms after the regular lectures of the university students, extension of the school day to about 8.30p.m. or the expansion of the university curricula to allow other training programmes like remedial classes for Senior Secondary School

graduates, Post Graduate Diploma in Education and many others.

Another study on space carried out by Bannerman-Mensah (2000) at Mfantsipim showed that total availability of teaching space facility in the school could accommodate 1780 and 890 students at 100% and 50% levels of global utilization respectively. According to Bannerman-Mensah, it presupposes that the 1999 school enrolment of 1434 was not too high as lamented by teachers and administrators, and thus students could be comfortably accommodated in the school if the space facility were adequately utilized.

Bannerman-Mensah (2000) further opined that the weekly average global utilization of 47.0%, 50.2%, 38.2%, and 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-Mensah suggested certain ways to increase the effective utilization of the teaching space in the school. These among others, included the introduction of central timetabling, proper planning of the existing time tabling, and the effective utilization of other buildings like laboratories, assembly hall and technical blocks for general teaching purposes.

Another study by Akomaning (2001) at Takoradi Polytechnic pointed out that total available teaching space for all the instructional rooms (without Assembly Hall) could accommodate 10, 908 students at 100% level of global utilization. He indicated that teaching space facilities were under-utilized with the

observed average global utilization of 51.41%, 48.87%, 32.67% and 8.04% for classrooms, workshops, laboratories and assembly hall, respectively per day for the whole 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 proposed norms 53. 36% recommended by the URC (1988). He also stated that the SUR for classrooms, workshops and laboratories throughout the study period were 117. 1%, 157, 88% and 101.44 % respectively, which were higher than the proposed space utilization rate of 66.7% (URC, 1988).

Akomaning (2001) stated that the TUR was however much lower than the norm. He further mentioned that "observed average times for all the instructional rooms tended to be higher (38.09% to 62.23%) in the morning sessions than in the afternoon and evening sessions (7.17% to 46.08%)," (p.28). Akomaning estimated that teaching space facilities at Takoradi Polytechnic could cater for 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 (2001) concluded that there were low TUR as well as GUR, which signified under-utilized instructional rooms. However, SUR was very high (over 100%). These meant instructional rooms were overcrowded. The overall average rates for 59 instructional rooms for 1999/200 academic year were 39.75% (TUR), 123.72% (SUR) and 49.17% (GUR). He further argued that, the overcrowded nature of the instructional room was attributed to small sizes of instructional rooms, lack of furniture in some large instructional rooms, lack of

teaching staff, the operation of the departmentalized timetable system 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 (14hrs).

Turkson (2006) reported that the overall average time, space and global utilization rates of the whole academic year for instructional rooms at Cape Coast Polytechnic during the morning sessions from 7:30 and to 12:30 noon tended to be higher than rates obtained for use of these spaces during the afternoon and evening sessions for the whole academic year. He further explained that TUR, SUR and GUR of 24.59%, 16.14% and 4.0 4% respectively were recorded for the morning session whilst 3.99%, 2.77% and0.17% to respectively were recorded for the evening session for the classroom in the whole academic year. The findings of the study revealed that the auditoriums and laboratories obtained relatively lower TUR, SUR and GUR during the morning and evening sessions than the afternoon sessions on Mondays, Wednesdays and Fridays.

Turkson (2006) recommended that the low utilization rate for most of the instructional rooms during the afternoon and the evening sessions could be reduced by first considering the re-arrangement of the existing timetable, and strict adherence to it. This means that lecturers must be implored to stick to the dictates of the timetable. He suggested that there must be a policy to mitigate lecturers' preference to certain periods of the day. To solve this problem more permanent lecturers must rather be employed. In addition, lecturers and students

must be motivated to use the lecture rooms, especially during the afternoon when the rooms are perceived to be hot due to the large number of students in some of the rooms. The ventilation system must be improved by providing enough ceiling fans or air conditions to make the rooms conducive for teaching and learning.

To improve the low rates in the evening sessions, Turkson suggested that the instructional rooms could be put into a multi - purpose use. Workers in the various disciplines who could like to up- grade their knowledge or those who have not had in any knowledge in any formal knowledge in courses being offered at the Polytechnic but on the field could be admitted to attend evening programmes after work in the evening sessions. This could be achieved when the curriculum policy of the Polytechnic is modified to re-schedule or plan academic programmes (lectures) to be run from morning (7:30am) to afternoon (12: 30pm). Thereafter educational and training programmes of the workers in the various disciplines mentioned could be accommodated on the timetable from 1:30pm to 7:30pm.

Studies on space utilization carried out by Owolabi (1992, 1993, 1994, and 1995) in five higher institutions in Ghana revealed that, generally teaching space was under-utilized. Owolabi (1994) maintained that at University of Cape Coast the teaching spaces were under- utilized in time across the length and breadth of the University. He indicated that many rooms are empty most of the time, while some rooms were not being used at all. He also argued that few rooms were also under-utilized in terms of space. Owolabi further mentioned that to improve

utilization rates there should be more students. He stated that the University is capable of accommodating more than 5000 students as far as teaching spaces are concerned.

Owolabi (1994) commenting on the need for standardization of lecture rooms at Legon, said that:

> In general, the teaching spaces across the faculties 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, in order to accommodate future expansions, it may be advisable to consider building large lecture rooms with capacity for 200 or more seats, but with moveable partitions. Concerning teaching space at Legon, Owolabi (1994) argued that the teaching spaces were under-utilized in terms of time utilization rate. He recommended an increase in the enrolment of students. He further stated that about 7000 students could be conveniently accommodated in the teaching space at Legon.

Owolabi (1994) however reported that some rooms were over-utilized. These were offices that had been converted into classrooms as well as lecture rooms and conference rooms. He also recommended that since most lecture rooms were under-utilized in terms of time utilization rate, a well constructed timetable could release all rooms that were supposed to be offices. To resolve the problem of overcrowding the report indicated that large classes could be divided 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 (1994) concluded by saying that such arrangement will eliminate the problem of over- utilizing space and its deleterious effects on learning environment and equipment used. Also it will provide the much needed flexibility for their students in their choice of courses. This would however call for more lecturers to be employed, thus increasing the cost of education. Owolabi (1993) reported that at the Accra Polytechnic there existed some degree of shared use of teaching space, but full potentials of this arrangement had not been realized. The report further mentioned that some technological and secretarial courses were taught wholly in the workshops and studios, where the theoretical aspect could be delivered in the general lecture rooms. Thus he concluded by saying that, all the teaching space were under- utilized and the apparent congestion that existed in some of the rooms appeared to be due to poor scheduling of course work.

Owolabi (1995) observed that at the Kumasi Polytechnic, the frequency of use factor was generally low. He further indicated that, this factor gets as low as

20%. As a result splitting large classes would improve time utilization rate but increase the use of teachers' time. He also mentioned that the occupancy factor is high but may not be high enough to deserve splitting of classes. But if intakes into the School of Business and Management Studies for example are in the multiple of 40-50 (i.e. admitting no more than 50 students in a class or admitting not less than 80 students and having them grouped into two classes) the occupancy factor would improve and rooms would be efficiently utilized.

Owolabi concluded that even though the general classrooms were rather poorly used, the special rooms were over-utilized in many cases. He attested to this fact by saying that, even though some workshops were less frequently used (for example, Furniture and Mechanical Engineering Workshops), in general, the workshops and laboratories are more intensively used than classrooms. He mentioned that almost all workshops and laboratories were overcrowded whenever they are put into use. Owolabi further stated that students are sometimes about twice the installed number of workstations. He lamented that congestion was worse in the Engineering Workshop where the occupancy factor was as high as 151%. According to Owolabi the laboratories had total utilization rate of about 120%, the workshops, 84% and the classroom, 52%.

Owolabi (1995) outlined that, teaching space was grossly under-utilized in the universities, whilst the Polytechnics show much high utilization rate of their work places. He explained that the high utilization rate of the Polytechnic might be because of the existence of the part time students who usually receive tuition in

the afternoon hours. Therefore work places are occupied throughout the working hours, thus making the frequency rate to be as high as the average occupancy rate.

Non-Academic Factors

On non-academic factors, empirical studies identified illumination and acoustics as the ergonomic factors influencing space utilization. With regard to illumination, Narasinham (1971) as cited in Apori (1997) recommended an optimum standard illumination level of 220 and 106 lux respectively as sufficient for performance of usual task in relation to size configuration and distance from blackboard to viewer. However, a survey carried out by UNESCO (1985) in developed countries showed that illumination varies from 215 to 253 lux. The Report related the observed variation to viability in design of teaching space, financial resource availability for education and norms in a country studied.

On the issue of acoustics, empirical studies by CEFP (1976) showed that in timetabling, time allocated for change over period as a noise control measure against noise from students walking on alleys, stairs and corridors reduce actual contact hours per day, that is permissible in teaching space and led to reduction in time within the day that the teaching spaces were used.

Summary of the Literature Review

The literature reviewed under this study focused mainly on theories and

empirical studies done on the utilization of teaching spaces in Ghana and elsewhere. Firstly, the writers argued that efficiency in the management of teaching spaces is one of the means of tackling short run overcrowding problems and scheduling problem in schools. Finally, the studies agreed that the social norms for the provision of teaching spaces, the educational programmes being offered, timetabling and space allocation, content and method of delivery and student enrolments are the major factors that influence the utilization of teaching spaces in the institutions.

CHAPTER THREE

METHODOLOGY

This chapter describes the research design, the population, the sample and sampling procedure. It also describes the research instruments, pilot testing, the procedure for data collection and methods that were used for the data analysis.

Research Design

Research design is a blue print which indicates how data relating to a given problem should be collected and analyzed. The researcher employed the descriptive case study type. The purpose of descriptive research is to describe some existing phenomenon. This design involves the collection of data for the purpose of describing existing conditions. According to Leedy (1985), descriptive survey method of research looks with intense accuracy at the phenomena of the moment and then describes precisely what the researcher sees. To him, whatever the researcher observes at any one time is normal and under the same condition could be observed again in the future. The major techniques or tools used in collecting data in this type of research are the questionnaire, interview and observation.

The descriptive design takes various forms. In this study, a case study was used. Leedy (1985) explained that a case study is a type of descriptive research in which data are gathered directly from individuals or social or community groups in their natural environment for the purpose of studying interactions, attitudes or characteristics of individuals or groups. Nisbet and Watt (1984) stated that the case study is a specific instance that is frequently designed to illustrate a more general principle. The case study allows the researcher to establish generalizations about the wider population to which that unit belongs.

Since this study was intended to assess the efficient utilization of teaching space facilities at the OLA College, for the purpose of making generalization

about the entire population, the case study was found most appropriate.

Population

The population for the study was made up of teaching space facilities and the users of these facilities of OLA College of Education. At the time of the study, the teaching space facilities were made up of one laboratory, two workshops and 17 general purpose classrooms which were only used for teaching and learning purpose. The population of the users of teaching spaces comprised one Vice Principal, 25 tutors, and 696 students of the college. The 696 students were made up of 343 level 100 and 353 level 200 on the Diploma in Basic Education programme.

Sample and Sampling Procedure

The sample for the study is in two categories: the teaching space facilities and the respondents. The sample of teaching space facilities at the OLA College of Education included one laboratory, two workshops and 17 general classrooms used for teaching and learning.

Another category of the sample of the respondents was made up of one Vice Principal, 25 tutors and 140 students. The researcher used purposive and stratified sampling techniques to select respondents for the study in order to know their opinions on the use of the teaching space facilities in the college. Purposive

sampling technique is used by researchers to choose samples that are likely to be knowledgeable and informative about the phenomena under study (Fraenkel and Wallen, 2000). In view of this, the researcher purposively selected the Vice Principal (Academic) and all the 25 tutors of the College.

The Vice Principal of the College was purposively sampled because of his position as an administrator responsible for the allocation of classrooms for teaching and learning. All the 25 tutors were purposively chosen because they are the primary users of the teaching space facilities under study. Hence, the implementation of the timetable depends largely on tutors. Therefore, the views of the tutors on the use of the teaching space facilities at OLA College could help put in place effective mechanism, for efficient utilization of the teaching space facilities at the College.

A stratified random sampling technique was used to group the students first into level 100 and 200 and second into 17 classes. On the basis of the proportion of each class, a quota of 20% was used. Then a simple random sample of using the balloting was used to select 140 respondents. Nwana (1992) suggests that one selects a sample size of 20% or more if the population is a many hundreds. In each class that the researcher visited, 'Yes' and 'No' were written on a slip of paper. The slips were then put into different boxes and labelled according to the classes. These slips were thoroughly shuffled and respondents were asked to pick the slip of paper with replacement, until all the slips were finished. Those who picked 'Yes' were given the questionnaire to answer. The reason for the use

of these sampling techniques was to get a fair representative sample for the population. Table 1 illustrates the quota sampling for students in each class.

Table 1

Quota Sampling Technique for Students in each Classroom

Classroom No.	Students in each class	% Used	Quota
1J	44	20	9
1L	47	20	9
1K	40	20	8
1M	48	20	9
1N	45	20	9
1P	40	20	8
1Q	39	20	8
1R	40	20	8

Table 1 continued

Quota Sampling Technique for Students in each Classroom

Classroom No.	Students in each class	% Used	Quota
2A	45	20	9
2B	50	20	10
2C	43	20	9
2D	34	20	7
2E	35	20	7
2F	35	20	7
2G	37	20	8
2H	35	20	7

The Study Instruments

The instruments that Bannerman-Mensah (2000) used to collect data on the utilization of teaching space facilities at Mfantsipim Senior Secondary School, Cape Coast were adapted for the study. The adapted instruments consisted of two sets of questionnaires (Appendices A and B), an interview guide (Appendix C) and three observation checklists (Appendices D, E and F). The instruments were used to collect data on the utilization of teaching space at OLA College of Education. The adapted instruments (Appendices A and B) were modified taking into consideration the time of the day when teaching and learning were held in general classrooms, workshops and laboratory. There was the need for item revision, deletion and addition to the instruments. Since the classroom spaces, seating capacities, timetables and the type of buildings were not the same for both institutions (Mfantsipim and OLA College of Education), some few changes were made in the instruments. For example, OLA College had 17 general classrooms while Mfantsipim Senior Secondary School had 34 classrooms. Therefore, the observation checklist was modified to account for this difference. Also the periods on the observation checklist for Bannerman-Mensah was 7:00 am to 2:30pm but was changed to 7:20am to 2:30pm for OLA College of Education.

Few changes were also made to the questionnaire items for both tutors and students. For instance, Bannerman-Mensah's questionnaires had a list of 21 items

for students and were modified to become 19 items for OLA College of Education study. Questions 1 to 3 in the questionnaires for tutors and students used by Bannerman –Mensah were deleted, because they sought information on personal data of the respondents which were not needed for OLA College study. The questions in the questionnaires would not lead to the assessment of the efficient utilization of teaching space facilities at the OLA College of Education. Similarly, questionnaires for tutors were modified to elicit vital information for the study. The modifications done in the case of questionnaire for tutors included items 4, 5, 10, 11 and 13 and for students' items 2,4, 9,11 and 15. These were done to enhance clarity and easy analysis and discussion of the result for this study.

A revised questionnaire for tutors (Appendix A) sought information on the use of the general classrooms: the number of students in a classroom, the number of hours used for teaching and learning and possible factors that limit optimization of the use of teaching spaces.

Another revised questionnaire (Appendix B) was used for students who used the teaching spaces facilities at the College. This helped in the collection of information on comfortability of the classroom, the number of hours a classroom was used, the number of students occupying each classroom when put into use and factors that limit the utilization of teaching space facilities of the College.

An interview guide (Appendix C) for the science and pre-vocational tutors was used in interviewing the tutors who used the science laboratory and the two Workshops to help in collecting information on time spent for preparing for practical work at the Science Laboratory and the workshops. The instrument helped the researcher to ascertain the frequency of use and the number of students occupying the special rooms when they were in use. The technique has the advantage of flexibility. However, the interview schedule designed for respondents was not modified. This was because changes in them were not necessary.

Three observation checklists were used in the study to collect data on the use of teaching space facilities at OLA College of Education. The first observation checklist (Appendix D) was used to collect quantitative data on the use of the 17 general classrooms from 7:20am to 2:30pm of each working day from Monday to Friday. These were the times that the classrooms were scheduled for teaching and learning purposes. The data collected included the number of hours the classrooms were in use (frequency of use) and the number of students in attendance when classrooms were in use (occupancy rate).

Another observation checklist (Appendix E) was used to collect data on the use of the Science Laboratory on each working day of the week from 7:20 to 2:30pm. The data collected included the number of hours in a day the laboratory room was in use (frequency of use) and the number of students occupying the room College. The data collected were needed to enable the researcher to

calculate the time, space and global utilization rates which are indicators used in the assessment of the efficiency of the utilization of teaching space facilities.

The third observation checklist (Appendix F) was used to collect data on the use of the two workshops on each working day of the week from 7:20am to 2:30pm. The data collected were the number of hours in a day when each special room was in use (frequency of use) and the number of students occupying each special room when in use at OLA College of Education.

Pilot Testing of the Instruments

To ensure content validity of the instruments, expert guidance was sought from the supervisors and some senior lecturers who are seasoned researchers in educational issues. This is in line with the view of Best and Kahn (1995) that a panel of experts in the field usually assesses content validity of the instruments to ensure their adequacy. For the reliability of the instruments, an internal consistency approach was used. The adapted instruments were pilot-tested at Holy Child College of Education in Takoradi in the Western Region of Ghana. This involved administering the instruments to a sampled group of respondents in the Holy Child College of Education. This College was selected because of the similarity in its character to that of OLA College of Education, Cape Coast. Thus, the environments of the Colleges and their personnel background in terms of qualification and experience were similar. The responses helped to ascertain the validity and reliability of the instruments. The correlation coefficient was

calculated for the responses gathered by the use of a computer software programme called the Statistical Package for Social Science (SPSS). The internal consistency reliability co-efficient obtained for the questionnaires for tutors and students were 0.74 and 0.78 respectively. As the reliability co-efficient obtained for both respondents were more than half, it means that the instruments are reliable. As such, no further changes to the questionnaires were made.

Data Collection Procedure

The final draft of the instruments was administered on 26 tutors and 140 students respondent with the necessary instructions on how to respond to the statements. Prior to the data collection, a letter of introduction was obtained from the Institute for Educational Planning and Administration and sent to OLA College of Education, Cape Coast. This letter enabled the researcher to establish a good rapport with the College's administration. Also the researcher selected this college because he had some personal contacts there with teachers who were ready to participate in the project.

Permission was then sought from the Principal and Vice Principal (academic) who have administrative control over the teaching space facilities at the College. With the help of research assistants, the physical measurements of the floor spaces were taken in square meters in accordance with the Commonwealth Countries' Standards recommended by the University Rationalization Committee (URC, 1988) Report to get the actual seating

capacities of the instructional rooms at OLA Education of College. The data collection took nine weeks to cover 17 general classrooms, two workshops and one science laboratory for first and second semesters. Further, the physical measurements of each classroom were taken after 2:30pm of each working day in order not to interrupt instructional hours (periods). The data collection was done in the 6th and 10th weeks of the first semester and 6th and 9th week for the second semester, by which time virtually all the students had reported and also the timetable had stabilized. The first week was used to measure the instructional rooms and the rest of the weeks were used to observe physically, the use of the instructional rooms using the observation checklists. This made it possible to collect data on the frequency of use of each instructional room. All the Class Representatives were given copies of the observation checklists and completely briefed on how to use them. Besides, three research assistants were trained on how to fill the checklists and their checklists were used to cross check that of the Class Representatives. The number of students in each class was counted after ten minutes of the teaching session to allow the late comers to be counted. This exercise was repeated throughout the whole day from 7:20am to 2:30pm each day during the week. All the research assistants helped in the data collection. The data on space utilization for first and second semesters remained the same in terms of time and space utilization rates from Mondays to Fridays. The attendance to class by students during the periods of the study was very regular. Most of the classes that were observed had 100% students attendance, and therefore the very few times a student or two was absent from a lesson was insignificant. So it was safe

to assume that the average space utilization rate for all the classes were constant throughout the periods of the study. Since the timetable for the use of general classrooms and special rooms remained the same throughout the first and second semesters for the 2006/2007 academic year, it is safe to say that the pattern of use of the teaching space facilities remained the same.

Besides, the observation of the various instructional rooms, questionnaires and an interview guide were used to collect data on class size, comfortability of the space, problems associated with the use of laboratory and workshops and number of times teaching spaces were put to use. Questionnaires were administered to both tutors and students of the College. The questionnaire was administered to students who were gathered together in their classroom as previously arranged during preparation period (prep time). In the case of tutors and the vice principal the questionnaire were left with them, who promised to fill them within the shortest possible times, this, they did. The return rate of questionnaires for both tutors and students was 100%. Possible answers were provided for respondents to tick and open ended questions were also provided for respondents to write out their views and comments on spaces provided on the number of times the rooms were in use and the problems associated with use of teaching space facilities, workshops and science laboratory.

All the Science tutors and pre-vocational skills tutors were purposively selected for the interview section. All the science tutors and the Pre-vocational skills tutors were purposively selected for the interview sections because they

were the primary users of such facilities. Hence, it was hoped that they were in a better position to give out the needed information.

Data Analysis

The quantitative data on the use of general classrooms, laboratory and workshops were analyzed using time, space and global utilization rates as indicators to assess how the teaching space facilities were being utilized in the 2006/2007 academic year. The observation checklists for the general classrooms, laboratory and workshops helped in calculating the average time, space and global utilization rates of the teaching space facilities. Each observational day was divided into morning (7:20-8:15am), mid-morning (8:45am-11:30am) and afternoon (11:45am-2:30pm) sessions as well as the whole day in the 2006/2007 academic year.

The utilization of the teaching space facilities at the OLA College was done by the application of the Use Factor (UF) concept. The calculation of OLA College buildings is based on the Use Factor (UF) concept because the seating capacities teaching spaces and class enrolments are usually uniform. Thus, the seating capacities of the OLA College were predetermined. UF compared the actual number of hours held in the classroom expressed over the theoretical number of hours available for use. The UF was calculated as follows:

$$UF = \frac{\text{Actual number of hours held in the classroom}}{} \times 100.$$

Theoretical number of hours available for use

This calculation may also be referred to as the Time Utilization Rate (TUR). Similarly, the same method was used to calculate TUR for the workshops and the laboratory. Since TUR did not give the true picture about the full utilization of the teaching facilities, there was the need to also calculate the Space Utilization Rate (SUR). The SUR compared the average size of the class occupying a room and theoretical number of student places available in the room. In general, SUR was calculated as:

$$\text{SUR (\%)} = \frac{\text{Average number of students in attendance}}{\text{Actual number of student place available}} \times 100.$$

Like TUR, SUR had a limitation, for it did not show the frequency of use of a given teaching space facility. Therefore, the Global Utilization Rate (GUR) was calculated as the product of time utilization and space utilization rates divided by 100. Thus,

$$\text{GUR} = \frac{\text{Actual numbers of hours use}}{\text{Theoretical numbers of hours use}} \times \frac{\text{Average number of students in attendance}}{\text{Actual number of students place available}}$$

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

The responses to the item in the questionnaires for tutors and students were analyzed using frequencies and percentages, with the use of Statistical

Package for Social Science (SPSS). To ensure consistency, the responses in the questionnaires collected from respondents were edited and then coded. The responses for the open-ended questions were grouped based on common ideas that the respondents expressed and a pattern employed for them. This was because there was the need to determine some problems associated with the use of classrooms, the class size and the day to day utilization of the teaching space facilities. The data were analyzed in frequencies and percentage and were presented in tables.

CHAPTER FOUR

RESULTS AND DISCUSSION

The main objective of this study was to assess the utilization of the

teaching space facilities at OLA College of Education at Cape Coast. This chapter presents the data of observation made on the time, space and global utilization rates of teaching space facilities put to use by the students during teaching and learning sessions. It also discusses the responses of the tutors and students on the utilization of teaching space facilities at the College. The analysis and discussion of the data collected were based on the research questions that guided the study.

Utilization Rates of Teaching Space Facilities at OLA College of Education at Cape Coast

Tables 2 and 3 show the time utilization rates for teaching space facilities from Mondays to Fridays for four consecutive weeks in the 2006/2007 academic year when the facilities were put to use by the students. The values for the time utilization rates were derived by calculating the actual hours of use of the instructional rooms over the theoretical hour of use of the rooms for the periods of the study. For example, if a room is actually used for six (6) hours and the expected hour of use is seven (7) hours, the time utilization rate (TUR) = 6/7x 100% = 85.7%. The time utilization rates for Tables 2 and 3 are shown under each column of the days that teaching spaces were used by the students during the teaching and learning sessions. Similar computations were used to derive the rates for Space and global utilization rates for teaching space facilities from Mondays to Fridays for four consecutive weeks in the 2006/ 2007 academic year. These rates are presented in Tables 4 and 5 for the space utilization rates and Tables 6 and 7 for the global utilization rates for teaching space facilities in the College

during the study.

Time Utilization Rates for General Classrooms from Mondays to Fridays

Table 2 shows the time utilization rates for teaching space facilities from Mondays to Fridays for four consecutive weeks in the 2006/2007 academic year when the facilities were put to use by the students.

Table 2

Time Utilization Rates for General Classrooms from Mondays to Fridays

	TUR(%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
1J	100	85.7	85.7	71.4	42.9
1K	71.4	100	57.1	85.7	100
1L	85.7	57.1	100	71.4	57.1
1M	85.7	57.1	100	57.1	85.7

Table 2 Table 2 Continued

Time Utilization Rates for General Classrooms from Mondays to Fridays

	TUR(%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
1N	71.4	100	42.9	100	85.7
1P	100	85.7	100	71.4	57.1
1Q	71.4	57.1	85.7	100	85.7
1R	100	100	85.7	57.1	42.9

2A	100	71.4	71.4	71.4	85.7
2B	85.7	85.7	57.1	100	71.4
2C	71.4	85.7	100	100	100
2D	71.4	71.4	100	100	85.7
2E	85.7	71.4	71.4	85.7	71.4
2F	85.7	85.7	42.9	57.1	85.7
2G	100	71.4	85.7	100	100
2H	85.7	85.7	71.4	100	85.7
2I	100	85.7	100	71.4	100

Findings on the time utilization rates for the 17 general classrooms for four consecutive weeks during the 2006/2007 academic year are recorded in Table 2. In the table 2, the time utilization rates for the 17 general classrooms are varied. The 100% time utilization rate for general classrooms indicates that the rooms were fully used throughout the 7 periods from Mondays to Fridays. The 100% rate depicts that those rooms were fully utilized by the students throughout the periods that the rooms were scheduled for official use.

From Table 2, the time utilization rate of 85.7% was obtained for individual general classrooms when the rooms were open for use by the students throughout the 7 periods. The 85.7% rate indicates that the rooms were used for 6 out of the 7 periods in a day. The time utilization rate of 71.4% was recorded for general classrooms when the rooms were open for use from Mondays to Fridays

for the 7 periods in each day. The 71.4% TUR indicates that the rooms were used for 5 out of the 7 periods that the rooms were officially scheduled for use. Table 2 further shows the time utilization rate of 57.1% for general classrooms when the rooms were scheduled for official use by the student throughout the 7 periods of teaching and learning sessions. This means that the rooms were used for 4 out of the 7 periods from Mondays to Fridays during the study. Further, the least time utilization rate of 42.9% obtained for individual general classrooms when the rooms were used during teaching and learning sessions in each day. The 42.9% rate represents 3 out of the 7 periods that the rooms were open for use by the students.

It is clear from the table that the time utilization rates ranging between 85.7% and 100% recorded from Mondays to Fridays show that the rooms were efficiently utilized as compared to the recommended rate of 80% set by the URC (1988) for efficient use of general classrooms in tertiary institutions in Ghana. The British Department of Education and Science (1992) also recommended a target rate of 80% for general classroom for tertiary institutions. However, the time utilization rates of 42.9%, 57.1% and 71.4% recorded for general classrooms from Mondays to Fridays indicate that those rooms were under-utilized as compared to the recommended target utilization rate of 80% set by the URC (1988) for general classrooms.

Time Utilization Rates for Special Rooms from Mondays to Fridays

Data on the time utilization rates for special rooms at the OLA College of

Education from Mondays to Fridays is presented in Table 3.

Table 3

Time Utilization Rates for Special Rooms from Mondays to Fridays

	TUR (%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
Science Lab.	57.1	85.7	100.0	57.1	71.4
Catering Workshop	0.0	28.6	71.4	57.1	71.4
Sewing Workshop	14.3	71.4	57.1	14.3	57.1

Table 3 shows the time utilization rates for science laboratory, catering and sewing workshops for four consecutive weeks when the rooms were put into use by the students. The time utilization rate of 57.1% , 71.4% and100% were recorded for sewing workshop , catering workshop and science laboratory respectively when the rooms were open for use on Wednesdays for the 7 periods during teaching and learning sessions . Thus, the catering and sewing workshops were used for only 4 and 5 periods respectively out of the 7 periods on Wednesdays. The science laboratory obtained 100% TUR which indicates full use of the room throughout the 7 periods during the study. This might be the case

because the College has only one laboratory which was used by the entire first and second year students for science practical lessons .Further, the time utilization rate of 85.7% recorded for science laboratory on Tuesdays indicates that the room was used for 6 out of the 7 periods during teaching and learning sessions. The time utilization rate for the science laboratory on Tuesdays and Wednesdays showed an efficient use of the room as compared to the URC (1988) recommended rate of 80% for efficient use of instructional room.

The laboratory recorded 85.5% and 100% efficient TUR values on Tuesdays and Wednesdays, while the TUR values recorded on Mondays, Thursdays and Fridays the days fall below the URC rate of 80% throughout the 7 periods that the room was put into use by the students. The table also shows the time utilization rates for workshops from Mondays to Fridays were less than the recommended rate of 80% set by the URC Report. From the table, the time utilization rates ranging between 0.0% and 71.4% for workshops indicate under-utilization of the rooms as the rates were below the recommended target rate of 80% set by the URC (1988) for efficient use of the instructional rooms. For example, the time utilization rate of 0.0% for catering workshop indicates that the room was not used throughout the 7 periods on Mondays when the was put to use by the students. The rates imply that the instructional rooms were under-utilized from Mondays to Fridays when the rooms were used by the students during teaching and learning sessions. The low rates recorded for the workshops might be attributable to the poor planning of instructional hours.

The time utilization rates for the special rooms from Mondays to Fridays

indicate that the rooms obtained the higher TUR on Wednesdays than any other day when the room were used for teaching and learning sessions. The low rates recorded for the science laboratory and workshops might be attributable to the poor planning of instructional hours and tutors' preference to use general classrooms for practical lessons in order to avoid over-crowding of students in the special rooms during the study. It can be seen Table 3 that none of the time utilization rates was up to 80% for the workshops. This implies that 80% TUR target set by the URC (1988) was quite higher than that of the current study. This supports Kenny and Foster's (1983) argument that the recommendation of the target utilization level of 80% for special classrooms by the URC (1988) is unrealistic and unachievable even with the help of computerized space allocation and timetabling system.

Space Utilization Rates for General Classrooms from Mondays to Fridays

Information on space utilization rates for teaching space facilities from Mondays to Fridays for four consecutive weeks in the 2006/2007 academic year when the facilities were put to use by the students is shown in Table 4. The space utilization rate looks at the percentage of room space put to use by the students. It measures the number of students occupying a room against the expected number of students place available. For example, if 32 students are in a room with a seating capacity for 50 students, the space utilization rate (SUR) = 32/50 ×100 = 64.0%.

Table 4

Space Utilization Rates for General Classrooms from Mondays to Fridays

	SUR (%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
1J	89.8	77.0	77.0	64.1	38.5
1K	68.5	82.2	54.8	82.2	95.9
1L	70.0	46.6	81.6	52.3	46.6
1M	84.4	56.0	98.0	56.0	70.0
1N	76.5	107.1	46.6	107.1	91.8
1P	153.8	109.9	131	109.9	87.9
1Q	56.9	45.5	68.2	79.6	68.2
1R	81.6	81.6	69.9	46.6	46.6
2A	132.4	94.6	94.6	94.6	110.5

Table 4 continued

Space Utilization Rates for General Classrooms from Mondays to Fridays

	SUR (%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
2B	126.1	120.1	95.3	147.1	105.1
2C	93.1	93.1	130.3	130.3	105.1
2D	97.1	77.7	136.0	136	116.6
2E	120.0	80.0	100.0	120	100.0
2F	120.0	120.0	60.0	120	120.0

2G	108.0	62.2	93.3	108.8	108.8
2H	88.2	88.2	73.5	102.9	88.2
2I	76.6	68.2	79.6	56.9	79.6

As shown in the table 4, the space utilization rates of over 100% for 17 individual classrooms indicate congestion when the rooms were occupied by the students during teaching and learning sessions from Mondays to Fridays. The space utilization rates ranging between102.9% and 153.8% for general classrooms from Mondays to Fridays show that the rooms over-utilized during teaching and learning sessions. The classrooms which recorded over 100% SUR values were the result of large class sizes that used the rooms. Owolabi (1994) explained that excessive use of teaching space facilities could result in destruction of the buildings. Beshire (1974) also reported that extreme hot environments reduced sedentary task of students when the rooms were without environmental modifiers like acoustics. Thus, overcrowding of students could lead to hot environments which reduce students' performance of work.

Furthermore, individual classrooms which obtained SUR values ranging between 68.2% and 97.1% from Mondays to Fridays give the picture that the rooms were efficiently utilized as compared to the target rate of 66.7% set by the URC (1988) for efficient use of the instructional rooms. The low SUR values recorded for general classrooms ranging between 38.5% and 64.1% showed under-utilization as compared to the URC (1988) target rate of 66.7% rooms for

efficient use of teaching facilities in tertiary institutions. From the table, the highest SUR value of 153.8% was recorded for 1P on Mondays, while the least SUR of 38.5% recorded for 1J on Fridays when the rooms were put into use by the students.

The space utilization rates from Mondays to Fridays for the general classrooms indicate that most of the classrooms were efficiently used. The over 100% SUR was the result of large students who used the place. Owolabi (1995) explained that rooms with high occupancy factors could be split into small classes in order to improve the utilization of such rooms.

Space Utilization Rates for Special Rooms from Mondays to Fridays

The table 5 depicts space utilization rates for special rooms from Mondays to Fridays for four consecutive weeks in the 2006/ 2007 academic year.

Table 5

Space Utilization Rates for Special Rooms from Mondays to Fridays

	SUR (%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
Science Lab.	169.2	257.1	307.7	190.1	228.6

Catering Workshop	0.0	227.9	220.8	302.5	180.5
Sewing Workshop	45.5	207.8	45.5	207.8	152.8

The space utilization rates show the values for science laboratory, catering and sewing workshops for the seven periods that the rooms were used by the students from Mondays to Fridays in the 2006/2007 academic year in the table 5. The low SUR values of 0.0% and 45.5% for catering workshop and sewing workshops were respectively recorded on Mondays when the rooms were open for use by the students. The SUR values of 0.0% and 45% were lower than the recommended target rate of 66.7% set by the URC (1988) for efficient use of rooms. This means that the workshops were under-utilized on Mondays by the students. The sewing workshop obtained SUR of 45.5% on Mondays and Wednesdays which means that the room was under-utilized as compared to the URC (1988) target rate of 66.7% for efficient use of classrooms. The workshops obtained over 100% SUR values ranging between 152.8 % and 302.5%, apart from 0.0% and 45.5% SUR values recorded on Mondays and Wednesdays respectively, during the study.

As shown in Table 5, the SUR values for science laboratory for the seven periods that the rooms were used by the students from Mondays to Fridays were over 100% which indicates that the rooms were over-utilized during the study.

For example, the SUR values for science laboratory ranged between 169.2% and 307.7 % for the seven periods that the rooms were used by the students from - Mondays to Fridays. This indicates over-utilization of the rooms because the rates were higher than the recommended target rate of 66.7% set by the URC (1988) for efficient use of rooms. According to Owolabi (1994), utilization rate above 100% suggests over-utilization of instructional rooms. Owolabi (1995) explained that the excessive use of the facilities might limit the life span of the equipment and gadgets.

From Table 5, the space utilization rates for special rooms show that the rooms were occupied by large student population that used the rooms. This has resulted in high SUR values recorded during the period of the study from Mondays to Fridays that the facilities were observed during teaching and learning sessions. Owolabi (1995) agreed that instructional rooms with high occupancy factor or large classes could be split into small classes in order to improve the utilization of the rooms. He further suggested that, in order to accommodate future expansions, it may be advisable to consider building large classrooms, but with removable partitions.

Global Utilization Rates for Teaching Space Facilities from Mondays to Fridays

Table 6 shows global utilization rates for general classrooms from Mondays to Fridays for four consecutive weeks in the 2006/2007 academic year. The global utilization rate puts time and spaces into consideration. In other words,

it is the percentage of time for which a room is put to use multiplied by the percentage of room space put into use. The global utilization rate of a college room is measured in students hours. For example, if 40 students use a room for six (6) hours in a day and the room can seat 50 students for seven (7) hours , the global utilization rate (GUR) would be (40×6) / (50×7) ×100 = 68.6%.

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Table 6

Global Utilization Rates for General Classrooms from Mondays to Fridays

	GUR (%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
1J	89.8	66.0	66.0	45.8	16.5
1K	48.9	82.2	31.3	70.4	95.9
1L	60.0	26.6	81.6	37.3	26.6
1M	72.0	32.0	98.0	32.0	60.0
1N	54.6	107.1	20.0	107	78.7
1P	153.8	94.2	131.8	78.5	50.2
1Q	40.6	26.0	58.2	79.6	58.4
1R	81.6	81.6	60.0	26.6	20.0
2A	132.4	67.5	67.5	67.5	97.3
2B	108.1	120.9	54.4	147.1	75.0

Table 6 continued

Space	Monday	Tuesday	Wednesday	Thursday	Friday
2C	66.5	95.7	130.3	130.3	130.3
2D	69.3	55.5	136.0	136.0	99.9
2E	123.8	102.8	71.4	71.4	71.4
2F	108.8	44.4	25.7	25.7	102.8
2G	75.6	75.6	80.0	80.0	108.8
2H	76.6	58.4	52.5	52.5	75.6
2I	76.6	68.2	79.6	79.6	79.6

For the 2006/2007 academic year, the global utilization rates show the rates for four consecutive weeks when the rooms were put to use throughout the 7 periods were either high or low. The over 100% GUR values ranging between 102.8% and 153.8% which show that the rooms experienced high population of students during the study. These rates indicate that the teaching space facilities at the College were over-stretched beyond their seating capacities. The GUR values ranging between 54.6% and 99.9% were recorded for individual rooms when the rooms were used in the 7 periods from Mondays and Fridays. The rates indicate efficient use of the rooms as their rates were higher than the target rate of 53.3% recommended by URC (1988) as the rate for teaching facilities in tertiary institutions in Ghana. Kenny and Foster (1983) agreed that the utilization rate above 50% indicate efficient use of instructional rooms.

The general classrooms which recorded low GUR values ranging between 16.5% and 52.5% indicate that the rooms were under-utilized in terms of time and space utilization rates. These rates indicate under-utilization of teaching space facilities in the 2006/2007 academic year as compared to the URC (1988) target rate of 53.3% for efficient use of classrooms. These rates suggest poor planning of the instructional time due to departmentalization and space allocation of teaching spaces at the College.

Global Utilization Rates for Special Rooms from Mondays to Fridays

Table 7 shows global utilization rates for science laboratory, sewing and catering workshops from Mondays to Fridays for four consecutive weeks in the 2006/2007 academic year. The global utilization rate puts time and spaces into consideration. The global utilization rate of a college room is measured in student's hours. For example, if 40 students use a room for six (6) hours in a day and the room can accommodate 50 students for seven (7) hours , the global utilization rate (GUR) would be (40×6) /(50×7) ×100 = 68.6% .

Table 7

Global Utilization Rates for Special Rooms from Mondays to Fridays

	GUR (%)				
Space	Monday	Tuesday	Wednesday	Thursday	Friday
Science Lab.	96.6	220.3	307.7	108.5	163.2
Catering Workshop	0.0	29.0	198.4	126.0	216.0
Sewing Workshop	6.5	183.6	6.5	118.7	118.7

With reference to Table 7, the global utilization rates show the rates for science laboratory, catering and sewing workshops for the seven periods that the rooms were used by the students from Mondays to Fridays in the 2006/2007 academic year. The GUR values of 0.0% and 6.5% indicate that catering and sewing workshops were under-utilized throughout the whole day on Mondays when the room was used by the students. The rates recorded for the workshops were less than the recommended target rates of 53.3% set by the URC (1988) for efficient use of instructional rooms. This means that the workshops were under-utilized on Mondays by the students. The sewing workshop obtained SUR of 6.5% on Mondays and Wednesdays which means that the room was under-utilized as compared to the URC (1988) target rate of 53.3% for efficient use of classrooms. The workshops obtained over 100% SUR values ranging between 118.7% and 198.4%, apart from 0.0% and 6.5% recorded on Mondays and Wednesdays, during the study.

From Table 4, the GUR values for science laboratory for the seven periods that the rooms were used by the students from Mondays to Fridays were over 100% which means that the rooms were over-utilized during the study. For example, the GUR values for science laboratory ranged between 108.5% and 307.7 % for the seven periods that the rooms were used by the students from Mondays to Fridays. This indicates over-utilization of the rooms because the rates were higher than the recommended target rate of 53.3% set by the URC (1988) for efficient use of instructional rooms. According to Owolabi (1994), utilization rate above 100% suggests over-utilization of instructional rooms. The over-

utilization might be the result of small spaces available to students during teaching and learning sessions. Owolabi (1995) explained that the excessive use of the facilities might limit the life span of the equipment and gadgets.

From Table 7, the global utilization rates for special rooms show that the rooms were occupied by large student population that used the rooms. These rates might be the result of large population of students that used the rooms which showed over-utilization of teaching space for the whole day as compared to the recommended rate of 53.3% for efficient use of instructional rooms. The over-utilization of teaching spaces by the students might be the result of poor timetable planning and small available spaces to the students. Owolabi (1994) explained that the problem of over-utilization of teaching space is more serious in the developing world partly because of population explosion and universalism of education at all levels. Such situations have deleterious effect on the teaching and learning process leading to poor supervision of students' work by tutors.

Average Weekly Utilization Rates for General Classrooms

The utilization rates for 17 individual classrooms for four consecutive weeks in the 2006/2007 academic year are shown in Table 8. The table displays information on the time utilization **r**ates (TURs), space utilization rate (SURs) and global utilization rates (GURs) for general rooms for the 7 periods for four consecutive weeks during the 2006/2007 academic year. The rates were derived by summing up all the averages of the time utilization **r**ates (TURs), space

utilization rates (SURs) and global utilization rates (GURs) for the 7 periods from Mondays to Fridays during the 2006/2007 academic year. Similar, calculations were done for the utilization rates for special rooms in the 2006/2007 academic year which are presented in Table 8.

Table 8

Average Weekly Utilization Rates for General Classrooms

Room No.	TUR (%)	SUR (%)	GUR (%)
1J	77.1	69.3	567
1K	82.8	76.7	65.7
1L	74.3	59.4	46.4
1M	77.1	72.8	58.8
1N	80.0	85.8	73.5
1P	82.8	118.7	101.6
1Q	80.0	63.7	52.6
1R	77.1	65.3	54.0
2A	80.0	105.9	86.4
2B	80.0	118.7	97.5
2C	91.4	1191	110.6
2D	85.7	112.7	99.3
2E	77.1	104.0	81.1
2F	71.4	108.0	80.5
2G	91.4	93.4	90.2
2H	85.7	88.2	76.4
2I	91.4	71.0	67.0

As shown in the table 8, the highest TUR, SUR and GUR of 91.4%, 119.1% and 110.6% which were recorded for the 17 general classrooms for the week in the 2006/2007 academic year for general classrooms labelled 2C. This was followed by the classroom labelled 1P which obtained TUR, SUR and GUR of 82.8%, 118.7% and 101.6% respectively for the week when the classroom was open for use in the 2006/2007 academic year. The individual classrooms (i.e. 1P and 2C) had SUR and GUR of over 100% for the week which indicate that the classrooms were over-utilized as their rates were higher than the time utilization rates (i.e. 1P and 2C) of 82.8% and 91.4% respectively during the week when the rooms were put to use. These rates indicate efficient utilization of the rooms for the week.

Table 8 further shows the number of individual classrooms that obtained 80% TUR or more for the week (i.e. from Monday to Friday) when the classrooms were put to use throughout the whole day in the 2006/2007 academic year. Thus, 11 individual classrooms obtained TUR of 80% or more (i.e. TUR ranging from 80% to 91.4%) for the week. This suggests that a large number of the individual classrooms were efficiently utilized in terms of time utilization rates throughout the week. In the table, 6 out of 17 individual classrooms had TUR ranging between 17.4% and 77.1% for the whole day in the week when the rooms were used respectively. The SUR for the week recorded values of over 100% for individual classrooms labelled 1P, 2A, 2B, 2C, 2D, 2E, and 2F respectively in the 2006/2007 academic year. A careful look at Table 8 shows that some individual classrooms had SUR of over 100% while their TUR, especially

for specific rooms 2E and 2F recorded low values of 77.1% and 71.4% respectively. This suggests that the rooms labelled 2E and 2F were over-utilized in terms of space utilization rates but underutilized in terms of time utilization rates. The individual rooms had GUR of 81.1% and 80.5% respectively for rooms 2E and 2F in the week. The high GUR was the result of high space utilization rate for these rooms (i.e. 2E and 2F) when the rooms were put to use by the students. Hence, 14 out of the 17 classrooms were efficiently used in terms of space utilization rate in the 2006/2007 academic year.

The Table 8 further shows that 13 out of 17 classrooms obtained GUR values ranging between 54.0% and 110.6% for the week when the rooms were officially scheduled for use in the 2006/2007 academic year. The individual classroom (i.e.1L) with the least utilization rates of 74.3% for TUR, 59.4% for SUR and 46.4% for GUR recorded for the week in the 2006/2007 academic year when the rooms were put to use by the students. The individual classroom labelled 1Q obtained 80.0% for TUR, 63.7% for SUR and 52.6% for GUR for the week when the room was scheduled for use by the students. The room 1Q recorded low SUR (63.7%) and GUR (52.6%) which were less than the target rates of 66.7% for SUR and 53.3% for GUR, recommended by the URC (1988) for efficient use of the rooms.

Average Weekly Utilization Rates for Special Rooms

Table 9 displays the time utilization **r**ates (TURs), space utilization rates (SURs) and global utilization rates (GURs) for special rooms for 7 periods for four

consecutive weeks during the 2006/2007 academic year.

Table 9

Average Weekly Utilization Rates for Special Rooms

Space	TUR (%)	SUR (%)	GUR (%)
Science Laboratory	74.3	230.5	179.3
Catering Workshop	45.7	180.5	113.9
Sewing Workshop	42.8	152.8	86.8

The TUR values of 42.8%, 45.7% and 74.3% were recorded for sewing workshop, catering workshop and science laboratory respectively when the rooms were used by the students during the week in the 2006/2007 academic year. The TUR of 74.3% for science laboratory was close to the target rate of 80% recommended by the URC (1988) for efficient use of the rooms. This means that the science laboratory was efficiently utilized in terms of time. The sewing and catering workshops obtained TUR values of 42.8% and 45.7% respectively for the week in the 2006/2007 academic year when the rooms were scheduled for use. These rates indicate under-utilization of special rooms (catering and sewing

workshops) in terms of time utilization rates. This low frequency of use factors might be partly due to tutors' preference to conduct practical lessons in the general purpose classrooms. Owolabi (1994) observed that low time utilization rate of instructional rooms could be improved by splitting large classes into small classes. He explained that this would increase the use of tutors' time.

The SUR of 152.8%, 180.5% and 230.5% recorded for sewing workshop, catering workshop and science laboratory respectively for the week in the 2006/2007 academic year when the rooms were put to use. The SUR values recorded for all the rooms were far more than the target rate of 66.7% set by URC (1988) for efficient use of instructional rooms. The over 100% utilization rate indicates over-utilization of the rooms because large students used the facilities. Owolabi (1994) argued that large class sizes could be split into small classes so as to ensure efficient of the rooms.

The GUR of 86.8%, 113.9% and 179.3% recorded for sewing workshop, catering workshop and science laboratory respectively for the week when the rooms scheduled for use during the 2006/2007 academic year. The high GUR values were the results of high SUR values that pulled up the time utilization rates of these rooms. From Table 9, the teaching space facilities where under-utilized in terms of time utilization rates whilst they were over-utilized in terms of space utilization rates throughout the weeks when the rooms were available for use.

Average Time Utilization Rates General Classroom from Mondays to Fridays

Average utilization rates for four consecutive weeks and as well as weekly averages are presented in Tables 10 and 11 when the rooms were available for use in the 2006/2007 academic year. The sum of the various time utilization rates (TUR), space utilization rates (SUR) and global utilization rates (GUR) for the morning, mid-morning and evening sessions for the instructional rooms from Mondays to Fridays as well as weekly average rates in the 2006/2007 academic year for teaching space facilities are presented in Tables 10 and 11. These rates were derived by averaging the utilization rate for morning, mid-morning and afternoon sessions for each working day in the 2006/2007 academic year. Tables 10 and 11 further show the calculation of utilization rates for teaching space facilities during morning (7:20am - 8:15am) ,mid-morning (8:45am – 11:30am) and afternoon (11:45am – 2:30pm) sessions from Mondays to Fridays as well as average weekly rates in the 2006/2007 academic year.

Average Time Utilization Rates for General Classrooms from Mondays to Fridays

Table 10 shows the time utilization rates for the 17 general classrooms during morning (7:20am - 8:15am), mid-morning (8:45am – 11:30am) and afternoon (11:45am – 2:30pm) sessions from Mondays to Fridays as well as the

whole day rates in the 2006/2007 academic year.

Table 10

Average Time Utilization Rates for General Classrooms from Mondays to Fridays

	TUR (%)			
Periods	7:20-8:15am	8:45-11:30am	11:45am-2:30pm	Whole Day
Monday	93.8	86.4	84.3	88.2
Tuesday	82.7	80.1	66.9	76.5
Wednesday	81.3	80.1	77.4	79.6
Thursday	93.8	88.0	76.0	85.9
Friday	82.0	81.7	74.2	79.3

The time utilization rates of 93.8%, 86.4% and 84.3% for the 17 general classrooms during morning (7:20am-8:15am), mid-morning (8:45am-11:30am) and afternoon (11:45am-2:30pm) sessions respectively recorded in Table 9 on Mondays when the classrooms were put to use. The TUR values imply that the classrooms were efficiently utilized as compared to the target rate of 80.0% recommended by URC (1988) as a norm for teaching space facility in tertiary institutions in Ghana. The highest rate of 93.8% for TUR was recorded during

morning sessions when the rooms were officially opened for use in the 2006/2007 academic year. That is, the high rate might be that the morning session for the 17 rooms had only 1 period of the 7 periods in the whole day.

The time utilization rates of 82.7%, 80.1%, 66.9% and 76.5% for the 17 general classrooms were recorded during morning (7:20am-8:15am), mid-morning (8:45am-11:30am), afternoon (11:45am-2:30pm) sessions and whole day respectively on Tuesdays in the 2006/2007 academic year. The TUR values of 82.7% and 80.1% for morning and mid-morning sessions respectively were higher than the rates for afternoon sessions. The relatively least TUR values of 66.9% and 76.5% for afternoon and the whole day sessions show that the general classrooms were under-utilized as compared to the target rate of 80.0% recommended by URC (1988). The time utilization rates of 81.3%, 80.1%, 77.4% and 79.6% for general classrooms were recorded during morning (7:20am-8:15am), mid-morning (8:45am-11:30am), afternoon (11:45am-2:30) sessions and the whole day respectively for the 17 classrooms on Wednesdays. The TUR values of 81.3% and 80.9% for morning and mid-morning sessions were higher than the rates of 77.4% and 79.6% for afternoon and the whole day sessions respectively when the rooms were used by the students.

Also, the time utilization rates of 93.3%, 88.3%, 76.0% and 85.9% for general classrooms were recorded during morning, mid-morning, afternoon sessions and the whole day respectively on Thursdays. The relatively least TUR of 76.0% was recorded during afternoon session while the highest time utilization

rate of 93.8% was recorded in the morning when the classrooms were put to use. The whole day TUR of 85.9% suggests that the 17 classrooms were efficiently utilized as compared to the target rate of 80% recommended by the URC (1988) for efficient use of rooms.

The time utilization rates of 82.0%, 81.7%, 74.2% and 79.3% were recorded during morning (7:20am- 8:15am), mid-morning (8:45am-11:30am), afternoon (11:45am-2:30pm) sessions and the whole day respectively recorded on Fridays in the 2007/2008 academic year. The highest TUR of 82.0% was recorded in the morning session while the least TUR of 74.2% was recorded in afternoon in the 2006/2007 academic year. The whole day time utilization rate of 79.3% was recorded during the study was close to the target rate of 80% as recommended by URC (1988) for efficient use of teaching facilities at the tertiary institutions in Ghana.

Average Time Utilization Rates for Special Classrooms from Mondays to Fridays

Table 11 shows time utilization rates for science laboratory and workshops when the rooms were used from Mondays to Fridays in the 2006/2007 academic year.

Table 11

Average Time Utilization Rates for Special Classrooms from Mondays to Fridays

Space		Time Utilization Rates		
Periods	7:20-8:15am	8:45-11: 30am	11:45am 2:30pm	Whole Day
Laboratory				
Days				
Monday	0.0	66.7	66.7	44.5
Tuesday	0.0	100	100	66.7
Wednesday	100	100	100	100
Thursday	100	0.0	0.0	66.7
Friday	100	66.7	66.7	77.8
Workshops				
Days:				
Monday	0.0	16.7	0.0	5.5
Tuesday	33.3	16.7	83.4	44.5
Wednesday	0.0	66.7	83.4	50.0
Thursday	0.0	16.7	66.7	27.8
Friday	0.0	66.7	83.4	50.0

Time utilization rates of 0.0%, 66.7%, 66.7% and 44.5% were recorded in Table 11 for morning (7:20am-8:15am), mid-morning (8:45am-11:30am) afternoon (11:45am-2:30pm) sessions and the whole day respectively for laboratory on Mondays in 2006/2007 academic year. These rates indicate that the laboratory was under-utilized as compared to the recommended target rate of 80% set by the URC (1988) for efficient use of classrooms. The laboratory obtained high TUR value of 66.7% for mid-morning and afternoon sessions, whilst the least of 0.0% was recorded in the morning session. The workshops obtained the least TUR 0.0% in the morning and afternoon sessions, whilst TUR of 16.7% was recorded in the mid-morning session. The whole day TUR values of 5.5% and 44.5% recorded for workshops and laboratory respectively indicate that the rooms were under-utilized. These rates were less than the target rate of 80% set by the URC (1988) for efficient use of classrooms.

The time utilization rates of 0.0% and 33.3% for laboratory and workshops were also obtained respectively during morning sessions on Tuesdays show that the instructional rooms were not fully used. The laboratory had highest TUR of 100% during the mid-morning and afternoon sessions respectively, whilst the least TUR of 0.0% was recorded in the morning session. The least TUR value of 16.7% recorded during mid-morning sessions, whilst highest TUR of 83.4% recorded during afternoon sessions for workshops during the study. The whole day TUR values of 44.5% and 66.7% for workshops and laboratory respectively indicate that the rates were lower than the target rate of 80% set by the URC (1988) for efficient use of classrooms. The under-utilization of the rooms might

be the result of poor planning of instructional time as well as allocation of classrooms to groups.

Further, the time utilization rate of 100% for laboratory recorded during morning, mid-morning and afternoon sessions and the whole day on Wednesdays indicate that the room was fully used by the students. The TUR values of 66.7% and 83.4% recorded for the mid-morning and afternoon sessions respectively, whilst TUR of 0.0% recorded during morning session for workshops in the 2006/2007 academic year. The whole day TUR of 50.0% and 100% for workshops and laboratory recorded respectively during the 2006/2007 academic year when the rooms were put to use. The laboratory was efficiently utilized whilst workshops were under-utilized during the day when the classrooms were used by the students.

The time utilization rate of 100% recorded for laboratory during morning and afternoon sessions indicates that the room was fully used. The least TUR of 0.0% recorded for laboratory during mid-morning session indicates that the room was not used on Thursdays. The TUR values of 0.0% and 16.7% recorded for workshops during the morning and mid-morning sessions respectively whilst the high TUR of 66.7% was recorded during the afternoon session on Thursdays. The whole day TUR values of 27.8% for workshops and 66.7% for laboratory indicate that the rooms were under-utilized. This is because the rooms obtained rates which were less than the target rate of 80% set by the URC (1988) for efficient use of classrooms.

More so, the time utilization rates of 66.7% recorded for laboratory during mid-morning and afternoon sessions, whilst the highest TUR of 100% was recorded during morning sessions on Fridays. The TUR values of 66.7% and 83.4% recorded for workshops during mid-morning and afternoon sessions respectively when the rooms were officially opened for use. The whole day TUR values of 50.0% recorded for workshops and 77.8% for laboratory imply that the rooms were under-utilized on Fridays. This is because the rooms obtained rates which were lower than the target rate of 80% set by the URC (1988) for efficient use of classrooms

Average Space Utilization Rates for General Classrooms from Mondays to Fridays

In the Table 12, space utilization rates for teaching space facilities during morning (7:20am-8:15am), mid-morning (8:45am-11:30) and afternoon (11:25am-2:30pm) as well as the whole day from Mondays to Fridays in the 2006/2007 academic year are shown.

Table 12

Average Space Utilization Rates for General Classrooms from Mondays to Fridays

All classrooms	Space Utilization Rate (%)			
Period	7:20-8:15am	8:45-11:30am	11:45-2:30pm	Whole Day
Days				
Monday	63.2	95.7	93.9	84.3
Tuesday	59.2	89.6	73.7	74.2
Wednesday	52.7	89.6	90.7	74.8
Thursday	63.8	99.2	85.7	92.9
Friday	51.7	93.1	81.9	75.6

The space utilization rates for 17 general classrooms were recorded during morning (7:20am-8:15am), mid-morning (8:45am-11-30am) and afternoon (11:45 am – 2:30 pm) sessions and the whole day in the 2006/2007 academic year. The SUR values of 63.2%, 95.7%, 93.9% and 84.3% for morning, mid-morning, afternoon and the whole day sessions recorded respectively when the rooms were occupied by the students during the study. The higher SUR values of 95.7% and 93.9% were recorded during mid-morning and afternoon sessions respectively

whilst the least SUR value of 63.2% was recorded during morning sessions on Mondays. The high SUR might be due to large class sizes that used the rooms during the study. The whole day of 84.3% indicates that 17 classrooms were efficiently utilized in the 2006/2007 academic year as compared to the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms.

The SUR values of 59.2%, 89.6%, 73.29% and 74.29% recorded for the 17 general classrooms during morning, mid-morning, afternoon sessions and the whole day respectively on Tuesdays. The SUR values of 89.6% recorded for mid-morning session was relatively higher than 59.2% for morning and 73.7% for afternoon sessions when the rooms were occupied by the students during the study. The whole day SUR of 74.2% indicates that the rooms were efficiently utilized as their rate was higher than the 66.3% rate set by URC (1988) as the norm for efficient use of the rooms.

The SUR values of 52.7%, 89.7%, 90.7% and 74.8% recorded for the 17 general classrooms during morning (7: 20 – 8:15 am), midmorning (8:45 am – 11:30 am), afternoon (1:45 am – 2:30 pm) sessions and the whole day respectively on Wednesdays in the 2006/2007 academic year. The highest SUR value of 90.7% was recorded during the afternoon sessions whilst the least rate of 52.7% was recorded for the morning in the 2007 academic year. The whole day SUR value of 74.8% shows that the 17 classrooms were efficiently utilized during the day when the rooms were occupied by the students as compared with the

recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms.

The SUR values of 63.8%, 99.2%, 85.7% and 82.9% recorded for general classrooms during morning (7:20 am – 8:15 am), mid – morning (8:45 am – 11:30 am), afternoon (11:45 am – 2:30 pm) sessions and the whole day respectively on Thursdays in the 2006/2007 academic year. The SUR of 99.2% for mid–morning sessions was relatively higher than the 63.8% for the morning and 85.7% for the afternoon sessions when the rooms were put to use by the students on Thursdays. The whole day SUR value of 82.9% was higher than the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms.

The SUR values of 51.7%, 93.1% , 81.9% and 75.6% recorded for the 17 general classrooms during morning (7:20am-8:15am), mid-morning 8:45am-11:30am) and afternoon (11:45am-2:30pm) sessions and the whole day respectively on Fridays in the 2006/2007 academic year. The high SURs of 93.1% and 81.7% were recorded during mid-morning and afternoon sessions respectively whilst the low SUR of 57.7% was recorded in the morning session when the rooms were put to use by the students on Fridays. The whole day SUR of 75.6% shows that the 17 general classrooms were efficiently utilized because their rates were higher than the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms on Fridays.

As shown in Table 12, the SURs for the morning indicate that the 17 general classrooms were under-utilized because their rates fall below the

recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms at the tertiary level in Ghana. However, the rates obtained for the morning sessions in the week show that these values were close to the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms. The table also shows the SURs for mid-morning and afternoon sessions which recorded high values from Mondays to Fridays in the 2006/2007 academic year. The SUR values for the mid-morning and afternoon indicate efficient utilization of the rooms because their rates were higher than the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms. The whole day rates recorded from Mondays to Fridays ranged between 75.6% and 92.9% which were higher than the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms at the tertiary level in Ghana.

Average Space Utilization Rates for Special Classrooms from Mondays to Fridays

Table 13 shows space utilization rates for teaching space facilities during morning (7:20am-8:15am) mid-morning (8:45am-11:30) and afternoon (11:25am-2:30pm) as well as the whole day from Mondays to Fridays in the 2006/2007 academic year.

Table13

Average Space Utilization Rates for Special Classrooms from Mondays to Fridays

	Space Utilization Rate (%)			
Period	720-8:15am	8:45-11:30am	11:45am-2:30pm	Whole Day
Laboratory				
Days				
Monday	0.0	174.3	220.5	131.6
Tuesday	0.0	279.5	320.5	200.0
Wednesday	307.7	269.2	346.1	307.1
Thursday	369.2	0.0	320.5	229.9
Friday	307.7	202.6	228.2	246.3
Workshops				
Days:				
Monday	0.0	53.3	0.0	17.7
Tuesday	145.5	72.8	272.7	187.9
Wednesday	0.0	286.4	280.3	188.9
Thursday	0.0	68.2	257.6	108.6
Friday	0.0	254.6	340.8	198.4

Space utilization rates for laboratory and workshops during morning (7:20-8:15am), mid-morning (8:45am-11:30am) and afternoon (11:45am-2:30-pm) sessions for Mondays as well as the whole day in the 2006/2007 academic year are presented in the table 12. From the table, the laboratory obtained SUR of 220.5% and 174.3% for mid-morning and afternoon sessions respectively whilst the least SUR of 0.0% was recorded for morning session on Mondays when the rooms were put to use by the students. The rates for mid-morning and afternoon sessions indicate the rooms were over-utilized on Mondays because their rates were higher than the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms. These high rates imply that a large number of students used the laboratory during mid-morning and afternoon sessions on Mondays in the 2006/2007 academic year. The SUR of 53.3% recorded for workshops during mid-morning session whilst the least SUR value of 0.0% recorded for morning and afternoon sessions when the rooms were put to use by the students. The SURs for workshops indicate under-utilization because the rates fall far below the recommended target rate of 66.7% set by URC (1988). The 0.0% SUR recorded for the laboratory and workshops show that the rooms were not used by the students on Mondays in the 2006/2007 academic year. The whole day SUR of 17.7% and 131.6% were recorded for laboratory and workshops respectively when the rooms were occupied by the students. The whole day SUR for the laboratory implies that a large number of students used the room on Mondays in the 2006/2007 academic year.

In the Table 13, space utilization rates show the values for laboratory and workshops during morning (7:20am-8:15am), mid-morning (8:45-11:30am) and afternoon (11:45am2:30pm) sessions and whole day obtained on Tuesdays in the 2006/2007 academic year. Again, the SUR of 271.5% and 320.3% were obtained for mid-morning and afternoon sessions respectively whilst the least SUR of 0.0% for morning session was recorded for laboratory during teaching and learning sessions. The SUR of 145.5% ,72.8% and 272.7% during morning, mid-morning and afternoon sessions respectively were recorded for workshops when the rooms were put to use by the students on Tuesdays. The rooms which obtained over 100% utilization rates indicate that those rooms were over-utilized as their rates were higher than the recommended target rate of 66.7% set by URC (1988) for efficient use of classrooms. These high rates imply that a large number of students used the laboratory and workshops during teaching and learning sessions in the 2006/2007 academic year. The SUR of 200.0% for whole day implies that a large number of students used the laboratory whilst the 0.0% rate recorded in the morning on Tuesdays means that the room was not utilized by the students. This suggests that the laboratory was not efficiently assigned to students during the morning sessions on Tuesdays in the 2006/2007 academic year.

From the Table 13, space utilization rates for laboratory and workshops on Wednesdays recorded during the morning (7:20-8:15am), mid-morning (8:24-11:30am), and afternoon (11:45am-2:30pm) sessions and the whole day in the 2006/2007 academic year. Table 12 further shows the SUR of 307.7%, 269.2% and 346.1% for laboratory during morning, mid-morning and afternoon sessions

respectively in the whole day of Wednesdays. The workshops obtained SUR of 0.0%, 286.4% and 280.3% for morning, mid-morning and afternoon sessions respectively when the rooms were put to use by the students. The SUR of 0.0% workshops on Wednesdays is less than the recommended target rate of 66.7% set out by URC Report (1988) for efficient use of classrooms. The SUR of 188.9% and 307.1% for workshops and laboratory for the whole day indicate that the rooms were occupied by a large number of students on Wednesdays in the 2006/2007 academic year.

Table 13 shows the SUR of 369.2%, 0.0% and 320.5% for laboratory during morning (720:815am), mid-morning (8:45-11:30) and afternoon (11:45am-2:30pm) sessions on Thursdays in the 2006/2007 academic year. The SUR value of 0.0% indicates that the laboratory was not occupied by the students during the teaching and learning sessions in the day. The SUR of 0.0%, 68.2% and 257.6% for workshops were recorded during morning, mid-morning and afternoon on Thursdays in the 2006/2007 academic year. The SUR of 108.6% and 229.9% for whole day were recorded for workshops and laboratory respectively in the 2006/2007 academic year.

Table 13 shows the space utilization rates of 307.7%, 202.6% and 228.2% for laboratory during morning, mid-morning and afternoon sessions respectively when the rooms were put to use by the students on Fridays in the 2006/2007 academic year. The workshop recorded SUR of 254.6% and 340.8% for mid-morning and afternoon sessions respectively whilst 0.0% rate was recorded for

morning sessions. The whole day SUR of 198.4% and 246.3% recorded for workshops and laboratory respectively during teaching and learning in the whole day on Fridays.

Table 13 shows space utilization rates for laboratory and workshops during the morning, mid- morning and afternoon sessions on Mondays to Fridays as well as the whole day in the 2006/2007 academic year. From Table 13, the laboratory and workshops recorded high values during teaching and learning sessions which indicate that the rooms were occupied by a large number of students. This situation resulted in over-crowding of students and poor supervision of students' work during practical lessons by the tutors.

Average Global Utilization Rates for General Classrooms from Mondays to Fridays

Table 14 displays global utilization rates for 17 general classrooms for four consecutive weeks from Mondays to Fridays in the 2006/2007 academic year. Table 14 further shows the rate for morning (7:20- 8:15 am), mid – morning (8:45 am – 11:30 am) and afternoon (11:45 am – 2: 30 pm) as well as the whole day during the study.

Table 14

Average Global Utilization Rates for General Classrooms from Mondays to Fridays

	Global Utilization Rate (%)			
Periods:	720-8:15am	8:45-11:30	11:45am-2:30pm	Whole Day
Days				
Monday	58.8	82.6	79.2	73.5
Tuesday	50.3	71.7	49.2	57.1
Wednesday	40.7	65.5	64.7	57.0
Thursday	58.4	88.0	67.2	71.2
Friday	41.3	78.5	62.0	60.6

As indicated in the table 14, the global utilization rates of 58.8%, 82.6%, 79.2% and 73.3% recorded for general classrooms during morning (7:20am-8:15am), mid-morning (8:45am-11:30am) and afternoon (11:45am-2:30pm) sessions and the whole day respectively on Mondays in the 2006/2007 academic year are presented. The Table 13 further shows that the GURs for all the classrooms were higher than the target rate of 53.3% recommended by URC

(1988) as the efficient rate for the use of rooms at the tertiary institutions in Ghana. This means that the rooms were efficiently utilized on Mondays when their time and space utilization rates were recorded in the day.

The GUR values of 50.3%, 71.7%, 49.2% and 57.1% recorded for general classrooms during morning (7:20am-8:15am), mid-morning (8:45am-11:30am) and afternoon (11:45am-2:30am) sessions and the whole day respectively on Tuesdays in the 2006/2007 academic year. The highest GUR of 71.7% was recorded during mid-morning session whilst least rate of 49.2% was for afternoon sessions when the rooms were put to use by the students. The GUR of 57.1% for whole day indicate that these rooms were efficiently utilized on Tuesdays because the rate was higher than the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms. However, the global utilization rate of 49.2% recorded for the afternoon sessions was below the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms. The global utilization rates below 50% indicate under-utilization of the rooms as suggested by Kenny and Foster (1983) for efficient use of classrooms.

The GUR values of 40.7%, 65.5%, 64.7% and 57.0% recorded for general classrooms during morning (7:20am-8:25am) mid-morning (8:45am-11:30am) and afternoon (11:45am-2:30pm) sessions and the whole day on Wednesdays in the 2006/2007 academic year. The least GUR value of 40.7% was recorded during morning sessions whilst the highest rate of 65.5% for mid-morning sessions when the rooms were occupied by the students in the day. The GUR of 40.7% for the 17

classrooms was below the target rate of 53.3% recommended by URC (1988) as the efficient rates for the use of rooms at the tertiary institutions in Ghana. However, the GUR of 57.1% for the whole day indicates efficient use of the rooms as the rate was higher than the URC (1988) utilization of 53.3%. This means that some rooms were occupied by large students population that pulled up time utilization rate for the whole day value of 57.1% on Wednesdays in the 200/2007 academic year.

The GUR values of 58.4%, 88.0%, 67.2% and 71.2% recorded for general classrooms during morning (7:20am-8:15am), mid-morning (8:45am-11-30am), afternoon (11:45am-2:30pm) sessions and the whole day on Thursdays in the 2006/2007 academic year. The highest GUR of 88.0% was recorded during mid-morning sessions, whilst the GUR of 67.2% and 71.2% recorded for morning and afternoon sessions respectively. The whole day GUR of 71.2% was recorded during 2006/2007 academic year when the classrooms were put to use. These rates were higher than the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms.

The GUR values of 41.3%, 78.5%, 62.0% and 60.0% for general classrooms during morning (7:20am-8:15am), mid-morning (8:45-11:30am), afternoon (11:45am-2:30pm) sessions and the whole day respectively on Fridays in the 2006/2007 academic year. The least GUR of 41.3% was recorded during morning session, whilst high values of 78.5% and 62.0% recorded for mid-morning and afternoon sessions respectively when the classrooms were scheduled

for use by the students.

Average Global Utilization Rates for Special Rooms from Mondays to Fridays

Table 15 displays the Global Utilization Rates for laboratory and workshops from Mondays to Fridays for four consecutive weeks in the 2006/2007 academic year. Table 15 further shows the rate of morning (7:20- 8:15 am), mid – morning (8:45 am – 11:30 am) and afternoon (11:45 am – 2:30 pm) as well as the whole day during the study.

Table 15

Average Global Utilization Rate for Special Rooms from Mondays to Fridays

Space	Global Utilization Rate (%)			
Period	720-8:15am	8:45-11:30am	11:45am - 2:30pm	Whole Day
Laboratory				
Days				
Monday	0.0	116.3	147.1	87.8
Tuesday	0.0	279.5	320.5	200.0
Wednesday	307.7	269.2	346.1	307.7
Thursday	369.2	0.0	320.5	229.9
Friday	307.7	135.1	152.2	198.3
Workshops				
Days:				
Monday	0.0	17.7	0	5.90
Tuesday	145.5	24.3	233.4	158.6
Wednesday	0.0	240.9	245.0	162.0
Thursday	0.0	22.7	212.1	78.0
Friday	0.0	169.8	300.5	156.6

The global utilization rates for laboratory and workshops during morning, mid-morning and afternoon sessions as well as the whole day on Mondays in the 2006/2007 academic year are shown in the table 15. In the table, the GUR of 0.0%, 116.3% and 147.1% for morning, mid-morning and afternoon sessions respectively recorded for the laboratory during teaching and learning sessions. The GUR of 0.0%, 17.7% and 0.0% for morning, mid-morning and afternoon were sessions respectively recorded for the workshops when the rooms were put to use by the students. The over 100% utilization rates of classrooms indicate that these rooms were over-utilized as the rates were higher than the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms. These rates (over 100%) imply that a large number of students used the laboratory during teaching and learning sessions in the 2006/2007 academic year. The GUR of 0.0% for morning and afternoon sessions recorded for workshops as well as 17.7% for mid-morning session were less than the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms. The whole day rates of 5.9% and 87.8% for workshops and laboratory were respectively recorded for the rooms during teaching and learning sessions. The rate of 5.9% for workshops means that the rooms were under-utilized whilst the rate of 87.8% for laboratory indicates efficient use of the rooms by students during teaching and learning sessions.

As shown in Table 15, the global utilization rates for laboratory and workshops during morning, mid-morning and afternoon sessions as well as the whole day on Tuesdays in the 2006/2007 academic year. The GUR of 279.5% and

320.5% for mid-morning and afternoon sessions were respectively recorded whilst the least GUR of 0.0% was recorded in the morning sessions. The workshops obtained high GUR of 145.5% and 233.4% for morning and afternoon sessions respectively whilst the least value of 24.3% was recorded in the mid-morning session when the rooms were put to use. The whole day GUR for special rooms obtained 158.6% for workshops and 200% for laboratory were over 100% utilization rates which indicate that those rooms were over-utilized. This is because the rates were higher than the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms. These rates might be the results of a large number of students that used the laboratory and workshops during teaching and learning sessions in the 2006/2007 academic year.

Table 15 depicts the global utilization rates for laboratory and workshops during morning, mid- morning and afternoon sessions as well as the whole day on Wednesdays in the 2006/2007 academic year. The GUR of 269.2%, 307.7% and 346.1% for morning, mid-morning and afternoon sessions were obtained respectively when the laboratory was used by the students. The workshops obtained high GUR of 240.9% and 245.0% for mid-morning and afternoon sessions respectively whilst the least value of 0.0% was recorded in the morning session when the rooms were put to use by the students. The whole day GUR for special rooms obtained 162.0% for workshops and 307.7% for laboratory were over 100% which indicate that those rooms were over-utilized on Wednesdays. This is because the rates were higher than the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms.

From the table 15, the global utilization rates for laboratory and workshops during morning, mid-morning and afternoon sessions as well as whole day are obtained for Thursdays in the 2006/2007 academic year. The table shows that the GUR of 369.2% and 320.5% for mid-morning and afternoon sessions respectively were higher than the GUR of 0.0% for mid-morning session when the room was put to use by the students. The workshops obtained GUR of 0.0%, 22.7% and 212.1% for morning, mid-morning and afternoon sessions respectively when the rooms were put to use by the students. The whole day GUR of 78.3% for workshops indicates efficient utilization of the rooms even though the rate of 0.0% was recorded for morning session. The rate of 78.3% for efficient utilization of the workshops might be attributed to the large class sizes that used the rooms during afternoon session.

The global utilization rates for laboratory and workshops during morning, mid-morning and afternoon sessions as well as the whole day on Fridays in the 2006/2007 academic year are shown in Table 15. The GUR of 307.7%, 135.1% and 152.2% for morning, mid-morning and afternoon sessions were respectively recorded when the laboratory was put to use by the students. The workshops obtained GUR of 0.0%, 169.8% and 300.5% for morning, mid-morning and afternoon sessions were respectively recorded when the laboratory was put to use by the students. The whole day GUR values of 156.6% for workshops and 198.3% for laboratory were recorded on Fridays indicates that these rates were higher than the recommended target rate of 53.3% set by URC (1988) for efficient use of classrooms. These rates might be the results of large number of

students that used the laboratory and workshops during teaching and learning sessions in the 2006/2007 academic year.

Average Weekly Utilization Rates for General Classrooms in the 2006/2007 Academic Year

The average weekly utilization rates for 17 general classrooms were obtained by summing up all the averages of TUR, SUR and GUR in Tables 9,11and 13 from Mondays to Fridays in the 2006/2007 academic year.

Table 16

Average Weekly Utilization Rates for General Classrooms in the 2006/2007 Academic Year

Space	Period	TUR (%)	SUR (%)	GUR (%)
All	7:20-8:15am	86.7	58.1	62.0
Class-	8:45am-2:30pm	83.7	91.8	77.1
rooms	11:45am-2:30pm	75.7	83.5	63.7
	Whole Day	82.0	77.8	67.6

Table 16 shows average weekly TUR of 86.7%, SUR of 58.1% and GUR 86.7% for morning for general classrooms in the 2006/2007 academic year. The rates of 86.7% TUR and 62% GUR for the morning indicate that the rooms were efficiently utilized as compared to the target rates of 80% TUR, and 53.3% GUR recommended by the URC (1988) for efficient use of classrooms. The least rate of 58.1% SUR for morning for the week indicates that the rooms were under-utilized in terms of their space rate as the rate recorded were below 66.7% set by the URC (1988) for efficient use of instructional rooms in the tertiary institutions in Ghana. The rates of 83.7% TUR, 75.7% TUR, 91.8% SUR, 83.5% SUR, 77.1% GUR and 63.7% GUR recorded for mid- morning and afternoon sessions respectively during the week that the 17 rooms were put to use. These rates of 80% TUR, 166.7% SUR and 53.3% GUR set by the URC (1988) for efficient use of during afternoon session was close to the target rate of 80% set by the URC (1988). The whole day rates of 82.0% TUR, 77.8% SUR and 67.6% GUR for the weeks indicate that the 17 generalized classrooms were efficiently utilized to the URC (1988) recommended rates efficient use of teaching space facilities in the tertiary institutions in Ghana. The relatively low 58.1% SUR recorded was in the morning during the study. The URC (1988) suggested that under-utilization of teaching spaces occur if the utilization rate is below 50%. Based on this, it can be concluded that the utilization rates for the weeks were efficient. The whole day GUR of 67.6% shows over-utilization of the general classrooms during the 2006/2007 academic year as compared with the target rate of 53.3% set by the URC (1988) for efficient use of teaching space facilities in tertiary institutions.

From Table 16, the weekly average TUR of 82% for the 17 general purpose classrooms indicates that 14 general classrooms were utilized each period out of the 17 rooms which were available for use thought out the 7 periods in a day. This means that 3 out of the 17 general purpose classrooms were not utilized during the 7 periods that the rooms were available for use. Similarly, the weekly average SUR value of 77.8% for the 17 general classrooms observed during the study indicates that 512 students made themselves available to be taught for each period throughout the day compared with the total seating capacity of 658 teaching spaces provided at the general classrooms per period for prospective students. This reveals that the general purpose classrooms were efficiently used, and therefore tutors were able to supervise students work conformably during teaching and learning sessions in the general classrooms.

Average Weekly Utilization Rates for Special Classroom in the 2006/2007 Academic Year

The average weekly utilization rates for special classrooms (laboratory and workshops) were obtained by summing up all the averages of TUR, SUR and GUR in Tables 11, 13 and 15 from Mondays to Fridays during the 2006/2007 academic year.

Table 17

Average Weekly Utilization Rates from Special Classrooms in the 2006/2007 Academic Year

		Utilization Rates		
Space	Period	TUR(%)	SUR(%)	GUR(%)
Laboratory	7:20am – 8:15 am	60.0	196.9	118.1
	8:45am – 11:30 pm	66.7	185.1	160
	11:45am – 2:30 pm	86.7	287.5	257.3
	Whole Day	71.1	223.1	204.7
Workshops	7:20am – 8:15 am	10.0	43.7	43.7
	8:45am – 11:30 pm	36.7	147.0	95.1
	11:45am – 2:30 pm	63.4	230.3	196.2
	Whole Day	49.5	140.3	112.3

In the Table 17, the average weekly utilization rates for laboratory and workshops were derived by summing up all the averages of the TURs, SURs and GURs from Mondays to Fridays in the 2006/2007 academic year. The average weekly TUR values of 10.0% for workshops and 60.0% for laboratory were

recorded during morning sessions when the rooms were put to use by the students. Table 17 shows TUR of 66.7% and 86.7% for laboratory during mid-morning and afternoon sessions respectively whilst the TUR of 36.7% and 63.4% for workshops were recorded during mid – morning and afternoon sessions when the rooms were put to by the students. The whole day TUR of 49.5% and 71.1% for workshops and laboratory were recorded during the 2006/2007 academic year. These rates were lower than the recommended target rate of 80% set by URC (1988) for efficient use of classrooms. This means that the rooms were under-utilized in terms of time utilization rates throughout the week when the facilities were put to use. The average weekly TUR of 86.7% for laboratory during the afternoon sessions was higher than the average weekly TUR of 63.4% for workshops recorded respectively. Findings of the study revealed that TUR for afternoon sessions (86.7%) were higher than rates recorded in the morning and mid-morning sessions in the 2006/2007 academic year.

The average weekly SUR values of 43.7% for workshops and 196.9%for laboratory were recorded during morning sessions respectively. The SUR of 196.9% is an indication that the rooms were over-used whilst the rate 43.7% shows optimal use of the workshop. Table 16 shows SUR values of 147% and 230.3% obtained for workshops during mid–morning and afternoon sessions respectively. The whole day rates of 223.0% and 140.3% for laboratory and workshops were experienced during the study indicate that the rooms exceeded their utilization rates. In other words, the facilities were over-stretched beyond their capacity. This might result in crowding of students and as well as shortening

the life span of the facilities. According to Owolabi (1995), overcrowding makes supervision of students' work becomes practically impossible. Thus, tutors find it difficult to examine individual student work due to large number of students.

The average weekly GUR value of 43.7% recorded for workshops during morning sessions indicate that the rooms were used in terms of time and spaces by the students. The GUR values of 118.1%, 160% and 257.3% recorded for laboratory during morning, mid-morning and afternoon sessions respectively whilst GUR of 95.1 and 196.2% recorded for workshops during the mid–morning and afternoon sessions respectively were higher than the recommended target rate of 53.3% set by the URC (1988) for efficient use of the rooms. The rates recorded were higher than 60% rate set by Kenny and Foster (1983) as efficient use of teaching space facilities. This indicates that the teaching space facilities at the college were over–utilized. The GUR values recorded during the study in the 2006/2007 academic year indicate that the facilities were over-used. The student population far out-stripped the seating spaces available to them during teaching and learning sessions throughout the study. This might lead to over – crowding of students.

From Table 17, the weekly average TUR values of 49.5% and 71.1% for workshops laboratory indicate that 1 out of the 2 workshops and 1 out of the 1 laboratory were utilized per every period in the 7 periods that the special rooms were made available for use in a day. The TUR values for the special rooms indicated under-utilization of the rooms because their rates were lower than the

recommended rate of 80% set by the URC (1988). The observed of 80% TUR was used by all the levels of students in the college, perhaps relatively higher then the rate of workshops throughout the period of the study. The weekly average SUR values of 140.3% and 233.1% for workshops and laboratory indicated that about 15 and 30 students presented themselves for practical lessons each period in workshops and laboratory respectively as compared to the total seating capacities of 11 in workshops and 13 in laboratory, according to the estimated sating capacities basic on the URC rooms.

Utilization of Teaching Space and Associated Problems

The observational data had established that the time utilization rates (TUR), space utilization rates and the global utilization rates (GUR) for the teaching spaces were generally high from Mondays to Fridays. The problems associated with the utilization of the teaching space facilities at OLA College of Education at Cape Coast are presented in Tables 18 to 24.

Respondents' Views on How Often Lessons Were Held in the General Classrooms

Table 18 presents the views of tutors and students on how often teaching sessions were held in the general classrooms during the 2006/2007 academic year.

Table 18

Tutors' and Students' Views on How Often Lessons Were Held in the Classrooms

	Tutors		Students	
Responses	Freq.	%	Freq.	%
Always	22	84.6	128	91.4
Sometimes	4	15.4	12	8.6
Never	-	-	-	-
Total	26	100	140	100

From Table 18, the responses from both tutors and students on how often lessons were held in the general classrooms are displayed. 22 tutors (84.6%) responded that lessons were always held in the classrooms. In other words, tutors normally held lessons in the general classrooms allocated to a particular class and not any available classroom. The student respondents agreed that lessons were always held in the general classrooms as indicated on the school time table. The responses from tutors and students confirm the high TUR obtained during the study in the 2006/2007 academic year (see Table 10).

Respondents' Views on How Often Lessons Were Held in the Special Classrooms

Table 19 displays the views of tutors and students on how often lessons were held in the laboratory and workshops for the 2006/2007 academic year.

Table 19

Tutors' and Students' Views on How Often Lessons Were Held in the Special Rooms

	Tutors		Students	
Responses	Freq.	%	Freq.	%
Always	2	25	13	9.3
Sometimes	6	75	125	89.3
Never	-	-	2	1.4
Total	8	100	140	100

From Table 19, six tutors and 125 students who responded to the questionnaire agreed that the special rooms were sometimes used. The tutors interviewed gave their reasons for the low use of the special rooms as inadequate equipment, inadequate chemical materials and small space areas. This confirms high SUR for the special rooms obtained during the study. The TUR for

laboratory was high because at the time of study, Science was offered as a core course (Integrated Science) for all the students while the workshops obtained low TUR for morning sessions during the study (see Table 11).

Respondents' Views on Class Sizes

Data on the views of tutors and students on class sizes for general classrooms during the 2006/2007 academic year is illustrated in Table 20.

Table 20

Tutors' and Students' Views on Class Sizes

	Tutors		Students	
Class Sizes	Freq.	%	Freq.	%
25-30	3	11.5	7	5.0
30-35	4	15.4	12	8.6
35-40	6	23.1	41	29.3
40-45	11	42.3	58	41.4
45-50	2	7.7	14	15.7
Total	26	100	140	100

Table 20 gives useful information on the class sizes for 17 general classrooms during 2006/2007 academic year. About 29.3% of the student respondents expressed their opinions on the class sizes that the rooms would accommodate 35-40 students comfortably during teaching and learning sessions. However, 11

tutors (42.3%) agreed that the class sizes of 40-45 students would seat comfortably during lessons. This supports the high SUR (Table 11) recorded during the study.

Students' Opinions on Permanent Seats Available during Lessons

The responses on the students' views on permanent seat available in the classrooms during teaching and learning sessions in the 2006/2007 academic year are displayed in Table 21.

Table 21

Students' Opinions on Permanent Seats Available during Lessons

Responses	Freq.	%
Yes	140	100
No	-	-
Total	140	100

The student respondents (100%) agreed that all the classrooms had permanent seats during lessons. This implies that no students had to look for a seat during lesson. In other words, there was adequate furniture for students during teaching and learning sessions during the 2006/2007 academic year.

Respondents' Views on Problems Associated with the General Classrooms

Table 22 provides useful information on problems associated with the use of general classrooms for the 2006/2007 academic year.

Table 22

Tutors' and Students' Views on Problems Associated with the General Classrooms

	Tutors		Students	
Responses	Freq.	%	Freq.	%
Yes	3	11.5	44	31.4
No	23	88.5	96	68.6
Total	26	100	140	100

23 tutors and 96 students agreed that there were no problems associated with the use of general classrooms as shown in Table 22. However, tutors (11.5%) and students (31.4%) of the respondents agreed that general classrooms were associated with problems such as overcrowding and poor ventilation. The data on SUR (Table 11) confirmed that most teaching space facilities were overcrowded leading to poor ventilation and destruction of teaching space facilities.

Respondents' Views on Problems Associated with the Special Rooms

The responses on tutors' and students' views on problems associated with the use of laboratory and workshops during 2006/2007 academic year are shown in Table 23.

Table 23

Tutors' and Students' Views on Problems Associated with the Special Rooms

	Tutors		Students	
Responses	Freq.	%	Freq.	%
Yes	5	62.5	104	74.3
No	3	37.5	36	25.7
Total	8	100	140	100

From Table 23, five tutors and 104 students agreed that there were problems connected with the use of the special rooms. The student respondents identified inadequate floor space, insufficient furniture and inadequate equipment as some of the problems associated with the use of special rooms. From the interview sessions held with tutors, it came to light that there were inadequate floor space, inadequate chemicals, no laboratory assistants and inadequate equipment at the rooms. This was the result of low TUR of the workshops and laboratory (Table 10).

Respondents' Views on Problems Associated with the Time Utilization Rates for Special Rooms

One problem that affects the time utilization rates of special rooms is the time taken to prepare for practical work and clean up of the rooms. In the observation data, it was found out that apart from the laboratory, the TUR values for special rooms were very low during the morning sessions (see Table 13). The researcher explained the situation by finding out the number of hours taken by the tutors to prepare for practical work and clean up after practical work. Table 24 displays the information on the time taken to prepare for practical work and clean up of the rooms during teaching and learning sessions. From the interview session held with the tutors who formed part of the study, most of them expressed the views that they usually use one to two hours to prepare for practical lessons and use less than one hour to tidy up the place after practical work. The College does not have assistant laboratory technicians to assist with the setting out of practical works and clearing up of the rooms.

Table 24

Time taken by Tutors to prepare for Practical Work and Clean Up at the Special Rooms

cleaning of room			set up of room for practical work	
Time taken	Freq.	%	Freq.	%
Less than 1 hour	1	12.5	6	75
1 hour	4	30.0	2	25
2 hours	3	37.5		
Total	8	100	8	100

From the table, the low rates were obtained during the observation, since an hour used for setting up and cleaning up can be used to increase the periods for the practical work. The time spent for setting out and cleaning up special rooms, which might have resulted in the low rates of special rooms confirm reports of Kenny and Foster (1983) that it is unrealistic and unachievable even with the application of computerized time table and space allocation. Owolabi (1994) said that, the assumption that teaching space would have utilization rate of 100% is impracticable.

Another problem identified with the use of special rooms was the number of practical lessons held in a day. From the interview held with the tutors in charge of special rooms, it was evident that at most, two practical lessons were

held in a day. In all, eight hours of practical lessons were held in a week for one laboratory at the College. This means that only few groups could be taught at a given time. Hence the few rates recorded for TUR in a week (Table 13). The tutors explained that their inability to conduct frequent practical lessons was due to loaded course content to be covered within four semesters for the academic years. UNESCO (1985) supports this view by commenting that course content and method of delivery act together to determine scheduling of teaching space facilities for specific courses which indirectly influence their time utilization rates within a given period of time (other factors held constant).

New Structures under Construction

At the time of the research, new structures were being put up at the College. These constructional works were part of the Ghana Government's plan to upgrade all the 38 Teacher Training Colleges into Colleges of Education. These new structures were made up of additional science laboratory, dormitory and assembly hall to address the problem of congestion at the College.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The important role that the Colleges of Education in the country play cannot be overemphasized. Colleges of Education produce professionally trained and certified teachers who teach in the Basic schools in the country; hence the quality of their training is crucial. It is therefore important that teaching space facilities at the Colleges of Education be assessed in order to ensure efficient utilization of the facilities for quality training of students.

The URC (1988) observed that most tertiary institutions (including Colleges of Education) were built between 1951 and 1966 and since then, many of them have seen very little or no renovations. Even though, enrolments in the colleges have increased over the years, there has not been any corresponding expansion of the facilities in most of these institutions. In the light of these reasons, the research was undertaken to find out the utilization of teaching space facilities at the College of Education, Cape Coast. The study was meant to answer the following questions:

1. What is the time utilization rate of teaching space facilities at OLA College of Education at Cape Coast?

2. What is the space utilization rate of teaching space facilities at OLA College of Education at Cape Coast?

3. What is the global utilization rate of teaching space facilities at OLA College of Education at Cape Coast?

4. What are the problems associated with the utilization of teaching space facilities at OLA College of Education at Cape Coast?

The review of literature focused on aspects such as the assessment of elements that affect time and space utilization rates of teaching space facilities of the institutional buildings.

The study adopted the descriptive case study design and data were collected through the use of questionnaires, interviews and observation of class attendance during teaching and learning sessions in the 2006/2007 academic year. The study showed that the attendance of class by both tutors and students was very regular. For example, most of the classes had 100% attendance and the few times a student or two were absent for a lesson did not affect the result significantly. In other words, the class sizes for all classrooms were even or almost the same throughout the period of the study. The timetable for the use of teaching space facilities remained the same throughout the first and second semesters of the 2006/2007 academic year.

Summary of Findings

The principal findings of the study are as follows:

1. The average time utilization rates of 49.5% and 71.1% were recorded for workshops and laboratory respectively in the 20006/2007 academic year. The time utilization rates for the special rooms indicated under- utilization of the rooms in terms of time as compared to the URC (1988) rate of 80% for efficient use of the instructional rooms in tertiary instructions. The low TUR values might partly be the result of the tutors' preference to use the general purpose classrooms for practical lessons due to small floor space and inadequate furniture for the students on roll in the special rooms, and the departmentalization of timetabling and space allocation practised by the College. However, the study showed that the 17 general classrooms were efficiently utilized. The time utilization rate of 82.0% indicated efficient use of the classrooms as compared to the rate of 80% set by the URC (1988). This rate implied that the general classrooms were fully used anytime a lesson was scheduled in a room.
2. The average space utilization rates of 140.3% and 223.1% for workshops and laboratory were generally very high. Further, the SUR values of over 100% for the special rooms indicated an over- utilization of the instructional rooms as compared to the URC (1988) target rate of 66.7%. These high rates showed that the special rooms were occupied by large class sizes of students during teaching and learning sessions. This might

result in discomfort, uncongenial learning environment and high rate of equipment destruction. The space utilization rate of 77.8% for the general classrooms indicated efficient use of the rooms as compared to the target rate of 66.7% set by the URC (1988). The rate indicated that the students were comfortably accommodated in the rooms during teaching and learning sessions.

3. The average global utilization rates of 112% and 204.7% for workshops and laboratory respectively indicated that the special rooms were occupied by large student population but not in terms of time. The over 100% utilization indicated that the special rooms were over-utilized as these rates were far above the recommended rate of 53.3% set by the URC (1988) for efficient use of the instructional rooms. The information on the global utilization rates depicted that the instructional rooms were over-crowded during teaching and learning sessions. The global utilization rate of 67.6% for general classrooms indicated efficient use of the rooms as compared to the URC (1988) target rate of 53.3%. The findings revealed that the 'OUT' segment programme in the College did not lead to under-utilization of space as claimed by some educational administrators. The rate showed that the classrooms were efficiently used in terms of time and space utilization rates.
4. Data on the use of classrooms illustrated that there were problems associated with the utilization of teaching space facilities such as poor ventilation, inadequate space and inadequate furniture. This situation was

attributed to large student population, the allocation of classrooms to departments and timetabling system practised by the College.

Conclusions

From the findings of the study, the following conclusions are drawn.

1. One obvious conclusion is that the special rooms were under-utilized in terms of time due to poor timetabling and space allocation. This means that the special rooms were not fully used, or sometimes empty, anytime a lesson was scheduled in the room. Further, the low time utilization rates of the special rooms were the result of tutors' preference to hold practical lesson in the general classrooms due to small floor space and inadequate furniture at the special rooms.
2. Another conclusion that can be made from the findings is that the special rooms were overcrowded in terms of space. As observed by Owolabi (1995), overcrowding makes supervision of students' work become practically impossible. This implies that individual student's creativity and originality is not encouraged due to large student population. Further, overcrowding of space might lead to discomfort and uncongenial environment during teaching and learning sessions.
3. The study revealed that the general classrooms in the College were efficiently utilized. This means that the number of students who use the Classrooms were proportional to the available seating places at the time of

the study. It is obvious to conclude that the College's administration maintain the efficient use of these facilities now and in the future.

4. The study observed that the College faces challenges such as poor ventilation and inadequate floor space. Further, poor ventilation and inadequate floor space lead to hot, stuffy and uncongenial learning environment which may result in stress on the part of the users. Also, hot environment causes the tutors to cut short the hours of teaching which may result in low time utilization rates.

Recommendations

Based on the conclusions, the following recommendations are made.

1. With regard to the under - utilization of time for the special rooms, the study recommends that in the short run, splitting of large classes into small classes would improve time utilization rates but increase the use of tutors' time. Further, the study recommends that the Principal of the College should ensure that the maximum workload of tutors should be taken into consideration in order not to over burden them.

2. The overcrowding of students in the special rooms could be controlled. In the short run, the large classes could be split into small classes to overcome the problem of overcrowding. Further, in order to accommodate future expansions, it may be advisable to consider building large classrooms with capacity of 50 or more seats, but with moveable partitions. Since Colleges of Education are in

transition to become tertiary institutions, it is recommended that the Ministry of Education should provide the needed facility to support educational training of the students.

3. The study recommends that the College's Principal should admit students based on the available seating capacities of the rooms.

4. The introduction of centralized time-tabling at the College could help in eliminating poor time-table planning. The centralized time-tabling eliminates the situation whereby classrooms are dedicated or assigned to a particular year group or course. Hence, the practice of departmentalization of teaching space should be reduced to the nearest minimum.

5. There is the urgent need to improve the general ventilation level within the teaching spaces of the College so as to eliminate discomfort and uncongenial learning conditions.

6. The study recommends that from time to time, seminars or workshops on timetabling are organized for principals and tutors who are responsible for time-table preparation at the college by Directors of Education of the Ghana Education Service.

Suggestion for further Study

To get a global picture, the researcher suggests a study into the utilization of teaching space facilities in all the 38 Colleges of Education in order to ensure efficient planning of short and long term admissions of students.

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APPENDIXES

APPENDIX A

QUESTIONNAIRE FOR TUTORS

Introduction

The questionnaire has the objective of seeking information on teaching space utilization at OLA Teacher Training College, Cape Coast in Central Region. The study may help in improving the teaching space utilization in your college.

Kindly respond to each item of the questionnaire as candidly as you can. All information shall be treated as confidential.

Tick [√] the appropriate response or provide your suggested answer in the space provided.

TEACHING SPACE FACILITIES

1. State your working experience at the present college.

   a. 1-5years [ ] b. 6-10years [ ] c. 11- 15yars [ ]

   d. 16-20years [ ] e. 21years and above [ ]

2. What subject(s) do you teach? ……

3. What class (es) do you teach? ……

4. Does every student have seat to herself while you teach?

   a. Yes [ ] b. No [ ]

5. If no to (Q4) give reason(s) ……

6. Can you move around freely in the classroom while teaching?

   a. Yes [ ] b. No [ ]

7. If your answer to question 6 is No, give reason(s)

   ……

   ……

8. How many hours per week do you use in teaching?

   ……

9. How many students will sit comfortably in a classroom during a teaching session? ……

10. How many students will sit comfortably in a special room during practical session? ……....

11. In your opinion, what is your view about the existing time table of the college? a. Excellent [ ] b. Satisfactory [ ] c. Poor [ ]

    d. Very deficient [ ]

12. In the below, kindly tick to show where and often your lessons are held. Tick [√] those which applies to you.

	Place held					
	Science laboratory / workshop			Classroom		
	How often held			How often held		
	Always	Sometimes	Never	Always	Sometimes	Never
Biology						
Physics						
Chemistry						
Catering						
Sewing						

13. Are there any problems connected with the classroom?

a. Yes [ ] b. No [ ]

14. If yes to (Q13) state problem(s)

……

…….

15. Are there any problems connected with the special rooms?

a. Yes [ ] b. No [ ]

16. If yes (to Q15) state the problem(s) ……

…….

……

17. In your opinion, do you think the college needs additional classroom blocks to enhance teaching? a. Yes [ ] b. No [ ]

18. State your reason(s) to (Q17)…….

……

……

19. Please give your suggestion(s) for improving utilization of teaching space in your school.

……

……

……..

APPENDIX B

QUESTIONNAIRE FOR STUDENTS

The questionnaire has the objective of seeking information on teaching space utilization at OLA Teacher Training College, Cape Coast in central Region. The study may help in improving the teaching space utilization in your college.

Kindly respond to each item of the questionnaire as candidly as you can. All information shall be treated as confidential.

Tick [√] the appropriate response or provide your suggested answer in the space provided.

Teaching Space Facilities

1. In what year or level are you?

   a. level 100 [ ] b. level 200 [ ]

2. Please state your class (e.g. 1 M, 2A, etc) ……

3. What programme are your pursuing? Indicate your programme with a tick [√].

PROGRAMME

DBE (Catering) [ ]

DBE (Sewing) [ ]

DBE (Physical Education) [ ]

DBE (Religious and Moral Education) [ ]

DBE (Ghanaian Language, Twi) [ ]

DBE (Ghanaian Language, Fante) [ ]

DBE (Social Studies) [ ]

DBE (Art Related) [ ]

4. Do you have a permanent seat in your classroom?

   a. Yes [ ] b. No [ ]

5. Do you have a seat to yourself in your classroom during lessons?

   a. Always [ ] b. Often [ ] c. Not often [ ] d. Never [ ]

6. Can you move about freely anywhere in the classroom?

   a. Yes [ ] b. No [ ]

7. Is the classroom well ventilated? a. Yes [ ] b. No [ ]

8. Do you have any official lessons after the normal class periods?

a. Yes [ ] b. No [ ]

9. If your answer to questions 12 is yes give reason(s)

……

……

……

10. In your opinion, what is your view about the existing time table of the college? a. Excellent [ ] b. Satisfactory [ ] c. Poor [ ]

d. Very deficient [ ]

11. Looking at the size of your classroom, what in your opinion should be the maximum number of students in the class?

……

……

12. In the table below, kindly tick to show where and how often your lessons are held. Tick [√] those which applies to you.

	Place held					
	Science laboratory / workshops			Classroom		
	How often held			How often held		
	Always	Sometimes	Never	Always	Sometimes	Never
Biology						
Physics						
Chemistry						
Vocational skills						
Art Related						

13. Are there any problems connected with the specialized rooms?

a. Yes [ ] b. No [ ]

14. If yes to Q.13) state problem(s)

……

……..

15. Are there any problems connected with the classrooms?

a. Yes [ ] b. No [ ]

16. If yes to (Q.15) state the problem(s)

……

……

17. In your opinion, do you think the college needs additional classroom blocks to enhance efficiency?

a. Yes [ ] b. No [ ]

18. State yes to (Q. 17) state your reason(s)?

……

……

……

19. Please give your suggestion(s) for improving utilization of your classroom

……

……

APPENDIX C

INTERVIEW GUIDE FOR TUTORS

1. Interviewee's Department: science department and vocational skills departments.

2. Status: ……..

3. Number of years worked in the department: ……..

4. Hours of work per day (average): ……

5. Number of hours used to prepare for a practical lesson: ……

6. Numbers of hours used to tidy up a workshop/ laboratory after a practical lesson: ……..

7. Is the number of personnel in your laboratory / workshop adequate for the practical lesson organized for the week?

   ……

   ……

8. Number of practical lessons that can be held in a day (e.g. 1,2,3,4 etc.)

   ……

9. What can be done to improve the current level of utilization for the laboratory/workshop? ……

APPENDIX D

OBSERVATION CHECKLIST FOR GENERAL CLASSROOMS

Instrument 1: Space utilization: frequency of use of classrooms

Date: Day: Norm for seating capacity: 1.84m^2/students

BLOCKS	**DBE 1**								**DBE 2**								
RM NO.	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
PERIOD																	
7:20-8:15																	
BREAK																	
8:45-9:40																	
9:40-10:35																	
10:35-11:30																	
BREAK																	
11:45-12:40																	
12:40-1:35																	
1:35-2:30																	
TOTAL																	

APPENDIX E

OBSERVATION CHECKLIST FOR SPECIAL ROOMS

Instrument 2: Space utilization: frequency of use of classrooms

Date: Day: Norm for seating capacity: laboratory. 7.50m2/students

BLOCKS	**SCIENCE LABORATORY**
Room capacity	
Room No.	
Period	Number of students present
7:20-8:15	
BREAK	
8:45-9:40	
9:40-10:35	
BREAK	
11:45-12:40	
12:40-1:35	
1:35-2:30	
TOTAL	

APPENDIX F

OBSERVATION CHECKLIST FOR SPECIAL ROOMS

Instrument 3: Space utilization: frequency of use of classrooms

Date: Day: Norm for seating capacity: workshops. 7.50m^2/students

BLOCKS	**CATERING WORKSHOP**	**SEWING WORKSHOPS**
Room capacity		
Room No.		
Period	Number of students present	
7:20-8:15		
BREAK		
8:45-9:40		
9:40-10:35		
BREAK		
11:45-12:40		
12:40-1:35		
1:35-2:30		
TOTAL		

APPENDIX G

Inventory of Teaching Space Facilities at OLA Teaching Training College at Cape Coast in the 2006/2007 Academic Year.

Room No.	Interior Measurement			Estimated Seating Capacity	Actual No. of students on Roll
	Length(m) / Width (m)		Area (m^2)		
1J	12.60	7.10	89.46	49	44
1K	12.60	7.10	89.46	49	47
1L	12.60	7.10	89.46	49	40
1M	12.60	7.10	89.46	49	48
1N	11.00	7.10	78.10	42	45
1P	7.10	6.70	47.57	26	40
1Q	12.60	7.10	89.46	49	39
1R	12.60	7.10	89.46	49	40
2A	8.30	7.60	63.08	34	45
2B	8.30	7.60	63.08	34	50
2C	8.20	7.40	60.68	33	43
2D	7.30	6.40	46.72	25	34
2E	7.30	6.40	46.72	25	35
2F	7.30	6.40	46.72	25	35
2G	8.30	7.60	63.08	34	37
2H	8.30	7.60	63.08	34	35
2I	12.6	7.10	89.46	49	39
Science Lab	12.50	7.60	95.0	13.0	-
Catering Wks	11.0	7.22	79.50	10.60	-
Sewing Wks	11.0	7.22	79.50	10.60	-