Changing Trends of Medical School Curriculum, Effect of Technology and Role of Libraries: 
A Case Study at the Caribbean Medical Schools

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1. ABSTRACT

It is an era of ‘Gen Next’ and those seeking admission into a professional school are millennium students. The medical school curriculum in US and Caribbean is going through toughest reviews and scrutiny. It keeps on refocusing regularly. The technological advances that have influenced medical education have created demands for suitable shift in the curriculum of medical schools from traditional to incorporate several aspects like evidence-based medicine. The libraries are trying to keep up with changing trends in medical education to acquire all that is needed to support teaching, research, and healthcare. Off-shore medical schools, irrespective of what the LCME, the AMA and the AAMC consider of these, are crucial part of US medical system which largely depends on the graduates of these schools to fill the physician void by allowing them to enter the mainstream of American medical system. Since the establishment of the first medical school in one of the Caribbean states - Cuba in early part of the 18th century; and later at Montserrat in 1978, at Dominica in 1979, medical schools in other Caribbean islands are being established on a regular basis. Each medical school in the Caribbean region has adopted a typical curriculum that it feels will prepare students to be better qualified, knowledgeable, and skilled professionals. Most of schools in the Caribbean region do have a excellent library system offering traditional as well as state-of-the-art services - digital and web-based. However, there are a few among these that lack a sound library system to augment medical education and teaching. The author gives brief account of his experiences in the establishment of health sciences libraries at the two different medical school, which are now considered as the major schools in Caribbean region. This article narrates the efforts, challenges, and problems encountered while establishing and upgrading libraries to the acceptable International standards.

2. INTRODUCTION – TRENDS IN MEDICAL EDUCATION AND CHANGING PATTERNS OF CURRICULUM

The first decade of 21st century is viewed as the second great expansion of post-flexnerian medical education in the USA (1). After a period of 30-years, thirty-five peers and experts in US medical education met and have voiced concerns that current system in the US is unsuitable for the nation and recommended change of direction from the curricular reorganization to educate 21st century physicians (2). Medicine is a social activity that occurs in the context of social mores and customs; mutual respect between student and teacher or author and reader is an essential element of education and “Medicine is a profession that incorporates science and the scientific methods with the art of being a physician” (3). Biomedical literacy is a national imperative and is viewed as a platform for teaching science, ethics, technology, life and death. Tomorrows doctors need to be life-long learners and must adopt to the new information sources and technologies. A Physician is defined as a person having a set of skills and knowledge that is applied in the practice of medicine (4). A physician must possess strong scientific knowledge, best skills in communication, act in a professional manner, and provide patient care with understanding of the cultural and spiritual dimensions of his/her patients. Medicine is practiced from the philosophy of life - about what is
important in life and on assumption about health. The medical educators of the world must introduce the benefits and limitations of this view to medical students in every medical school. This could be achieved through structured curriculum that intentionally interweaves patient vignettes and case studies into the basic sciences, thereby meeting mandate of professionalism related to bias and self awareness against the effects of the hidden curriculum and bolster the status of social and behavioral sciences in medical education.

3. Medical Schools in the Caribbean - Brief

There are 1900 medical schools located in six of the seven continents as of 2007 and very little information is available about some of these, except in few countries and regions (5). The US citizens are likely to get trained in the Caribbean countries and attend a very limited number of medical schools in handful of countries (6). During the period 1983-2002, more US citizens graduated from Central America and the Caribbean than any other geographic region of the world (7).

There was a decline in the US citizens choosing a foreign medical school during 1980’s (8). A study by the ECFMG and AAMC shows that 10, 460 US citizens attended 359 medical schools from 75 countries and of these, 74% studied medicine in Mexico or the Caribbean (6). This study also shed light on the important fact that 55% of these students did not at all apply to a US medical schools, contrary to a fact that US citizens who choose any off-shore medical school do so after they had unsuccessful attempt to gain entry into a US medical school.

The Caribbean medical schools lack facilities for clinical training for their students. As a result, most of these seek accreditation from US State Medical Boards to enable their students to rotate in the US teaching hospitals (9).

3.1 Curricula in Caribbean Medical Schools

The aim of off-shore medical schools is to impart medical education on the same lines as those of US medical schools. These medical schools try extremely hard, in a competitive market, to ensure that their curriculum up to date and includes courses that will assist students to get education that will help them pass the USMLE Step I exam at the first attempt and to score high at these exams. As has been on record that some off-shore students have excelled and scored 99.9 percentile at the USMLE part I exams. It is those students- a very large part of the student population from the Caribbean that is at the cross-roads. They do not score high points at the USMLE and therefore do not get matched for residency programs their choices easily.

Curricula of the medical schools has been going through rigorous overview regularly to incorporate the topics in a particular course on the basis of National Board of Medical Examiners (NBME) or on the patterns of the USMLE course contents and their coverage at the Step I examination. The medical schools do not add contents to their curriculum because it is already overloaded (10). These have considered on how to improve, encourage and innovate in the redesign of their educational programs that lead to an improvement of education of students (11). A study showed that a new integrative, interdisciplinary curricula was preferred by medical students to a traditional one at one school (12). It is recommended that lecture-based curriculum be changed to a student-centered, self-directed, life-long educational model and is needed to prepare the 21st century physicians (13). A study (14) demonstrated the value of the problem-
based learning in acquisition of knowledge for basic sciences and enhanced student satisfaction with learning process. The students expressed satisfaction with the new curriculum, and they performed well at the National Board of Medical Examiners (NBME). The University of New South Wales has adopted a new curriculum management system called the eMed. Evaluation results have proved high level of acceptance by teachers as well as students to improve the curriculum at every medical school.

3.2 History of Caribbean Medical Schools

All the developing nations have knowledge-based and technologically driven societies and in depth knowledge is critical for development. The Caribbean region consists of sixteen nations. These are (i) Antigua & Barbuda (ii) Aruba (iii) The Bahamas (iv) Barbados (v) Cuba (vi) Dominica (vii) Dominican Republic (viii) Grenada (ix) Guyana (x) Haiti (xi) Jamaica (xii) Montserrat (xiii) St. Kitts & Nevis (xiv) St. Lucia (xv) St. Vincent & the Grenadines and (xvi) Trinidad & Tobago.

Currently there are 24 functioning off-shore medical schools in the Caribbean including those in Belize, Bonaire, Mexico, St. Eustasius, and two Netherlands Antilles countries - Curacao and St. Maarten. According to a recent publication (15) there are 56 working medical schools in the Caribbean, some of these have closed. This number includes seven medical schools in Cayman Islands, and the Netherlands Antilles. Some medical schools were established in the later part of 18th century such as in Cuba; and few were established after 2000.

This paper takes into account the medical schools in the Eastern Caribbean States (ECS), which consists of six nations/islands - Antigua & Barbuda, Barbados, Dominica, Grenada, St. Kitts & Nevis, St. Lucia, and St. Vincent & the Grenadines. These institutions play an extremely important role to cater to the needs of students who do not get accepted at the US medical schools, and thus alleviate the physician shortage in the US. In the US, there has been an increase of only 3% in the student class size in the last 25 years and it was suggested that an increase of 30% in class size will be the remedy for the physician shortage (16, 17) but it is true that this increase will in no way change the shortage of physicians in the US.

ECFMG Annual Report of 2006 (18) gave some facts which are interesting to note. There were a total of 20,605 students who took the USMLE Step I examination, of which 15,638 were foreign citizens and 4,967 were US citizens. Passing rate of US citizens at the USMLE I is 60%; against 66% of non-US citizens from Off-shore medical schools. The largest number of US citizens who took Step I from off-shore medical school stood at 1,367 from Dominica; 1,035 from Grenada; 969 from Netherlands Antilles; 897 from Mexico, and 679 from Cayman Islands.

Of the 16 off-shore medical schools in the Eastern Caribbean States (ECS), the oldest is the American University of the Caribbean School of Medicine (AUC), established in 1978; followed by Ross University School of Medicine, 1979; and The Trinity School of Medicine, St. Vincent & the Grenadines - the newest has opened its doors to students in September 2008 -; and the University of Medical and Health Sciences, St. Kitts, in May 2008.

Physicians face challenges in patient care because of the poor links between lower socioeconomic status and poor health and current medical school curriculum do not adequately prepare students to address this issue despite the recommendations of the AAMC and Institute of Medicine (19). The goal of all off-shore medical schools is to tailor their Basic Medical Science curriculum and teaching with as much parity as possible with those of US medical schools. The students accepted by the individual school gain sufficient
knowledge to pass the USMLE Step I, which is the gateway to enter the United States to practice medicine. While several students from most medical school do achieve this, a sizeable do not either pass or score high at these examinations, and fail to enter the US medical profession.

Among those studying in the off-shore Medical Schools over 95% are either US citizens or residents and remaining are Canadian citizens and a few foreigners. It has been a top priority for the Eastern Caribbean States medical schools to achieve significant success so that they are self sustained to be considered as well established schools by the students seeking to enter medical profession at the off-shore medical schools. One of the criteria, among those would-be medical students and their parents, have always been the passing percentage of the students at the USMLE Step I examination; as well as whether a particular medical school has accreditation by New York State, Florida State, Texas State, California State, or New Jersey State Medical Boards of Medical Education. These are the yard sticks for students and their parents to consider a particular school to enter medical profession.

Therefore the medical schools in the Caribbean region have been trying very hard to get accredited to the US States medical boards and as such they spend heavy budget to ensure that their libraries are up-to-date in collection, have qualified professional personnel and offer professional services to both the students and faculty of the institution. The Medical Schools preferably hire experienced faculty from the US, which has posed serious problems as the faculty is difficult to get. In the absence of these faculty, most medical schools recruit and hire overseas teachers with Ph. D. or Medical Degrees for the Basic Science teaching. Because of numerous off-shore medical schools, and their competitive nature, it is becoming increasingly difficult to attract these faculty as well. As such most of these medical schools have on their faculty, Internationally qualified basic science teachers, who have proved to be excellent and are playing crucial role in the off-shore medical schools.

4. **Library at a Medical School**

All developing nations have knowledge-based and technologically driven societies. The library is regarded as a social institution ever since its social and educational role was focused in the early part of the 20th century. It is the responsibility of a scientific library to meet satisfactorily requirements from its users for documents, information, as well as for a place/space for intellectual work. A library has to be self-sufficient in an institution; if it is not, then progress of the institution is hampered when the students and faculty seek outside resources for their requirements (20).

A library is always referred to as a trinity of reading materials, users and library personnel. It cannot function in absence of any one of these elements. Special libraries cover a broad and diversified range of services that go far beyond that of general library (21). A medical library is very special in that its existence is critical for a medical school. Tomorrow's doctors need to be life-long learners and adopt to the newer information, its sources and technologies. A library must be an active participant in accepting the challenges to change the teaching methodology in medical sciences. The libraries needs to play a more central role in the implementation of programs that focus on the beginning experiences of college students. It is argued that in the developing nations libraries must strengthen their functions of instruction and information (22). There exist a need for better quality, and focused continuing professional development directed at specific library sectors (23). The tremendous technological development and advances and their importance to the information industry have demonstrated importance to an organization to manage its resources efficiently and adequately. It is the responsibility of an organization to know how to use its resources of knowledge to improve the process of information and learning of their students.
The libraries of the world are shifting their emphasis from print to digital user-oriented or centered approach library services. The primary role of the libraries and librarians is to connect people with information - books, manuscript- printed or digital. Each library must, as a rule, impart such courses to medical students to put the library resources to proper and better use which will bring rewards to the students and the school. Librarians are responsible to introduce enormous resources and knowledge to their users to help them develop a self-learning approach, which can be accomplished through the instruction in the library use - the user education. The training a medical librarian provides to users with regard to the information seeking will enhance the physicians' skills of patient care and impact the sick. Patient-physician communication provides foundation for communication skills training for students in medical education (24).

Diffusion of innovation must include knowledge, persuasion, decision and confirmation to be effective. It shows the significant impact. The specific features of electronic reference materials have on their adaptation; and the most effective attributes of electronic reference sources are their ability to facilitate information retrieval and accumulation of large volumes of information; shortening the time of search; and accessing a variety for information sources from all over the world; their fair cost of resources and availability of help options. Examples are also present of slow diffusion of innovation in health information and library work (24, 26).

A study suggested that libraries should be well equipped to support physicians in evidence-based medical practice (27) which is the trend of the day. There are medical schools in the Caribbean, which do not have a good library facility, because they are too small and that they can not afford to spend large budget on this essentially required unit of the medical school.

4.1 Personnel

Professionals are not immune to the evolutions in technology and innovations, service provisions and customer expectations than any other professional group. This category includes professionally qualified librarians, assistant librarians and information specialists to manage several professional task in a library such as acquisition, technical services, administration, reference and currently there is evidence for audiovisual librarian and web-based librarian, etc. Some might opine that the 21st century has seen libraries without walls, so why require library personnel? The library personnel are liaising integral group in that they will match the specific information to particular user and thus save time of user. The support staff are essentially important as they actually manage routine task in library and serve the users- students as well as faculty.

Evidence-based librarianship requires international collaboration. There are voluminous materials in print and on the web about relationship of problem-based learning curriculum in librarianship. Importance of the interaction between health sciences libraries and problem-based curriculum has not adequately been addressed (28). The librarians are information providers who are capable of opening the channels of access to satisfy their users’ needs (29). The librarians are public health workforce, and their role is to keep clinicians up to date on the latest information and also to promote feedback loop between local practitioners and local public health. The librarians are information professionals who have evolved from acting as resource providers to critical appraisers, educators and change managers (30). The role of a librarian is not unlike that of a match-maker, where right user is matched with right resources (31). The librarians have to transform their role; with the health environment of uncertainty, organizational change and increasing pressure on financial resources, demands on library services and skills of library professionals continue to increase.
The availability of professionally qualified, diligently competent and experienced library personnel in the medical library management is not only difficult, but hard. These professionals from the US mainland are most suitable, but tend to reject the offers from Caribbean Islands for various reasons ranging from-salaries, away from family, home, relocation and high cost of living. Some institutions offer competitive salary and tax exemption benefits on salaries, which they have negotiated with governments of Caribbean nations. Other benefits for senior staff include, health insurance, CE opportunities, and Annual membership to professional societies/associations. Irrespective of salaries and perks, it is extremely difficult for most to leave families and relocate to an Island about which they hardly know anything. However, there are exceptions.

Medical libraries are very special, because these provide unique services to the future doctors and teachers who have so much varied requirements. To seek locally qualified library support staff becomes a problem. The support staff with medical library or any library experience from local population is extremely hard, as experienced are not available. Some high school graduates without any library experience are ready to take these positions. The citizens from other Caribbean Islands are available with library experience. If appointed, they require "Work Permit" from Labor Ministry to accept a job as a foreigner. It is not difficult to obtain work permit for qualified personnel, but due to meager salary structure, the citizens of other Eastern Caribbean States do not wish to relocate and accept the job offers. Therefore the only choice for libraries is to hire local support staff and train them in day to day medical library management including but not limited to serving students and faculty with reading materials, assisting with photocopying, circulation of reading materials, etc. These local support staff are extremely helpful and are ready to learn the medical library management.

It is mandatory that librarians, to be able to provide effective services to users, must get education to make use of the technological advances. A study (32) finds that librarians are affected by technology in the areas of - (a) affective change (b) personal change, (c) performance (d) workload, (e) training and education, and (f) management issues and stress. The professional development of librarians is essential to keep up to date in the ever changing profession (23) and professional obligation. The Librarians need to improve their skills to play role as members of healthcare team (33). It has been observed that appointment of Staff Development Committee (SDC) has proved to be extremely useful (34), which developed programs to enhance workplace skills and personal growth, communicate existing programs and opportunities at the institution and finally encourage staff to participate in these opportunities. Creation of such SDC will guide a library, especially in the Caribbean medical libraries to prepare their staff meet the challenges of modern times.

4.2 COLLECTION OR RESOURCES

The changes in the policies of Collection development, developing useful websites, document delivery techniques, emergence of reading materials with new digital and non traditional knowledge based information, format and adaptation to computer based operation have great impact on the institution and its library (17). The acquisition policy impact the very existence of a library. Currently web use has augmented library resources. The impact of web for the libraries has been profound than that of providing a new access point for its users (35). It is extremely important to consider sources to acquire reading materials. Since there are no local sources which specialize in supply of books and other materials in Caribbean, one has to depend on US mainland or sources in Trinidad & Tobago or Jamaica. Some US biomedical Publishers have appointed vendors from Eastern Caribbean States to work as sole agents for their publications such as Charran Books at Trinidad & Tobago for Lippincott-Williams and Wilkins books.
Some nations provide custom exemption on books, furniture, etc. which the institution has negotiated with the individual government. Even though the Customs are exempted, most countries charge the Sales Tax plus Customs Service Charges on goods imported including books and furniture. Thus a big chunk of library budget of approximately between 25-27% has to be spent for import of materials. In addition to this, there are delays in receipt of items ordered. The entire process of clearing goods from customs mandated at least 2 week’s time on rush basis. Because of non availability of ordered reading materials delayed in the process, the students and faculty are frustrated and the predicament of library and the management cascades.

4.3 **Users and Services**

The challenges that technology presented, in last decade, is the direct delivery of information to the end users. It is the responsibilities of the librarians and information professionals, in their role as trainers of users in the skills of information management, to ensure that end-users are satisfied.

The enrolment of off-shore medical school ranges from 40-300 students with the exception of one school which take up to 500 students per semester. Only one medical school offers a 2-semester-a-year curriculum; all of the Eastern Caribbean Medical School have adopted a 3-semester-a-year system. Each semester is of 4-month duration. Each semester typically commence on the First Monday of January, May and September. The pros and cons of 2 semester vs. 3 semester a year are equivocal.

The teaching of courses in each semester differs from school to school. Given in Annexure A is an outline of courses that are offered from Semester I through V in five of the major medical schools in the Eastern Caribbean States. Each medical school in the ECS region has unique curriculum format adopted to suit its envisaged educational pattern. The syllabi has been adopted by each school with an elusive goal of preparing their students for a successful completion of USMLE Step I which is good standard to enter the US medical profession, which all students, irrespective of their medical school want to desperately achieve. The other important reason is to ensure that all students get the knowledge, skills and education that is essential to become a successful physician.

Planning user education from problem-based learning approach requires collaboration and commitment of the faculty to fit the user education into the curriculum. It is because the library instructions were designed with librarians’ perspective. Libraries should establish user needs, take on more proactive and targeted approach. It is worthwhile to consider the results of a study that has shown that the program for problem-based library skills for medical students which familiarizes them with the library and its resources and the use and retrieval of printed and/or electronic resources, searching of Medline and finally citing literature correctly for their papers, has been effectively achieved at the University of Manchester in the UK (37, 38).

Mentoring programs in libraries as well as in the professional associations have been established for the purpose of supporting the Continuing Professional Development of librarians (39). In a medical school library, the staff development committee took charge to three tasks (i) develop programs to enhance workplace skills and personal growth, (ii) communicate existing programs and opportunities at the organization, and (iii) encourage staff to participate in the available opportunities (40) to extend better services.

A study (41) recommends that the libraries establish user needs by taking more proactive and goal oriented approach; and that the health professionals believe they must have skills to search and seek information and for this, they should receive training. Training, Practice, Enjoyment, Time and Access to computers are
essential aspects of good library service provision. Libraries require information on user needs and their expectations to improve the services provided. The information literacy training the librarians provide to health professionals is effective in improving clinicians’ information skill and has an impact on patient care. This need assessment must be reliable, effective and appropriate. The user satisfaction and optimization of resources are essential for libraries to maintain awareness; User satisfaction and optimization of resources have become important areas or libraries to maintain awareness.

The pattern of services a library offers differs in the region. The pattern of reference services in libraries has changed. Sandra De Groote (36) showed that there was a steady increase in questions from users from 23,848 in 1990/91 to 49,037 in 1997/98; It declined to 1003 in 2004/05; reference questions from 2157 in 1990/91 to only 18 in 2004/05. This study also showed an increase in digital question from 0 in 1990/91 to 581 in 2004/05. This shows the trends in the use of a medical library by students and the faculty.

5. **DOMINICA: ANNE ROSS LIBRARY & LEARNING RESOURCE CENTER, ROSS UNIVERSITY SCHOOL OF MEDICINE**

In September 1994, the author accepted the challenging task of re-establishing and re-building old library of the Anne Ross Library of Ross University School of Medicine, in Dominica which had a collection of over 6000 items- books and bound volumes of journals. The collection consisted old and out-dated books on which were published between 1960 and 1980. There were no journals subscribed. There were old issues and bound volumes of medical journals acquired by donation. The Librarian who was working had additional responsibilities of selling latest books from University bookstore. The Library was engaged in renting skulls, and microscopes to students. In a nutshell library was carrying on work with dedication, none of which was a library related. The existing reading hall accommodated 100-120 students at a any given time. This library was air conditioned and the only unit on campus to have 24-hour power and therefore large number of students came to the library not only as a place to study, but as a refuge with comfort. They preferred to stay at the library than their residential quarters. With full cooperation of the Executive Dean building of this library commences with acquisition of current reading materials for the use of students and the faculty. Importance was given to survey the publisher catalogs and comprehensive lists were made to order books that were useful for integrated teaching in basic medical sciences courses. For the first time, a working library committee met, with some reservations and recommended a long list of books. On receipt of first batch of new acquisition the faculty and the students noticed the changing patterns and improvements in the library. New furniture were acquired. The management was approached and library was supplied with several workstations- at that time 386 ad 486 machines. Necessary audiovisual materials, computer-aided-instructional programs in basic sciences were ordered and acquired. A new circulation desk was designed and procured.

The most urgent task was to work to change the attitude of local staff, who were considered ill-mannered and un-useful. The management was again approached to promote them as supervisors and grant three of 22 staff additional, which was reluctantly approved. The local staff noticed that salaries of some staff were increased and were eager to learn as to how they might get benefited. They were all assured that good and dedicated work will bring everyone monetary rewards. The Executive Dean was convinced and approval was granted to provide all 22 local staff 2-pairs of uniforms. After couple of months working on these local staff, the entire campus- the faculty, students and management saw a miraculous change in the attitude of library staff and were all surprisingly happy. They voted the library staff as the “Most Improved and Professional” workers on campus.
The three supervisors were assigned specific tasks. One was responsible for Circulation; another one for technical processing and the third was a night supervisor. Later library automation system “Q system” was ordered. The day-time supervisors were given crash course in the technical processing of books and journal issues received in the library. They were taught to prepare catalog card entries and process books with book cards, pockets and spine labels.

The library worked from 7:00 AM until 2:00 AM Monday to Sunday; and during exam time, it was kept open 24-hours a day. The scheduling of staffing was the task of the two day-time supervisors. Due to demands from students for more seating, it was increased from 210 to 450 by constructing new reading hall with 120 additional seats. The old reading hall was expanded and renovated to accommodate 120 additional seats. As the number of students increased, the library was insufficient to accommodate the student population. A proposal to increase the reading area was submitted to the management, which was approved and additional reading halls were constructed. A new reading room to accommodate 120 students was commissioned. New reading tables with lamps, and comfortable reading chairs were procured. This reading served as a “show-piece” of the school. The construction could go only vertically and the old offices were converted to Internet Browsing Room and Computer Lab. The state of the art workstations, and furniture were acquired for both the Lab and the Internet Browsing Room. The new facility accommodated additional seating for 250 students. Thus the entire library was able to seat 800 students at a any given time. A large number of students approached the library management to extend and revise the rules to browse the internet and the limitations to the use of computerized resources, which was done to satisfy students.

By the time the author left the services of Ross University in July 2000, approximately an amount of US $3 million was spent on improvement to library, its collection and services. At that time, faculty members from other medical school in the nearby Islands, who visited school, voted this library as the “best” in all respect among all the Caribbean medical schools.

The students were provided training on “How to” of Medline, and finding out information on the available resources through the ONLINE catalog. It was a regular feature of the library services to conduct semester-wise workshops on utilizing medical library and its resources. A majority students wanted to know the how to utilize of library and its resources, and there were some who did not consider this service as beneficial and opted out.

The take home lesson is that, there should be, commitment both from the management and the professional to improve the library. The professional must utilize the cooperation and support from the management to establish and build library and resource center that will play extremely important role in achieving the goal of the institution in preparing students to become, academically well qualified, competent, compassionate and caring physicians. The library staff is the key in turning the library around.

6. **Antigua: Health Sciences Library, American University of Antigua**

The fact that there continues to be a limited number of seats available at U.S. medical schools motivated the founders of AUA to address this seriously growing shortage by offering an opportunity to qualified individuals to attain a high quality medical education and realize their dream to become a doctor. It is predicted in literature available that by 2010 there will be a shortage of at least 50,000 doctors to fill residency positions at U.S. and Canadian hospitals and to provide proper medical care for a growing and aging population.
College of Medicine was licensed by the government of Antigua & Barbuda to impart medical education in later 2003. and opened its door to students in January 2004. The founder made a commitment of preparing the students with following objectives:

AUA prepares its students to achieve passing scores on the U. S. Medical Licensing Examinations and provide clinical Clerkship opportunities in some of the best teaching hospitals in the U. S. AUA’s medical program is designed to make sure that our students meet the necessary requirements of medical Licensure in the United States. In addition, our curriculum ensures that students receive an education similar to the finest medical schools in the U.S.

AUA is very special because it is the only hospital-integrated medical school in the Caribbean with medical education program based on U.S. school curriculum that incorporates hospital experience. AUA’s basic science campus is located in St. John’s, Antigua and students pursue four semesters of Pre-Medical Education, essentially required to enter the medical school. The duration of Pre-Medical education is 16 months – 4 semesters of four month duration each.

Basic Science curriculum is covered in four semesters in Antigua and after successful completion, students are required to do compulsory clinical rotations in US teaching hospitals currently in Atlanta, GA, Baltimore, MD., Miami, Fl., Long Island, NY., and Pontiac, MI. AUA students are sent for clinical rotations in the teaching hospitals in the US, which offer them an in-depth and simultaneous training in seven core competencies recommended by the ACGME and AAMC (42).

AUA’s aim is to prepare each student to be a knowledgeable, qualified, caring, and compassionate licensed physician who will enter portals of the medical profession of the United States of America. The qualified physician from the AUA will have the six core competencies recommended by the American Board of Medical Specialties (ABMS), and the Accreditation Council for Graduate Medical Education (ACGME), prior to entering residency programs, which are:

- Medical Knowledge
- Interpersonal and Communication Skills
- Professionalism
- Patient Care
- Practice-Based Learning and Improvement
- System-Based Practice

With the above aims, AUA medical school opened doors to nine students who reposed faith and confidence in the goals of the institution and entered the profession in January 2004 semester. AUA school of medicine has completed its 5-year, which was both challenging and testing period. It has completed 15 semester thus far. The enrolment now stands at 754 students on its Antigua Campus undergoing either Pre-Medical courses or one of the four semesters of basic medical courses. There are nearly 500 students doing their compulsory clinical rotations in one of the clinical training sites- Miami, Fla., Long Island, NY., Baltimore, MD., Atlanta, GA., and Pontiac, MI in the United States.

The experience of Dominica had prepared the author to work in a offshore medical school with the students as well as faculty and establish library and learning resource center with collection that not only is suitable for the current curriculum requirements, but also to foresee the new challenges in the teaching and medical education requirements warranted by the changing patterns of curriculum and profession.
In 2004, the library was housed in a very small room, with student population of nine. Efforts were directed at first to acquire the Required and Recommended Textbooks and also to have into the collection of the library standard reference books. At the beginning, journal subscription was not considered, as it was the school's first semester and only courses in Gross Anatomy, Microscopic Anatomy, Doctor Patient and Society were offered.

In May 2004, when 25 new students were enrolled and books for 2nd semester courses - Physiology, Neuroscience, Biochemistry and Genetics which were taught were acquired for the library. The development of the library was slow and gradual in several stages. When 3rd and 4th semesters were accepted at the school, and so were books acquired. At the end of 2004, the library ordered subscription to about 32 selected journals which were - JAMA, BMJ, New England Journal of Medicine, Lancet, Acad Med, etc. Only print versions of the journals were acquired.

It is extremely difficult to justify huge expense towards journal subscription for a new medical school, when one is aware that their use will be bare minimum by faculty and students have little or no time to refer to the journals for their educational purpose and teaching assignments. The journals were being used by the faculty and management only for the first 2 semesters. When students enter into 3rd semester, there are given assignments, which require them to refer to journals utilizing Medline for their research papers to be presented at the Class. Thus commenced the utilization of journal articles by students at the school.

During the first Semester - January to April, 2004, only a sum of $15,000 was spent; May to August the library spent in excess of $20,000 and from September to December 2004, it spent approximately $30,000 for library. At the end of the school's 3rd semester, after about 11 months, the library was extended and a total area of 550 square feet was designated as library.

It was from May to August, 2005 semester that the library really got more engrossed in acquisition of books and increased subscription to journals as the student population rose from 34 to 82. In September 2005, the library moved to a new location with double the size- 1200 Square Feet area. The student population grew to 140. Furniture was acquired from local source and fabric and metal reading chairs were imported from the United States. Multiple copies of only review and required textbooks were acquired. The library considered options for desktop versus laptops, and it was decided that laptops will be excellent choice and 20 of these were added. Computer-aided instructional software were acquired - most network version; and some were single license.

Then there was the real library working; laptops and books were missing from the library. It was then discussed and decided that laptops were not suitable for the library environment and desktops were the natural and logical choice. Single-site computer-aided-instructional programs, (CAI) were loaded on to each desktops for students' use. It was a policy of the library to acquire all CAI programs that is current and suitable for students in the basic medical sciences at the school. As a result, the library's CAI collection has been gradually growing with students' population as well as faculty participation in the selection.

Later by the end of 2005, a library committee was constituted to act as an Advisory Committee to the Dean of library services. Its responsibilities included, approving and recommending library policies and procedures, and reading materials to be acquired for the library. This committee had faculty membership, and has now included a student representative. The Committee is established with responsibility to screen new titles of books and journals to be added to library regularly and make appropriate recommendations. The Committee meets at least twice a semester. The acquisition of books is a regular feature and the
recommended titles of books and reading materials- multi-media, etc. and quantities to be acquired are channelized through the library committee.

The management of the AUA has made the commitment to improve the library and its services for the betterment of students and faculty. As a result, seating capacity of the library has been growing steadily. From 20 students seating facility in 2004, to currently 450- seating capacity.

6.1 The Physical Plan for a New Library at AUA

A new campus is being constructed on the beach-front property in Antigua costing over US $70 million. The new library will have between 40-45, thousand Sq. Ft area. Besides study areas, the it will have separate Group Study room, Common room, Audiovisual rooms, seminars rooms, etc. with separate area for Internet browsing with a capacity for 250 workstations. Wi-Fi hot spot connections will be available throughout the library facility.

Planning of a health sciences library facility poses a tremendous challenge (43); and most librarians agree that library's physical plan was ill-suited at least in the past and at times acted as a barrier to its productivity (44). It is stated that the space used by Health Sciences Library will be less consistent by 2015 as it will be more tailored to institutional needs (45). 1966-1975 was a decade of revolution which attributed to the ever increasing resources, primary users and the library services. This is one of the reasons that of the 114 medical schools in the US, 86 libraries were either built, expanded or were under construction (46).

Waxman (47) is of the opinion that because of unattractive and unfriendly physical library facilities, 80% of students preferred off-campus as their favorite place to spend time; and this will be valuable for all those who are planning either to build or renovate their libraries to suit the present requirements for a better built library with attractive and friendly environment. Another study has confirmed critical importance of providing a comfortable and stimulating environment in libraries for students (48). Library must be a facility to find books, find special collection, to get assistance, to work, to get digital access, to celebrate research, as well as a place to meet and socialize (49).

An answer as to how much space should be devoted to particular area of service in the library should be through an exploration of emerging library practices and the library design must be linked to the aesthetic and functionality of effective architecture (50). Most educational institutions are integrating learning technologies into the design of new buildings (51). Studies have also offered various approaches to evaluating innovative space design (52). Noisy versus quite learning, personal computer access in libraries, physical environment and access to library resources and staff by students and faculty have made a strong case for a better library facility (53). The physical facility is viewed as an important aspect and it will effect on the total library services and use. As a result peers in the profession have advocated that it is extremely important that a library is designed keeping in view several aspects.

Most agree that in the past, the library's physical plan was ill-suited and that it acted, at times, as a barrier to its productivity (44). One can enter into a debate when it comes to its physical size of a library which did matter in the past; but not anymore, now that the libraries are without walls. The health sciences library space will be far less consistent in the next decade, as space becomes more tailored to the institutional needs (45).
The new library is commissioned and Ms. Sundaram Architects of Bangalore, India and are the architect, who have designed a variety of buildings - academic institutions, medical schools in Manipal, Malaysia, Sikkim and Nepal, and laboratories, classrooms, and libraries of these institutions - from a single story, single floor building to a six-floor library at Manipal University, Manipal, India. It will be housed in First and 2nd floor of the main building; with four block on each floor.

The planning of the library for AUA was based on management's vision to establish a Nursing School, and a College of Arts and Sciences and:

- Total number of students at the School/s
- Total number of faculty
- Various Departments and Courses offered
- US State Medical Board's Accreditation Requirements; and
- Range of Library Services offered
- System-Based Practice

on its new campus. Thus the original library plan was modified to include the above institutions.

The University Library when complete, will serve the users of the three institutions and a medical school. It will have a seating capacity of 1000-1200 at any given time.

### 6.2 E-Learning and Computer-Aided-Instructional Materials (CAI) at AUA

There is no universal definition of an e-book (54). There are several definition of E-book that are accepted by many. E-books are at a relatively early stage of development and E-learning is more efficient (55).

".... Any piece of electronic text regardless of size or composition (a digital object), but excluding journal publication, made available electronically (or optically) for any device (hand-held or desk-bound) that includes a screen." (56)

There is no consensus on the definition of the term e-book (57, 58) despite widely accepted definitions. According to Ruiz (59) E-learning is the use of internet technologies to enhance knowledge and performance.

The important aspect of planning and maintaining a website is to identify the likely users and to review their needs (60). A survey revealed that 59% of used for e-journals and 56.1% used Internet for e-books (61). Extensive application of digital technologies and advances to communications has changed the patterns of library services that were offered in 20th century (62). The electronic information environment facilitates enhancement of the speed of service, number of users served, and the quantity and exhaustiveness of information provided (63). The digital libraries give computer professionals a golden opportunity to help reverse the negative impact of information technology on the developing countries (64). Website behavior is largely dependent on the users' need, interest, knowledge and preferences (65). Most say that E-Learning materials are not subjected to a rigorous peer review process. Ruiz, Candler & Teasdale (66) offer approaches to ease burden and improve quality of e-learning peer review - - peer review training; embrace multi-disciplinary peer review; development of guidelines; and provision of incentives and compensation (66). The electronic information greatly enhances the speedy and extensive services to the users of the library (63). Currently web has augmented a library's resources. The use of web has changed information-seeking behavior and information use (Ameen) and website behavior largely depends on the user's need,
interests, knowledge and prejudices (66). The important aspect of planning and maintaining a website is to identify the likely users and to review their needs (67, 60).

Dodd and colleagues (68) have experimented laptops loaning to the students and recommends this service with increasing collaboration between the departments within a library for a strong feature of the laptop loan service. It will soon be evident if health sciences libraries opt for this. On its establishment, the AUA Library did keep laptops in the library and allowed students to bring their own laptops. The result was, there were at least six instances, when it found library laptops missing. It gave up the idea of keeping laptops, and instead acquired desktop computers which were secured on tables.

6.3 INFORMATION TECHNOLOGY

In this technologically advanced environment, library definition of “building collection and providing access” is replaced by the creation of user oriented environments, both physical and virtual and the librarians will have to explore roles that will take them far beyond the boundaries of traditional libraries by taking full advantage of new possibilities that are open. Tella, (69) offers information on the role of a library service in the new e-learning environment which provides enhanced services for its users and libraries are integrating their systems and services into the e-learning environments. The traditional book publishers are now publishing e-books along with the printed version of text for students, which are expensive. Institutions are investing and diverting hundreds of thousands of dollars to create online course materials that suite their curriculum for the use of their students and faculty members (70) offers views that new course creation takes more time to develop because online work has to be good enough to stand alone, and describes the use of e-learning in libraries in Seattle’s public library (Akeroyd (71) reviewed current thinking and activity surrounding the delivery of content in e-learning environment, and examines re-use of materials in an university environments, digital libraries and web content.

AUA library currently has two computer labs with 50 plus work-stations connected to internet and school intranet. More work-stations are being added to facilitate the access to latest learning resources and aids to maximum number of students. It is estimated that the library will acquire approximately 250 more workstations to provide student access to library resources including digital and worldwide web.

Both of AUA campus have WiFi access and hot-spots are available on campus. The students and faculty can use seamless access to internet and School’s intranet resources from anywhere on each campus. The AUA library site http://students.auamed.net/library is accessible through AUA intranet, which provides links to E-journal, E-Resources, CMDT online, Cochrane Library Database, Exam Master, AUA e-mail system for students, AUA student handbook, AUA library handbook; IT guide, and links to various departmental sites. More resources are being added regularly on the Library network.

The library currently has access to hundreds of online medical journals from Ovid and other Society Publishers, and all are integrated through library website noted above. The library will add more online journals on specific recommendations from the department to ensure that faculty and students have access to the latest information in biomedical sciences.

Comparing the teaching effectiveness of CAI with other forms of teaching is extremely difficult (72, 73, and 74). Other studies (75, 76, 72, and 77) have concluded that CAI is no more effective than any other teaching methods. It is important for us, as librarians and teachers, to identify the need to adopt a particular CAI program. This program should be suitable for course and be acceptable to a large number of students. This program must meet the educational needs (78, 79). The needs of the educators are not limited to
contents; but other requirements—such as technical support, instructions on how to implement such programs and additional resources that facilitate the maximum use of computer-aided instructional programs. A study showed that medical students used textbooks, e-mails, computers and study facilities in libraries and they used least the Computer-Aided-Instructional programs (CAI) and video facilities (80). During the span of five years, trends, and atmosphere has changed. Every student look for latest digital books, notes, video that augment medical education and assist them in gaining the required knowledge and skill to be a successful physician of 21st century.

The most unique feature of the library is the availability of Question Banks in all courses of Basic Medical Sciences. There are over 40,000 tested objective-based questions available. The library currently uses LXRTEST software from Logic eXtension Resources version 5.1.4. This software also provides an Interactive Examination access on a network. It is expected that this service will commence in December 2009, when the construction of the new facility is complete and occupied. It will assist both students and the faculty to utilize the Question Bank available at the library. AUA is on verge of acquisition of “Blackboard” E-learning software; and also considering acquisition of a Software of Online examinations, “Question Mark Perception” in a near future.

6.4 Future Plans

The library administration is exploring possibilities of approaching several publishers of biomedical sciences for permission to convert and format the questions from their review books in basic medical science subject as interactive exams online to be used on Intranet on campus. This will resolve the problems and mutilating these very important review books with markings, notes, and answers to each question, which the students always do and will not be useful to other students.

Library also manages Websites for Departments of the School, which are updated regularly. Black Board e-Learning Management System is selected for the School and it will be procured very soon. Once this is introduced, Library will be taking integral parts in integrating learning resources, multimedia content, e-journals, teacher notes, likened e-books and other resources to this platform. Library also plans to bring in Web 2.0 applications such as Blogs, Wikis and other Social networking Platforms to enhance the Faculty-Student interactions and learning skills of the 21st year students.

Finally, a learning resource center is essentially required for medical library. It should be created in a place where students feel at home with all necessary resources and can conduct independent study in a pleasant ambience. On completion of the new campus and the library, it is expected that the new facility will truly be a place of study, tranquility and refuge for students as well as the faculty. It will be in true sense a place where students will spend maximum time to prepare themselves with the increasing challenges of curriculum changes and the demands for quality medical education.

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Web: http://students.auamed.net/library/
PHYSICAL PLAN OF THE NEW LIBRARY

2-STORY FACILITY – 4 BLOCK EACH FLOOR

FIRST FLOOR PLAN
## Semester Spread of Curriculum of the Five ECS Medical Schools

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<th>Semester</th>
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**Caribbean University Identifier**
- AUA - American University of Antigua
- AUC - American University of Caribbean, St. Maarten
- ROSS - Ross University, School of Medicine, Portsmouth, Dominica
- SABA - Saba University, School of Medicine, Saba
- UMHS - University of Medical & Health Sciences, St. Kitts