

A Web-based Course on Medical Technology Management Practice

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ABSTRACT

A distance education course on medical technology management practice was developed. The course presents a systematic approach in managing technology in the healthcare environment. This is an online Web-based course using the internet for delivery and communication. It provides a mean for the working professionals, without having to leave their home and workplace, to understand and analyze the issues pertaining to the acquisition, utilization and disposal of medical technology. This paper provides an overview of the contents of the course as well as the rationale behind the course development and the choice of the mode of delivery.

INTRODUCTION

With continuous rapid advancement, technology has infiltrated into all parts of everyday life. Health care delivery and medicine are increasingly dependent on technology in the diagnosis and mitigation of illnesses, in disease prevention and in health promotion. Medical technology is one of the driving forces in shaping the direction of health care. However, it is also a primary factor for the escalating cost in the healthcare delivery system. For these reasons, it is important for managers to master the arts and methodologies in medical technology management so that technology can be used appropriately, effectively and efficiently.

EDUCATIONAL NEEDS

Managing health technology requires appropriate expertise and infrastructure to address the challenges in different phases of the technology life-cycle. Most health managers acquire their skills and knowledge in this area by attending seminars, reading and through on-the-job trials and errors. Although there are education programs and courses in technology management, none of them is in distance format nor designed to address the specific needs in managing technology in healthcare settings.

The Biomedical Engineering Technology (BMET) Program at BCIT performed a survey in 1996 asking graduates about their preference in continuing professional development topics. Medical technology management was at the top of the list. In addition, most of the respondents chose distance education as the preferred mode of delivery. To meet the demands and to cater for the working professionals including non-local residents, the format of an advanced level continuing education course in distance format was therefore chosen.

COURSE ORGANIZATION

Health technology in the broad sense includes device, supplies, drugs, medical techniques and procedures used in the monitoring, diagnosis and treatment of patients as well as in disease prevention and health improvement. In this course, we adopt the definition of “Medical Technology Management” as an interdisciplinary program that utilizes acceptable methods and information to provide guidelines and qualifications for the planning, selection, procurement, maintenance, and replacement of medical hardware, software and supplies¹. This course focuses on management of health technology in clinical settings, in specific, on medical device and supply technologies. Moreover, the concept of technology management illustrated in this course can readily be extended to other aspects of health technology.

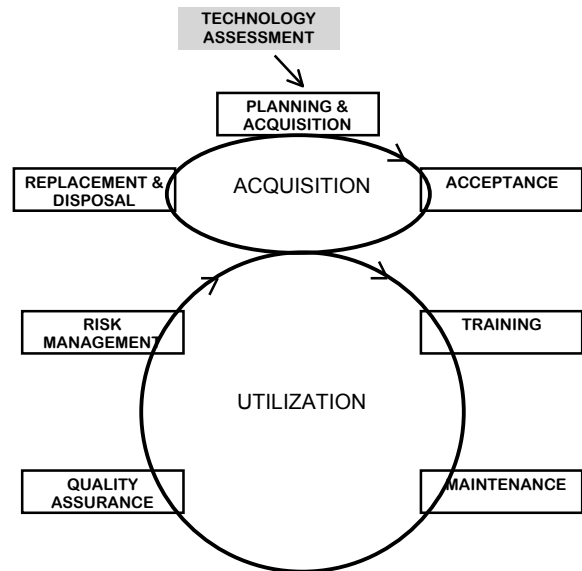


Figure 1 – Medical Technology Life Cycle

The “Technology Life-cycle” starts at the creation phase of the technology, goes through validation, acquisition, utilization and then ends in its replacement or abandonment. This course studies the medical technology life-cycle from the users’ perspective, rather than from the manufacturers and suppliers perspectives, that is, starting from its acquisition phase. Figure 1 show the different phases of the “Technology Life-cycle” in clinical settings. The cycle can be split into 2 sub-cycles: acquisition and utilization. The course is organized around this model. It consists of 6 modules:

- Module 1 provides an overview of the concept of health technology management and introduces the system approach in managing health technology.
- Module 2 introduces the life-cycle of medical technology and discusses the benefit of the “life-cycle” approach in medical technology management.
- Module 3 covers the maintenance aspect of medical technology and discusses the infrastructure and key criteria to ensure its safe and cost-effective use in health care settings.
- Module 4 covers quality assurance and risk management of medical technology. It stresses the importance of proper program design, process evaluation and outcome improvement in this area.
- Module 5 examines how diffused technologies find their way into clinical use and focuses on facility-level technology acquisition. The cost-of-ownership of medical technology is studied.
- Module 6 looks at criteria to determine technology retirement and replacement. Approaches to handle the surplus technology are also discussed.

This course is intended for those who are interested in technology management in the modern healthcare system including but not limited to clinical department managers, clinical engineers, biomedical engineering technologists, materials managers, and hospital administrators. It is organized to analyze the challenges facing managers and technology users in various phases of the technology life-cycle and to provide a systematic and practical approach to handle the issues. To fulfil these objectives, theories are reinforced with real life examples; case studies are used to stimulate critical thinking; practical processes and tools are used to help studying and analyzing these issues.

DELIVERY FORMAT

As the course is designed for the working professionals and targeted at the broader international market, distance learning is the delivery format of choice. Some advantages of using the Web for teaching include: multi-platform access, non-reliance on specific classrooms, off campus delivery, hypertext facilities with structural guidance, ability to offer students a choice of resources, and student feedback using “fill-out forms”².

WebCT³, an integrated set of tools for developing and delivering of interactive courses over the Web, is used in this course. Similar to most on-line education delivery platforms, WebCT provides authoring, tracking and evaluation tools for the developers and tutors. For the students, the advantages of WebCT include: browser independent, free of special or proprietary software, a well-structured home page and relatively intuitive navigation similar to ordinary web-browsing.

Furthermore, it is anticipated that most of the students enrolled in this course would be working health professionals, the interactive discussion and communication tools in WebCT as well as hyperlinks are used in the course to enrich the learning environment. Figure 2 shows the home page of the course.



Figure 2 – Home Page of Course

CONCLUSION AND FUTURE WORK

A 12-week on-line web-based course on “Medical Technology Management Practice” was developed. It was designed to be a 3-credit course in the advanced level cluster in the Health Option of the BCIT Bachelor of Technology Degree in Technology Management⁴. The course was launched in April 2001 with 6 students and repeated in January 2002 with 13 students. Students were primarily biomedical engineers and technologists from across Canada and the U.S. One student was taking the course from South Africa. A working biomedical engineer was contracted to tutor the course. Overall, feedbacks from the course tutor and students were positive. The delivery format seems to be appropriate for the subject matter and was proven to be cost-effective. The course is currently under reviewed.

ACKNOWLEDGEMENTS

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- [3] A product of WebCT, a Boston-based educational technologies firm. URL: <http://www.webct.com>.
- [4] URL: http://www.health.bcit.ca/biomed/HTM_H.htm