

At the School of Technology and Health at KTH, we develop new methods and work with improvements to existing methods for diagnostics, monitoring, and treatment within healthcare and medical applications. Research projects deal with describing physiological processes for predicting results from treatments. Development of new sensor systems is another field of research, and so is improved and simplified information transfer within the different parts of medical services.

In close collaboration with Karolinska University Hospital, we conduct research and development aimed at better understanding the complex relations between the way we build, design and organize medical equipment, production and working processes and the effects these have on personal safety, health and well being. School of Technology and Health at KTH has strong teaching programme at the undergraduate and post graduate levels, in the field of Medical Technology, Medical Imaging.

BSM Medical University in Bangladesh is the best known medical school for undergraduate and graduate studies in health sciences in Bangladesh. The university has a long tradition of medical education and education of health sciences for other health care professions.

Dr. Mannan Mridha from School of Technology and Health, at KTH, together with Dr. Heikki Teriö from the Department of Clinical Engineering at Karolinska University Hospital, have undertaken a study together with Dr. Mohammad Saiful Islam at the BSM Medical University in Dhaka, Bangladesh, to improve patient safety in intensive care units (ICU) by identifying and eliminating failures that lead to errors and increase risk of harm to patient. The study has the following objectives:

- a) Study the conditions at the ICU to identify the problems, errors, accidents and their severities.
- b) Find a useful, efficient, and cost-effective method for evaluating patient safety features of medical devices.
- c) Organise a workshop to present the results to prepare recommendations for improvement, and
- d) Modify and further develop the concept proposed by KTH student, an appropriate web-based safety reporting system for ICUs for reporting and analysis of equipment status and incidents.
- e) Implement and evaluate the ICT based support systems for patient safety improvement at the ICUs.

This study is important because, many people now wonder whether their visit to hospital might harm rather than help them, and are demanding concerted action. Clinicians worldwide in general, and in the developing countries like, Bangladesh in particular, are required to maintain an increasing workload with limited resources. The Intensive Care Unit (ICU) is particularly prone to medical errors because of the complexity of the devices, interdependence of the practitioners, and dependence on functioning of personnel and equipment. The ICUs should be specially staffed and equipped and managed so that the patients with life threatening illnesses or serious complications are treated well. A balance among risk, benefit and resource availability in relation to each diagnostic and/or therapeutic intervention in the context of the individual patient is essential. Therefore, in this L-P exchange programme, we would like to offer an undergraduate course for all health care providers at both the institutions in Sweden and Bangladesh on Medical safety.

The long term objectives of this cooperation are to integrate the medical engineering works with clinical engineering practice at the hospital; increase motivation, knowledge and skill of health care personnel on biomedical engineering education to effectively and efficiently use diagnostic and therapeutic medical equipment in Sweden and Bangladesh. This will create an enabling environment to develop application and content for providing safe and cost effective health care technology for patients.

Among the expected results would be to create benefits to Swedish teachers in areas such as; increased understanding of the education system and environment in Bangladesh; learn of technological problems and prospects, strengths and weaknesses of other nations; new opportunity for a career-enhancing experience and exposure to new teaching methods; and possibility to develop lifelong collaboration, friendship and professional relationships.

Benefits to Bangladesh teachers are expected to be increased knowledge on the use of modern laboratory equipment and modern medical equipment for diagnostic and therapeutic purpose, international awareness on the part of professional colleagues through interactions with Swedish exchange teachers, and development of a professional skill, capacity and relationship while jointly teaching courses in Sweden.

The students from both the universities would benefit from teaching methods jointly offered by the expert teachers from Sweden and Bangladesh. This would increase their motivation and interest for the subject, develop understanding for the global conditions, applications and environment of medical technology as well as encourage them to take part in the exchange programme for higher studies abroad.

The long term goals of this exchange cooperation are to create opportunity for sustainable international collaboration to solve medical technological problems and develop new teaching methods and systems for a safe and effective use of medical equipment. All the participants will develop understanding about problems and prospects, strengths and weaknesses of other nations; and find opportunity for increased awareness of diversity of ideas, values, world view and different ways of life.

The two important areas in our present cooperation will be to conduct courses on the efficient use of Information and Communication technology, ICT for better and safe use of medical equipment at the hospitals, and application of smart, affordable and robust and cost effective technology to improve rural health care facilities. These specific areas have been integrated into Biomedical engineering programme since ICT is an important tool to speedily improve the health care technology in the developing countries and the problem based project work would initiate research collaboration.

The collaboration would apply new and appropriate methodologies of teaching to employ the modern ICT facilities and sharing medical expertise and advice. Among the expected results from this collaboration are:

- a) Creation of an enabling environment to offer courses on medical safety of international quality applying ICT tool and involving experienced Swedish teachers from KTH and experts from BSM medical University in Bangladesh. The two institutions would offer courses that would help improving patient safety, effective use, maintenance and management of medical technology that involves the coordinated efforts of multiple members of the health care team, with easy access for all to relevant medical information. This will also enable to achieve the most cost-effective means of improving the quality of health care received by critically ill patients and their families.
- b) Teachers from both the institutions would benefit from this international collaboration to develop skill and competence to be able to utilise ICT for better quality and cost effective health care.
- c) Safe and effective utilisation of technology to provide cost-effective patient care in the remote and rural areas, as well as, support the health education mission. Swedish institutions would find opportunities to employ the advanced ICT technologies to address global health technology problems.

During the first two years of this exchange programme, two teachers from Sweden would travel to Bangladesh, and two teachers from Bangladesh would travel to Sweden, to teach courses introducing project based and problems oriented elements into the teaching methodologies.

From the third year, the students exchange programme would start where, initially two students from BSM Medical University would travel to KTH to study courses at KTH and also together with two Swedish students jointly work on a thesis project. At the same time, two Swedish students work at BSM medical University to conduct thesis work jointly with students in Bangladesh. This would increase international collaboration for future networking.