



Telemedicine

Continuous training programmes for hospital engineers

It is now widely recognised that telemedicine is an efficient tool to fill gaps in medical technology and knowledge. Overall, it comprises case teleconferences, live demonstrations, videoconferencing (VC) and the sharing of medical information between hospitals. However, adoption is held back by the lack of dedicated technical staff in many hospitals, especially in developing countries. Therefore training of hospital engineers is of the utmost importance to expand telemedicine domestically and internationally.

At the Telemedicine Development Center of Asia (TEMDEC), we have been conducting telemedicine activities internationally since 2002. As of December 2018, over 950 telemedicine programmes have been run, connecting 649 hospitals and universities in 68 countries. Since 2015, thanks to the support of the Asi@Connect and TEIN4 projects, we have developed and implemented telemedicine engineering training programmes for hospital engineers and physicians in countries across Asia.

On-the-Job Training Programme

As the secretariat of the Medical Working Group within the Asia Pacific Advanced Network (APAN), we organise on-the-job training programmes for hospital engineers at the twice-yearly APAN conferences. Programme participants join a one week training course at APAN. So far, we have organised seven programmes in Malaysia, the Philippines, Hong Kong, India, China, Singapore and New Zealand, with the eighth course taking place at the upcoming APAN event in South Korea. Asi@Connect and the TEIN4 project have supported the programme, by paying attendee travel expenses, living costs and registration fees, as well as creating visibility through the workshop programme.



Attendees were divided into three or four teams, each assigned with a particular colour and made up of trainers and trainees. Each group was tasked with supporting actual telemedicine sessions in various fields, such as endoscopy, surgery, dentistry and rural health care. By supporting actual sessions with other team members, the trainees learnt about technical issues, such as setting up VC systems, controlling equipment, planning connectivity tests and troubleshooting. This knowledge is vital for all engineers who support telemedicine. At the end of this training programme, we held an engineering workshop, in which trainees introduced their hospitals, explaining their ICT environment and telemedicine activities. Any technical problems encountered in the telemedicine sessions of the APAN meeting were reviewed and discussed in detail. These programmes have supported telemedicine sessions which connected 201 institutions in 32 countries.

A Medical Working Group dinner at each APAN meeting was also supported by the project. Invited engineers and other Medical Working Group members joined the dinner to meet each other and to share their opinions. It was a great opportunity to discuss telemedicine activities and future collaborations.

Train-the-Trainer Programme

Overall, there is a big difference in terms of processes between simply joining a teleconference and organising one. When an engineer is solely supporting as a participant in the teleconference, they only need to take care of their local site. On the other hand, the organiser or "Chief engineer" of the teleconference has to check all connecting institutions, contact engineers at every site, decide on the connection methods, control the layout, and troubleshoot for all engineers. Therefore, this Train-the-Trainer programme was designed to educate these Chief engineers when supporting and organising a session. The trainees stayed for one month at TEMDEC. The contents of this programme were made up of two training types; hands-on sessions and courses for organizing telemedicine programmes. Firstly, trainees learnt to install, set-up and control videoconferencing systems (H.323, Vidyo and Zoom) by themselves through hands-on training. This session also involved sharing good quality medical information, management of a multipoint control unit for multiparty connection, as well as running annotation systems for medical case conferences. Next,



trainees learn how to organise a teleconference programme by supporting a pilot teleconference, called the Training Report Conference. Finally, they organised their own teleconference, connecting hospitals and universities in their countries.

Between January 2015 to December 2018, 31 engineers from 13 countries (Vietnam, Thailand, Indonesia, Bangladesh, India, Nepal, Malaysia, the Philippines, Costa Rica, Brazil, Mexico, Chile, and Colombia), participated in this programme. 23 teleconferences were organised connecting 49 institutions. Asi@Connect and the TEIN4 project supported the programme, by paying attendee travel and living expenses while in Japan.

Publication of Engineer's Manual

We published an engineer's manual book in English entitled "Telemedicine Conferencing: An Introductory Guide for Engineers", in August 2017. This guide aimed to provide an introduction to teleconferencing and give technical tips, using illustrations and tables to make processes much easier to understand. All descriptions were simplified to be clear to non-native English speakers. It is based on the assumption that users will be participating in an externally hosted teleconference at one of the connecting institutions. The guide featured key points, set out according to their degree of difficulty, aimed at people who are tasked with organising a telemedicine conference at short notice. It also included a checklist for different kinds of teleconferences, enabling users to acquire the information they need quickly. It is freely downloadable from the TEMDEC website (URL: http://www.temdec.med.kyushu-u.ac.jp/eng/equipment_manual.html) with free, printed copies also available. The Asi@Connect project supported the printing costs of the manual. Feedback is that the book is much appreciated by engineers who have less telemedicine experience. However, experienced engineers also see its value, and encourage less experienced colleagues to study the manual and keep a copy to hand when they support a teleconference.



Conclusion

By running seven On-the-Job courses and training 31 people via Train-the-Trainer programmes, telemedicine activities in each country have increased. Furthermore, the human network amongst the engineers has been strengthened, meaning that technical preparations have improved. In result, higher quality telemedicine teleconferences are being carried out. In the future, information-communication technology will keep changing and improving, and it will help make telemedicine even more significant. Hence, the continuous training of hospital engineers will be essential to support telemedicine activity in different environments and countries.