

Creating e-learning material with optimal utilisation of limited resources

Channa A. Gunawardena MIT

Development Manager and Solutions Architect

i-Context Content Convergence (Pvt) Ltd, 102, Kitulwatte Road, Colombo 08, Sri Lanka

E-Mail address: cgunawardena@i-context.net

Dr. Aloka Pathirana MS, FRCS (Eng), FRCS (Edin)

Consultant Surgeon and Senior Lecturer

Department of Surgery, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka

E-Mail address: aloka@slt.lk

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Abstract

Sri Lanka is a country with comparatively high standards of healthcare, but a poor distribution of resources. While gaining access to expert trainers is relatively easy in the Western Province, the same cannot be said of regions such as the Eastern and North Central provinces. With access to broadband across all regional and geographic boundaries and an 88.6% penetration rate for mobile phones, internet access is becoming a single resource that is uniformly distributed across the island. An e-learning solution therefore is the only practical means to ensure that training resources are available to everyone, anytime, anywhere in the island.

This paper proposes a hosted e-learning solution incorporating video based lessons supplemented by text, animations and voice-overs to provide postgraduate level training for medical personnel. The process of creating training material will be non intrusive and will not require any additional time or expensive resources as it will be primarily based on capturing of actual cases including consultations, surgery and other day to day activities. A webcam or a mobile phone with sufficient storage capacity is all that is required to capture the core training content.

Formulation of the training course using these videos can be done by e-learning domain specialists, along with instructional design and preparation of rich content such as animations; only the knowledge and information needs to be provided by subject matter experts.

The proposed approach ensures that the most valuable resources are consumed in this process, the time of the expert practitioner is used optimally.

Keywords - e-learning; Healthcare; ICT; Sri Lanka; Content Creation

Introduction

E-learning can be defined as the use of technology to deliver learning outside the physical boundaries of the classroom. e-learning has been steadily growing in popularity due to improved flexibility, affordability and effectiveness over traditional means of imparting knowledge. Initially being adopted by the defense and aviation industries in the West, it is now being used effectively by almost any industry where knowledge is a primary driving force, across the world.

Sri Lanka can gain tremendous advantages by using e-learning to disseminate knowledge, due to its uneven distribution of resources and the proliferation of broadband access across the island.

Especially in the healthcare sector, where the country has been hailed as a developing nation that can claim to have standards of maternal and infant care that rival developed nations E-learning can be used to further improve access to information and learning across the island.

One of the primary barriers that must be overcome when moving to e-learning in Sri Lanka is the scarcity of suitable learning content, due in part to the lack of dedicated resources required to create the same. This paper proposes an approach that makes optimal use of limited resources to create content that is both relevant and inherently localised, giving the healthcare industry practitioners a repository of reusable learning content accessible from across the island with nothing more than a personal computer or mobile phone with a broadband connection.

Solutions

Many countries have successfully implemented e-learning programmes that are being used effectively to train both healthcare professionals and medical students. Studies based on some of these programmes have concluded that e-learning will be, almost certainly, one of the most important developments in the delivery of postgraduate medical education⁽¹⁾.

In a study which used simple video based e-learning software in both academic and corporate environments to teach students the cognitive foundations of medical interviewing, students reported high levels of satisfaction with online learning, which were reinforced by improvements in their self reported knowledge scores⁽²⁾. A similar study found that internet based continuing medical education programmes were just as effective in imparting knowledge as the traditional forms⁽³⁾.

Barriers in Sri Lanka

Sri Lanka has a relatively high rate of computer literacy, with about one in ten households owning a personal computer, the ratio rising to one in four in urban areas. Although broadband penetration is not at equal levels, the technology infrastructure available is on par with most developed nations. With homegrown learning management systems also being used in the corporate sector, the primary barrier to adoption of e-learning, especially in the healthcare sector, is the scarcity of relevant learning content. While material developed in and for other regions may be available for purchase, albeit at significant cost, the relevance and applicability of this material to Sri Lankan medical practitioners and students is questionable.

The answer then is to develop content suitable for Sri Lankans to be used with necessary updates for years to come. Again, the tools and technology required to create high quality e-learning material are readily available as well as locally developed content authoring software. The primary obstacle in this case is the scarcity of domain experts capable of creating e-learning material and the time constraints placed on the few available experts.

To elaborate, maintaining a dedicated team of expert medical practitioners to create e-learning content is not practical given the already stretched budgets and resources of government

healthcare service. In addition, content creation and assembly is a science of another specialisation by itself with the instructional design, the practice of maximising the effectiveness,

efficiency and appeal of instruction and other learning experiences, being a science by itself. Therefore, dedicating specialist medical practitioners for learning content creation would not be a practical solution.

Solution for Sri Lanka

The proposed approach for creating e-learning content revolves around a multi step approach of which the first step is to passively capture the knowledge of the subject matter expert with no impact to his or her schedule or the level of care being provided to patients. It is proposed that a digital video recording device with sufficient resolution, ranging from a high quality phone camera to a handheld camcorder can be used to record learning experiences and events such as patient consultations and diagnosis, surgical procedures or counseling sessions. Although capture in an analog format with subsequent encoding is also an option, it is suggested that digitisation only be considered for any existing video content available in an analog medium.

Prime examples of suitable video content will be recordings of laparoscopic surgery and video recordings made at interesting clinical consultations and at lectures. Activities requiring the setup of specialised recording equipment for procedures such as recording surgical procedures may be considered at a later stage, based on the perceived need and potential benefits to learners.

The second step is to edit and prepare this video based content, which can be performed by specialised personnel who possess the necessary technical skills and familiarity with video editing tools. Preliminary preparation of the video, such as cropping extraneous footage and adjusting sound levels can be performed by non-medical personnel since no expertise in the domains of medicine or instructional design are required at this stage. Such video editing can even be outsourced to third parties such as enthusiasts who are willing to perform this service at low or no cost. Once a presentable set of video clips are created, selecting the relevant segments to be included in each course or course unit will require the involvement of clinicians who will extract the relevant portions from this video material and suggest other reinforcement material required to create a comprehensive course unit. The end product of this step will be a set of video recordings that will form the core of one or more e-learning courses.

The third step will be the instructional design itself, where the learning course is designed and developed, incorporating text, voice-overs and multimedia content such as animations, to supplement the core video based content. At this state, frequent reviews and guidance by expert clinicians will be required, so a web based Learning Content Management System (LCMS) is proposed along with web based authoring tools, to ensure that all source material including the video content and all created learning material are accessible to all stakeholders anytime and from anywhere.

The LCMS will ideally allow the implementation of content creation and approval flows which allow all stakeholders to collaborate in the design, development and review of a given e-learning course. Finalised course material can be published into an integrated Learning Management System (LMS) for subsequent dissemination. Again, access will ideally be available at anytime and from anywhere via any device, to increase acceptance and adoption rates.

The envisaged audience for these courses will consist primarily of medical students, both undergraduate and postgraduate, especially those in the remote regions of Sri Lanka, where there exists a need for access to supplementary learning material. In addition other clinicians who wish to engage in Continuing Medical Education may also prove to be a very receptive audience, given their busy schedules and the flexibility of learning online.

With the instructional material creation process placing great emphasis on evaluation and updates based on feedback, mechanisms for learners to provide their feedback using ratings, comments and surveys can be incorporated into the implementation process. In addition, course specific forums can be created where learners can collaborate offline regarding the course content, reinforcing the course material while also providing valuable feedback to the course creators.

Versioning support on the LCMS will allow subsequent enhancements to be made to the course material without interrupting the learners currently following the published version of the material, resulting in continuous improvement of the course material over the years.

Conclusion

It is envisaged that the proposed process will enable Sri Lanka to have its own localised e-learning content in a relatively short period of time, thereby ensuring that medical students from across the island have access to specialised knowledge which has so far remained available only to a few due to constraints of resources, time and distance.

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