

Travel Medicine Online: the eCpd Experience

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Abstract:

The Travel Medicine course online is part of the response given by the LSHTM when confronted with the challenge to disseminate its medical expertise to a wider health community. The school was awarded a grant to develop two continuing professional development courses in online format (eCPD) and lay the bases for a virtual learning environment to deliver these eCPD courses with a limited amount of faculty support.

The courses designed for online distance learning, were constructed, archived and delivered using a browser-based proprietary Learning Content Management System (LCMS) called ForceTen. The force driving this system is object technology with metadata based on the SCORM standard to describe the elements of content supported by a reformulated Medical Subject Headings (MeSH) taxonomy to catalogue the entire database. Attention has been allocated to the reusability issues derived from object technology implementation.

The Travel Medicine course contains sections on operating a travel clinic, communication skills, vaccines and immunisation, and all aspects of malaria problems while travelling. It is constructed to provide a degree of clinical relevance. Content creation was handled by a team of experts assembled to manage the different modules of the course.

This paper describes the experience gathered in this process focusing on the delivering mechanism and the methodology used for the development of the eCPD courses, paying special attention to the reusability issues derived from object technology implementation.

Keywords: Learning Object, electronic Continuing Professional Development (eCPD), Travel Medicine, ForceTen, action research.

1. INTRODUCTION

In 2004, LSHTM was awarded funding by the Higher Education Funding Council for England and the London Development Agency to disseminate its medical expertise to a wider health community by developing accredited short courses e.g. online Continuing Professional Development (eCPD) courses.

CPD was central to this idea because it focuses on lifelong learning and its application to the professional individual lives. It is a constant process of internal growth to improve the physical or intellectual ability of professional people at work. The eCPD courses facilitate obtaining and developing a wide range of knowledge, and skills to maintain competence to practise. The eCPD courses, designed for online distance learning, has been constructed, archived and delivered using a browser-based proprietary Learning Content Management System (LCMS) called ForceTen. The eCPD programme complements our existing IT infrastructure and support our strategic eLearning objectives.

This interconnected, distributed model provides a reusable, integrated, and innovative environment for the dynamic creation and delivery of learning objects with the capability to retrieve resources from remote services. The eCPD courses and specifically the Travel Medicine course designed for online distance learning, were constructed, archived and delivered using a proprietary LCMS called ForceTen.

This paper describes our experience developing the Travel medicine course, focusing on the tool (delivering mechanism) and methods used for the development of the eCPD courses, paying special attention to the reusability issues derived from object technology implementation.

2. INFORMATION AND LEARNING OBJECT TECHNOLOGY

An Information Object (IO) is a term open to many interpretations. An IO is a general term used to represent several real entities (or groups) with some similar properties, rather than one individual. An IO technology is a specific term in the field of Software Engineering (Booch, 1987) coined to address problems and limiting factors in programming and modelling process. The concept extrapolates to all branches of knowledge, keeping this essential connotation and properties, but inheriting the specificity of the new arena. A learning software developer for example, suggests that an IO is an interactive multimedia instance that can be assembled to be used in a training or academic environment. The Library of Congress defines an IO (Hockey, 1995) as “logical units of information, probably built up of components each of which could stand on their own if necessary”. Academics are also interested in Intellectual Properties Rights (Erickson, 2001) vesting in an infrastructure for IOs, where a system can variously provide open access, interoperability of networked information and metadata services. The IOs need to have sufficient descriptive information to enable them to be used by human beings and by computer programs. Therefore, metadata plays an important role as an element for the description of digital resources that make a self-contained entity capable of depicting itself.

An IO can be considered as a reusable self-contained digital entity (see fig. 1), with embedded metadata

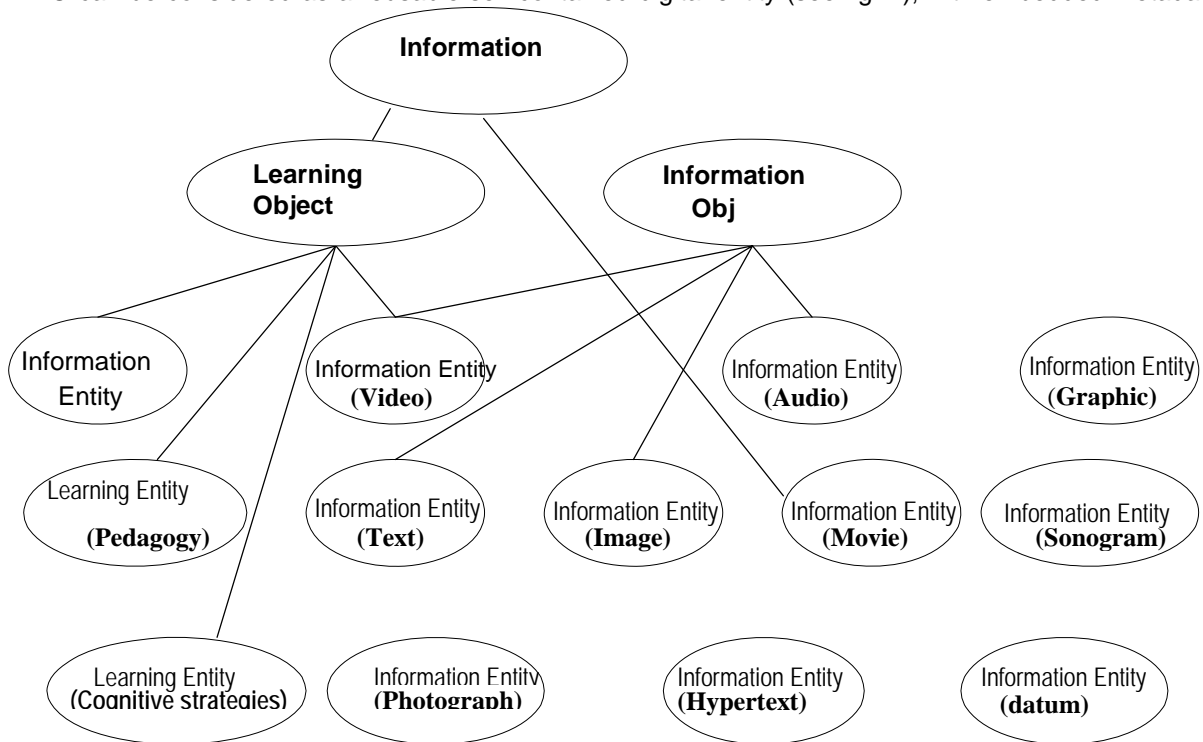


Fig.1 Information Object layout (Palacios, 2002)

resources, that might interact with others objects or encapsulate others resources (e.g. information instances), in an interconnected and platform independent environment (Palacios, 2002).

Granularity and reusability properties are essential parts of this concept. One can notice that emphasis is made to differentiate Learning Objects (LOs) from IO due to the fact that information can be communicated without an intention to teach.

Therefore, an IO becomes a LO when a specific learning strategy is applied that changes its purpose. Learning strategies are the methods that students use to learn and/or the pedagogy teachers use to convey a particular lesson. These range from techniques for improved memory e.g. acronym, acrostic, method of loci, etc. or better study skills, to an institutional curriculum designed for some specific course of academic studies. In general, a learning strategy helps to implement methods and adopt techniques that increase effectiveness in any aspects of the general cognitive process of acquiring skills or knowledge.

3. EDUCATIONAL ENVIRONMENT TOOL

The application called ForceTen used to create our online educational resources is a completely browser-based product that has as its core a LCMS that provides access to the content via structured e-learning, a searchable content database and content sharing tools.

In ForceTen all content components follow the object-based model previously described. The system offers a resilient system that is adaptive, and can be customised to the needs of the developers.

Reusability, the learning object key factor, employs a building block approach to content structure that resembles the components of the LO shown in figure 1. Another important feature is that the tool separates content from institutional structure and content format (e.g. a text object can be presented in different courses using different fonts, sizes and colors). In practical terms, for content to be reusable it needs to be broken down into the smallest possible self-contained objects. It is at this low level that granularity becomes an issue since the allocation of metadata to these small chunks of information becomes a high burden for developers who may need to build hundreds of courses. The system overcome this difficulty using a mechanism that automatically or by simple instructions allocate metadata to each LO.

This categorisation mechanism in ForceTen led to a key issue with the implementation of a standardised taxonomy for tagging the content. It is managed by a powerful and flexible taxonomy tool that enables efficient categorization and retrieval of content. Particularly we adopted the MeSH taxonomy with the intention of developing materials that could relate to any topics or areas within LSHTM. Some issues were faced because the size of the MeSH taxonomy overloaded the system and generated an erratic behaviour. Actions were taken to diminish the size by adapting the taxonomy using the six higher levels of the taxonomy to describe the content. Technical actions also were taken by the software engineers updating the entire mechanism that handle the taxonomy. It is an important lesson to take into account when setting up the infrastructure to support content development.

It has been adopted for building the eCPD courses and prescribed for future development of materials within the School. The tool could provide academic staff with an instrument for easy manipulation and future deployment of reusable educational resources to deliver content for classroom based lecturers.

4. TRAVEL MEDICINE COURSE

The Travel Medicine course encompasses four specific areas of travel medicine: operating a travel clinic including risk assessment of travelers, communication skills, vaccines and immunology, and all aspects of malaria and its prevention. Content was developed by leaders in the field based on their expertise using up-to-date guidelines differentiated into 'suggested' and 'compulsory' reading. The course is aimed at physicians GPs, nurses, and occupation health workers specifically. Additional resources as extension material within the course were included in the form of external web links and key documents inserted in PDFs format in areas considered important. Images and photographs are embedded in the course under appropriate licensing and copyright clearance.

The course is presented within the virtual learning environment (ForceTen) described previously, wrapped in a self-directed, and interactive portal. Users can interact with others in the course using the eCPD Forum that allow to read, post and discuss related topics. In addition, academic and technical staff will provide support to users according to need and availability. Relevant characteristics of the portal used for delivery include interactive menus and intuitive buttons employed for navigation, layered material presenting core messages in textual form on top with underneath complementary popup information, appealing screen design that combine short textual and graphical elements based on latest techniques and principles of multimedia design (R. Mayer, 2001), and a manual to help users and answer to more frequently questions. Pedagogical soundness centres on setting of learning objectives for each module, reinforcement activities, interactive assessments, prescriptive and reflective learning. Learning is reinforced by assessments situated throughout all the modules. These are delivered as simple or multiple choice questions, true or false questions, drag and drop tasks, or fill in the blanks texts scored immediately on completion to provide feedback.

On completion of the course, users are encouraged to complete an evaluation form used for feedback purposes. It helps to improve learner support and channel future developments. Then, an eCPD certificate of the programme, which has been accredited by the Royal College of Physicians, is issued.

5. COURSE DEVELOPMENT

A constructive approach was established in the design of the Travel medicine course based on the premise that new knowledge is constructed on the foundation of previous experiences. Therefore, concept and ideas has been presented from lower to higher level of complexity. Course objectives not only follow this pattern but they establish clearly the educational goals to achieve.

Course development revolves around the **action research methodology**. Action research establishes a participant's involvement directly in the activities. This involvement provides empirical and research evidence, thus allowing for a better understanding and learning of the individual's own practice by means of investigating and testing different points of view within ad hoc situations, and reacting to the feedback responses. It is a systematic and collaborative collection of evidence to support group reflections in order to adapt solutions to specific teaching and learning needs.

Within the action research methodology a particular model is used: "The Educational Management Action Research Model" (EMAR). It provides, in addition to communication channels to the pedagogical, institutional, and others constraining factors areas, the structure and spiral cycles of an action research approach (Mcpherson et al. 2004). The EMAR model (fig. 2) was produced as a result of research conducted at the University of Sheffield. It is composed of four basic areas through which a developer interacts by means of four essential cycles that constitute the action research framework (Coghlan and Brannick, 2001).

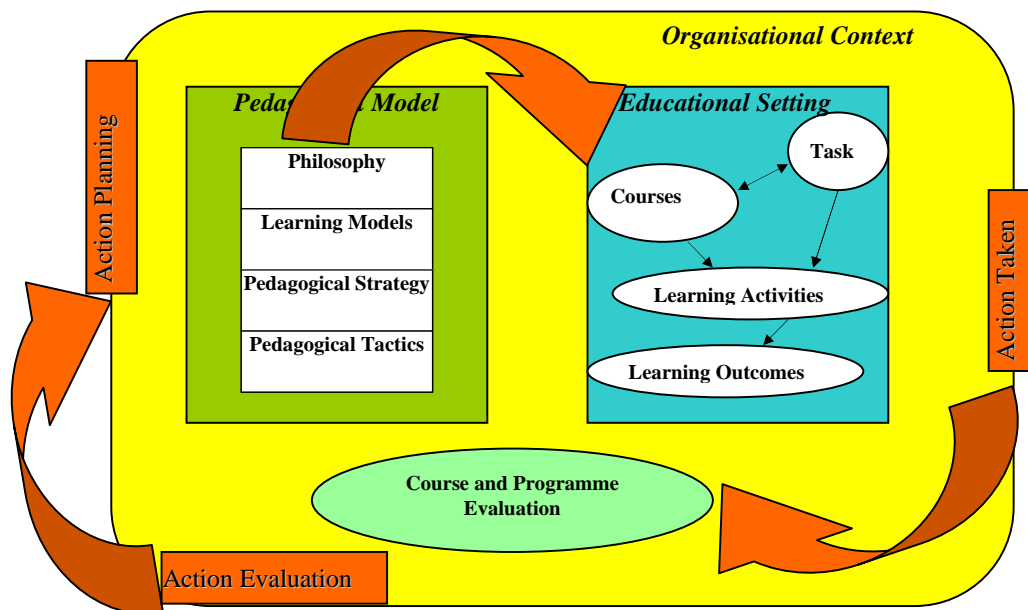


Fig. 2 The Educational Management Action Research Model (EMAR) (Mcpherson et al, 2004)

The four basic EMAR areas are: the **Organisational Context** (OC), the **Pedagogical Model** (PM), the **Educational Setting** (ES) and the **Evaluation** process (E). It is in these areas where the cycles intersect, and which are usually present in any project developing online learning. The **OC context**, for example, is the engine that drives forward the educational programme while at the same time establishing policies and strategies that constrain its normal flow. The **PM introduces the theoretical knowledge** that underpins the creation of the learning tasks, activities and outcomes to be implemented, as well as identifying the ICT technologies most appropriate for the delivery and composition of the educational resources. PM is the place where learning and cognition theories are incorporated into the design. Academic learning involves the acquisition of high levels skills of critical thinking and problem solving (Mcpherson et al,

2004). **The ES** relates to the curriculum design process by establishing the objectives, content to be delivered, and assessment procedures. ES is the territory where the subject expert introduces the syllabus, the specific nature of the content and the ways in which it should be taught. Finally, the most important part of action research is **E**. E differs from assessment in that the former focuses on examining the holistic nature of the process while the latter focus particularly in the content. Assessment is therefore more related to the programme and the efficiency in achieving the learning outcomes. E is intended to monitor all the activities related to the learning process and provide useful feedback and remedial actions.

The spiral cycles start with an earlier step which is essential for the action research to be effective called diagnosis, action Planning, action Taking, and evaluation. Diagnosis includes data collection, analysis and representations. It is followed by Action Planning that comprises building the curriculum design according to organisational context and pedagogical model. Next, Action Taking, which encompasses instructional design and implementing mechanisms for delivery, and finally Action Evaluation where evaluation is performed on the learning activities, modules, and programmes planned. The cycle is repeated at other stages of implementation as a result of feedback collected from learners, subject experts, administrators, technologist, etc. in the previous cycle. Therefore, there is a continuous process of improvement and refinement before, during and after the development activities.

By taking into account the organisational context, we were able to produce a curriculum that meets the staff expectations, and the educational objectives of the eCPD course. In addition, by using the action research approach, innovative use of situated activities involving research examples has become a main pedagogical component of the course. The PM is driven by the importance of CPD to professionals in the medical arena as a means to maintain and develop their professional knowledge and skills throughout their working life. eCPD implies both the commitment of an individual and the commitment of LSHTM to support this proposition and further, to improve their competence in the field of public health.

The ES consists of building the curriculum. In general terms the planning, and storyboarding, critical stages in building the courses. The E phase will occur as a series of field trials starting with a prototype consisting of a few modules of the course and later a complete beta version of the course. Feedback at each of these stages of **evaluation** will influence the final design.

6. CONCLUSIONS

The learning content management system has demonstrated to be an excellent delivery mechanism and powerful authoring tool. Its functionalities can be extended to support particular face to face teaching and educational activities beyond the online role supporting at the moment the developing of the eCPD courses. Learning object technology obviously contributes in a direct manner to these results. The reusability features attached to each educational component insert a high level of productivity and quality in the online environment which is quite unique. It can only be diminished by the costs imposed in licensing and the initial investments when setting up the whole system. However, the benefits will overcome this economical hinderance in an environment populated for the intervention of higher number of lecturers and developers. The Travel Medicine course is a successful story where technology and pedagogy gather to offer a product able to revitalise itself. The second edition of the course is being produced with minimal costs. The feedback obtained with more than 50 students already enrolled in the course is feeding the new version. From the development point of view action research has proved to be a useful methodology. In a practical scenario, it easily helps to identify flaws and guide our work. We can see that through this action research approach that, all activities can be planned, acted upon, and then evaluated, leading to a rationalisation of the development process, through constant reflection. Through this process the various ideas, actions, and experience can be consolidated. In this particular situation, the use of the EMAR model improved the curriculum development process of the Travel Medicine course.

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