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Nicephor[e]: A web-based solution for teaching forensic and scientific photography

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Abstract

Nicephor[e] is a project funded by ''Swiss Virtual Campus'' and aims at creating a distant or mixed web-based learning system in forensic and scientific photography and microscopy. The practical goal is to organize series of on-line modular courses corresponding to the educational requirements of undergraduate academic programs. Additionally, this program could be used in the context of continuing educational programs.

The architecture of the project is designed to guarantee a high level of knowledge in forensic and scientific photographic techniques, and to have an easy content production and the ability to create a number of different courses sharing the same content. The e-learning system Nicephor[e] consists of three different parts. The first one is a repository of learning objects that gathers all theoretical subject matter of the project such as texts, animations, images, and films. This repository is a web content management system (Typo3) that permits creating, publishing, and administrating dynamic content via a web browser as well as storing it into a database. The flexibility of the system's architecture allows for an easy updating of the content to follow the development of photographic technology. The instructor of a course can decide which modular contents need to be included in the course, and in which order they will be accessed by students.

All the modular courses are developed in a learning management system (WebCT or Moodle) that can deal with complex learning scenarios, content distribution, students, tests, and interaction with instructor. Each course has its own learning scenario based on the goals of the course and the student's profile. The content of each course is taken from the content management system. It is then structured in the learning management system according to the pedagogical goals defined by the instructor. The modular courses are created in a highly interactive setting and offer autoevaluating tests to the students.

The last part of the system is a digital assets management system (Extensis Portfolio). The practical portion of each course is to produce images of different marks or objects. The collection of all this material produced, indexed by the students and corrected by the instructor is essential to the development of a knowledge base of photographic techniques applied to a specific forensic subject. It represents also an extensible collection of different marks from known sources obtained under various conditions. It allows to reuse these images for creating image-based case files.

Keywords: Forensic photography; Imaging; Training; e-Learning; Knowledge management

1. Introduction

The School of Criminal Sciences (ESC) of the University of Lausanne, the Federal School of Technology of Lausanne (EPFL), and the University of Basel develop an e-Learning framework about scientific and forensic photography named Nicephor[e]. This sits within the framework of the federal initiative Swiss Virtual Campus (http://www.virtualcampus.ch/), which is dedicated to promote high-quality e-learning to Swiss universities based on innovative information and communication technology. This paper presents the lessons learned in creating e-learning courses applied to forensic and scientific photography with theory and practical work, the solution developed, and the results obtained after 2 years of development.

The main objective of the project is to propose appropriate modular courses in scientific and forensic photography corresponding to the educational requirements of undergraduate academic programmes and continuing education. Flexibility and sustainability of the system are key conditions to achieve this goal. For this purpose, hypotheses and global strategies along four different axes have been defined [1].

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1.1. The pedagogical axis

The pedagogical concept is based on blended learning, where the on-line course material serves as a platform to reinforce, expand, and use the theoretical ex-cathedra knowledge. For specific needs, such as with continuing education programmes, the blended learning scenario can be adapted to a full distant learning experience depending on students' characteristics.

The web learning platform is currently integrated at the ESC in all general photographic or microscopic courses. It also covers all the photographic aspects of courses specific to a given forensic topic (scene of crime, fingerprints, microtraces, etc.). A course on digital photography has been also deployed at EPFL. This extended integration of the on-line initiative in various teaching settings delivered by a wide range of teachers promotes a culture of acceptance of e-learning activities within the institutions.

1.2. The organisational axis

This initiative had significant impact on the organisations, in particular at the ESC. Beyond the material investments (cameras, image management system, and IT) to support the project, Nicephor[e] acts as a catalyst for important changes in the way forensic images are handled in a training environment (currently in the area of crime scene investigation, fingerprints, and footwear marks). Our aim is to develop such a strategy to other fields or even across institutions. It is a move toward a system based on shared knowledge by taking advantage of training material produced by staff and from students.

1.3. The technological axis

The architecture of the system guarantees ease of use and maintenance, flexibility, and interoperability. Technological choices fulfill these criteria and benefits of stability over time by the use of SCROM/IMS specifications dedicated specifically to e-learning content. The specific options will be describe below.

1.4. The economical axis

The modularity of the course material allows for building up training programmes for varied and wider potential audiences (BSc, MSc, and continuing education). For example, the ESC has a long tradition of offering continuing education programmes to scientists working for forensic services in Switzerland and abroad. It is planned that by 2007, the ESC will be able to offer a full workshop in forensic photography using Nicephor[e], mostly in a distant learning setting.

2. Methods and technology

2.1. Strategy of development

The development team is made up of six researchers supervised by a steering committee composed of the professors involved. Based on the course material of the professors, the development team has to create the on-line material, such as texts, illustrations, animations, films, and e-learning solutions. To organise the work of each researcher, a global strategy of development have been defined (Fig. 1).

This strategy is divided in five steps. The first one is carried out only once. This crucial step determines the technical and educational directions that will be followed during the entire length of the project specifying the requirements, limitations, and objectives. Steps 2–4 are iterative procedures of content production and validation, and course implementation and evaluation. Unlike the first step, this process of production is applied to several courses in different institutions. As technology changes extremely rapidly in digital photography, the content production and technical development are planned to be extensible to keep the courses up to date. For each course, pedagogical workshops are used to explore new teaching and pedagogical strategy and implement it in a learning management system (LMS). Finally, the last step consists in the integration of the courses into the curricula of the respective institutions.

2.2. Architecture of the system

At the beginning of the project several solutions were considered to build an e-learning system. It was clear that taking advantage of an existing learning management system featuring specialized educational tools was essential. Unfortunately, those systems are not sufficient to create or truly manage content

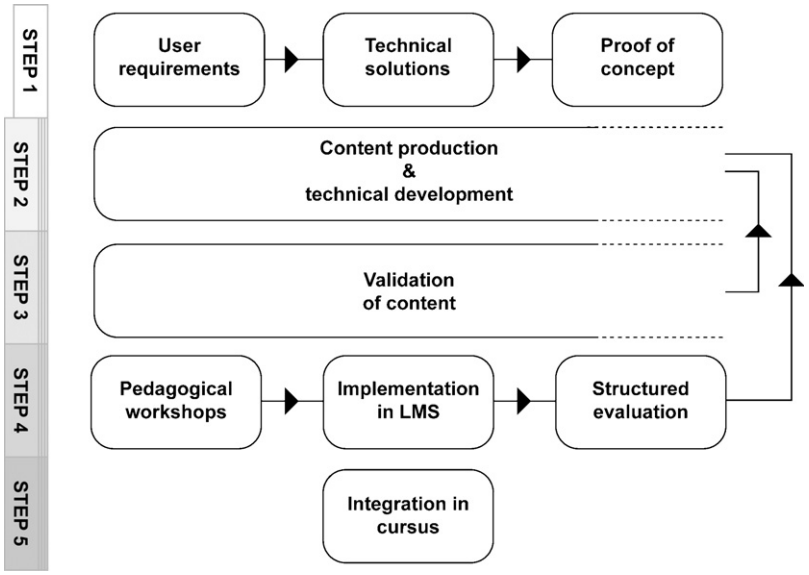

Fig. 1. Strategy of courses production in five main steps.