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## **Use of the FAO-UNESCO Learning Module on Digitisation and Digital Libraries**

by

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### **Abstract**

*The FAO and UNESCO, two United Nations specialized agencies, have developed a computerized self-learning module on Digitization and Digital Libraries. This paper will summarize the objectives of this project as reported by the sponsors, describe the module, and present the author's experience of testing it in a course on digital libraries in the M.Sc. programme in Information Science at the University of Madras.*

### **History and objectives of IMARK (1)**

The Food and Agriculture Organization of the United Nations has a vast experience in providing information services and promoting the capacity-building in this area in developing countries. Although these activities centre on agricultural information, their coverage is very broad in terms of both subject matter and generic information handling skills. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has a mandate to promote international cooperation and development in the area of information science through its intergovernmental Information for All Programme.

In order to provide learning opportunities for the large number of agricultural information and documentation workers in developing countries, many of whom have no formal qualification in information science, FAO has been developing for several years a series of interactive self-paced learning modules on CD-ROM entitled Information Management Resource Kit (IMARK). Access to IMARK is free of charge in up to five languages, in order to reach an internationally widespread audience that might otherwise be unable to access such resources. Each module is supplemented by an Internet-based online community, providing a virtual discussion forum for contributors and learners to exchange views, share information and request help from each other.

The first IMARK module on "Management of Electronic Documents", covering the basics of computerized information systems and services, was released in November 2003 and has earned wide acclaim, notably in the Asian region,<sup>1</sup> and two others aimed at entry-level learners are nearly completed, covering "Investing in Agricultural Information" (dealing with the planning, financing and management of information services) and "Building Electronic Communities and Networks".

The IMARK modules are typically developed through partnerships involving FAO and cooperating international, regional and national organizations. In mid 2003 FAO, UNESCO and the Indian Institute of Science (IISc) in Bangalore decided to work together to prepare an IMARK module at a higher level, designed to introduce professional librarians and information science students to the field of "Digitisation and Digital Libraries". UNESCO was primarily responsible for the subject coverage, while FAO was responsible for the pedagogical aspects and production methodology and IISc provided on-the-ground coordination. This module, which is the principal concern of the present paper, was available in beta version in late 2004 and the final version was in press at the time of writing.

### **Pedagogical approach**

The IMARK modules are based on the following recommendations of distance learning institutions and instructional design experts:

- The screen design and navigation architectures used should be based on sound instructional design principles and enhance the ease of learning.
- Interactive learner feedback should be built into the materials, so that learners are able to determine if they understand the material, and if not, find a way to correct their misunderstanding.

Each IMARK module is being designed in such a way that learners with various levels of experience, or having specific needs, can create tailored courses by designing their own Personal Learning Path, often saving significant study time. The basic building blocks of a module are lessons which introduce basic concepts and demonstrate real life applications of the concepts and procedures covered. Each lesson is designed to enable the learners to meet specified learning objectives and includes practical exercises, typically in the form of quizzes, to help the learners assess their understanding of the materials

In addition to the lessons themselves, each module provides the learners with access to an internal search function and a technical glossary, as well as with on-board and on-line reference materials, including relevant non-proprietary software applications and tools.

### **Technical development**

The choice of technology for the production of IMARK was made to support the above pedagogical approach and the following technical constraints:

- flexible and powerful interactive functionality
- re-usability of materials
- ease of development and maintenance of multi-lingual versions (at least in the official UN languages)
- stand-alone CD-ROM applications with the possibility for future Internet based use with same look and feel
- accessibility for users in developing countries in terms of equipment and software requirements
- multi-platform compatibility.

The solution adopted by FAO was a combination of Macromedia Flash and XML technologies. The learning content is stored separately in XML files, and is retrieved and presented by a generic software application using Flash. The creation, update and translation of learning content is carried out using templates, so that most of the implementation work consists of developing new XML documents, images and other media files. The Reusable Learning Object strategy is used to develop individual lessons which can then be combined to form pre-defined and user-defined curricula.

Although the incorporation of audio and video would be straightforward in this approach, this has not been done since it was felt that the value added would not warrant the additional overhead for translating such material, combined with the risks of offending cultural sensitivities.

At the time of the choice of technology, appropriate integrated authorware and delivery packages were not available, primarily because of the requirements for multilingual versions and for a stand alone delivery system.

The CD-ROM based modules already produced or under production require a basic PC with:

- Pentium I or equivalent processor
- 32 MB RAM (64 MB is strongly recommended)
- 800x600 screen resolution with 16-bit colour depth
- Windows 95 or above;
- Acrobat PDF reader version 4.0 or later; and
- A web browser.

A web-based delivery mechanism that will enable delivery on any Internet connected computer will be available in 2005.

#### *Production methodology*

The first step in production is to appoint a module coordinator who prepares a detailed content plan. Then a team of expert authors is constituted, and each one develops a topic analysis for specific lessons based on technical guidelines issued by FAO and under the guidance of the coordinator. When the analyses have been approved, the authors develop full content for the lessons, in close consultation with the team of instructional designers at FAO who prepare a Powerpoint mock-up of each lesson. The approved mock-up is then passed on to a technical development team who produce the final module.

Corrective evaluation and feedback are organized at each step, including peer review of the content and user feedback on the prototype versions.

### IMARK module on Digitisation and Digital Libraries

Several categories of learners are targeted by this module:

- librarians and other information specialists who are familiar with computers in their work, but have no training or experience in creating and disseminating complete electronic documents, who wish to master the required range of skills;
- librarians and other information specialists who have some training or experience in this subject area and who want to learn more about or implement certain procedures;
- information system managers wishing to understand the strategic and management issues, as well as implement organizational and technical solutions related to document preservation and the creation and dissemination of digital libraries.

The content and learning objectives of this module are as follows:

#### ***Unit 1: Conceptual Overview***

- Provide the user with an understanding of benefits of digital libraries through scenarios and examples that illustrate enhanced access, preservation or new forms of access to digital material
- Provide the user with a basic understanding of functional components of digital libraries and workflows related to their creation and distribution
- Provide the user with an understanding of basic concepts related to copyright and intellectual property
- Provide the user with an understanding of legal issues that need to be considered and precautions to be taken for inclusion and provision of access to material in a digital library

#### ***Unit 2: Electronic documents and formats***

- Provide the user with a basic knowledge of the different types and formats of electronic documents and their applications;
- Provide the user with a basic understanding of storage space requirements, and issues related to indexing and searching of major formats;

- Provide the user with a basic understanding of how to deal with electronic texts using non-Latin scripts;
- Provide the user with a basic knowledge of the different formats of electronic images and their applications

***Unit 3: Metadata and subject indexing***

- Provide the user with an overview of the relevant meta-data element sets for electronic documents.
- Provide the user with an understanding of the application of the Dublin Core meta-data specification;
- Provide the user with a basic understanding of subject indexing and the steps in subject indexing

***Unit 4: Creation and Management of Digital Documents***

- Provide the user with the essential considerations (pros and cons) to enable the user to fully evaluate the process of converting printed documents in retrospect to electronic format by digitisation;
- Provide the user with a technical overview of the digitisation process (scanning and OCR) and the resources required to conduct the process;
- Provide the user with insight into the essential components of an optimized workflow which combines existing processes for the production of printed documents with the creation of electronic documents constituting the digital library;
- Provide the user with an understanding of considerations to be given in long term preservation of digital material; and
- Provide the user with an understanding of special considerations to be given in digitising delicate and heritage documents.

***Unit 5: Creation and Sharing of Digital Libraries***

- Provide the user with an understanding of key steps involved in creating a digital library
- Provide the user with a technical overview of infrastructure requirements (hardware, software, network, personnel) for creating and sharing a digital library
- Provide the user with an understanding of the steps involved in planning and managing a digital library project

**Unit 6: Example of Digital Library Software - Greenstone**

- Provide the user with a technical overview of features of Greenstone software
- Provide the user with an understanding of alternate ways of building collections using Greenstone
- Provide the user with an understanding of configuring Greenstone collections for obtaining desired browse and search features
- Provide the user with an insight into collection building using a practical example

Units 2 and 3 are taken from the previously prepared module on "Managing Electronic Documents" with only modest updating and enrichment. Some of the other Units also draw on material from the former module, but treat the material in considerably more depth and detail.

In addition to the interactive lessons and integrated reference support as described above, the module contains a number of additional on-board resources provided by their owners:

- "Moving Theory into Practice - Digital Imaging Tutorial" of the Cornell University Library/Research Department
- Greenstone Digital Library Software of the New Zealand Digital Library project of the University of Waikato (including the manuals)
- Three major thesauri in the agricultural area.

The coordinator of the module was Dr. T. B. Rajashekar, Principal Research Scientist and Associate Chairman of the National Centre for Science Information at IISc, who was also a member of the team of six authors.

Use of the module at the University of Madras

The beta version of the module is being tested as the principal teaching aid for a three credit course in Digital Libraries for second year M.Sc. students in the Department of Information Science of the University of Madras. Seven students are participating in the course which is more than half completed at the time of writing.

The course is given in two sessions per week. In one session which is more technical, the present author lectures with the IMARK module for support, and in the other a colleague treats broader concerns and guides student presentations on

digital library issues. All units of the module are covered in the course, except for Unit 3 on Metadata and subject indexing which the students had studied in another part of the curriculum.

Each student has personal access to a computer on which the learning module and the Greenstone software are installed. The students follow the lectures at their own computers and complete the exercises with the guidance of the professor. They can use the computers in their free time to access the module and Greenstone, and do so an average about three times per week. As part of the course, each student is expected to build a Greenstone digital library in a personal field of interest.

The students have all indicated that this method of learning to have substantial added value. They are expected to complete an evaluation questionnaire covering the user friendliness and usability of the module, the content of each of the units, and an overall assessment.. Each section of the questionnaire elicits several objective measures of adequacy, as well as requesting opinions on the strengths and weaknesses of the module.

The module will be demonstrated at the Workshop and the preliminary results of the evaluation will be presented.

## **References**

1. This section is based on the IMARK website at <http://www.fao.org/IMARK/>
  2. See the review of the Asian Development Bank Institute (ADBI) at <http://www.adbi.org/cdrom-review/2004/11/08/760.information.management.resource.kit/full.review/>
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