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OPEN ACCESS STUDY MATERIALS FOR BETTER INFORMATION MANAGEMENT: DEVELOPING OCEANTEACHER

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ABSTRACT: Study materials about data and information management that are freely available through the Internet and the WWW are made available in an organized way through the OceanTeacher system at http://www.oceanteacher.org/ or http://ioc.unesco.org/oceanteacher/. Either we include the full documents or at least a WWW hyperlink to the documents in case the document cannot be copied for some technical reason or because of copyright restrictions. It is important that as many as possible full documents are included, because many users work in developing countries without broadband internet access. More specifically, most attention is spent to study materials on data and information management to support marine science or oceanography, as the whole system is created in the framework of UNESCO - International

Oceanographic Commission (IOC) - International Oceanographic Data and Information Exchange (IODE) network. The primary aim of the system is to assist managers and staff members to set up and run new IODE centres. In parallel with the part on information management, study materials on data management are included and this forms now the largest part. This contribution offers an overview of the framework, the evolution of the system, the state of the art of the contents and structure, the plans for the future, as well as the challenges and bottlenecks.

KEYWORDS: information management, open access, study materials, distance learning, digital libraries, Internet, WWW, capacity building

About UNESCO-IOC-IODE

Figure: Logo of UNESCO

UNESCO, the United Nations organization
for education, science and culture, with headquarters in Paris, includes UNESCO-IOC, The International Oceanographic Commission.

Figure: Logo of UNESCO-IOC

UNESCO-IOC-IODE The International Oceanographic Data and Information Exchange had been established by the IOC in 1960

- to facilitate and promote the exchange of oceanographic data and information,
- to develop standards, formats, and methods for the global exchange of oceanographic data and information,

- to assist member states to acquire the necessary capacity to manage oceanographic data and information and become partners in the IODE network.

Over 60 centres have been established.
Within the framework of the IODE program, UNESCO-IOC has developed a capacity building program to train data and information managers in developing countries with the objective of establishing and strengthening National Oceanographic Data and Information Centres.
Activities include:

- National and regional workshops and training courses
- Advisory missions
- Internships

Setting up and supporting Regional Oceanographic data and information exchange networks, such as the following:

- ODINAFRICA for Africa which is already running well now
- ODINCARSA for the Caribbean and South America is taking off but could use some more funding.
- ODINCINDIO for the Indian Ocean, which is also starting up with meetings and training workshops.

The strategy of these networks includes:

- linking of training with supply of equipment and with operational support
- stimulating regional co-operation
- orientation towards concrete products and services
- taking into account the many stakeholders

Figure: Logo of ODINAFRICA

The ODINAFRICA network started in 2001 with 20 states in Africa and has grown and consolidated in the meanwhile. Aims include the following:

- to improve access to data and information available in African marine science centers
- to develop skills for the creation, dissemination and analysis of data and information products

- to stimulate the transition towards digital information systems on the Internet like catalogues, interlibrary lending, communication by e-mail, usage of Internet-based information sources and setting up document repositories.

Achievements up to now include:

- The establishment of National Oceanographic Data Centers
- Improved Internet connectivity
- Data atlases
- Meta-databases
- National ocean awareness activities
- Stakeholder meetings
- National coordination teams
- Training courses

More concretely in the area of information management we see some improvement:

- Libraries have been established
- One computer program for integrated library management has been provided and has been installed in most centers
- Training courses were organized for information managers
- National catalogues have been created
- These are merged in a union catalogue that is searchable through the WWW
- One common ODINAFRICA document-repository has been established

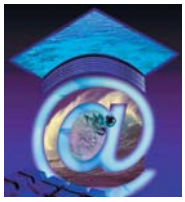


Figure: Logo of OceanTeacher.

The evolution towards OceanTeacher

As part of the capacity building activities mentioned above, OceanTeacher has been developed. In the period 1960-1997, no standard curriculum was available to support training sessions and consultancies. In 1997 the development started of an HTML-based training curriculum on CD. In 1998 the IODE so-called “ResourceKit” was born. In 2001 this “ResourceKit” together with some training modules formed the basis for OceanTeacher. In 2003 we worked on the refinement of the outline / taxonomy / classification of the study materials. In 2004 we renamed the ResourceKit to OceanTeacher “Digital Library”; this collection of materials is made easier accessible through some structured “Courses” that have been set-up mainly to support concrete live training courses that were organized during recent years.

OceanTeacher is now a self-training system that offers study materials and other information resources relevant for (marine/oceanographic) data and information management. It is used primarily during IODE capacity building courses. However it can also be used for more independent self-training and continuous professional development. The name OceanTeacher refers of course to the primary focus area of applications, due to its historical evolution, but the contents is not restricted to data and information management in the context of marine science only; on the contrary, most of the materials on information management are more general in the sense that they can be applied in most contexts where information management is needed, irrespective of the subject domain.

The contents can be accessed simply with a web browser, independent of computer platform at the user's client side.
The first version of the system has been accessible online through http://oceanteacher.org/ or http://www.oceanteacher.org/ or http://ioc.unesco.org/oceanteacher/ and on one CD-ROM that is made available by UNESCO-IOC on request, mainly for users with poor Internet access.

OceanTeacher has been presented as one of several recent activities initiated by UNESCO-IOC that rely on Internet and WWW information and communication technology by Pissierssens (2002).

The role of OceanTeacher in capacity building has been the subject of a paper by Reed (2004). The parts devoted to data management have been described and discussed by Brown (2004).

Further development is going on in 2004 – 2007, supported by the Flemish Government, Belgium, in the project named ODIMEX.

Structure and contents of OceanTeacher

The contents consist of two components: the "Digital Library" and "Course manuals".

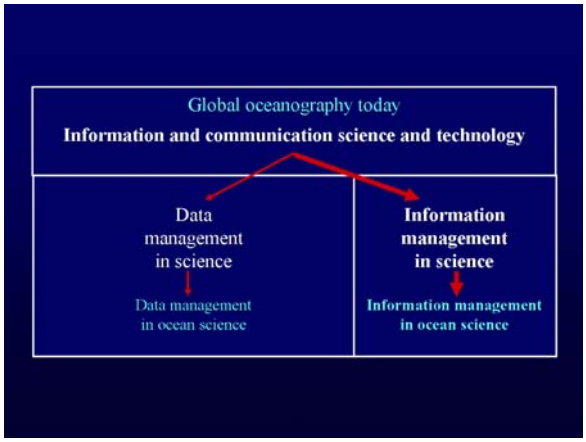


Figure: Structure of the OceanTeacher Digital Library.

The “Digital Library” corresponds with what was named the “Resource Kit” in earlier versions; this contains a wide range of material on marine data-management and information-management:

- documents, such as training manuals and relevant IOC documents;
- hyperlinks to documents on the WWW;
- references to related products (such as the FAO CD-ROM’s on information management);
- computer programs…

This can be considered primarily as an open access digital library developed in an international co-operation.

The highest level of the table of contents looks as follows:

- Oceanography Today - Contains resource materials describing the marine sciences as practiced today, with special emphasis on data and information management practices in research, routine surveys and operational programs.
- Information Technology & Scientific Communication - Contains materials covering basic usage of computers for data and information management, the use of metadata to find and utilize these resources, software for general and oceanographic purposes, and programs/agencies involved in developing information technology.
- Information Management Principles - Basic coverage of information management principles, without regard to specifically "marine" applications.
- Oceanographic Information Management Processes - Specific applications of information management principles to oceanography.
- Data Management Principles - Basic coverage of data management principles, without regard to specifically "marine" applications.

- Oceanographic Data Management Processes - Specific applications of data management principles to oceanography. Includes technical information on data formats, details about data centers and their resources, analyses and products from all levels of oceanographic work, and the use of ocean data in modeling.

The section on "Information Management Principles" offers the following subsections:

1. Information Concepts
2. Evaluating the Need for an Information Center
3. Infrastructure: Establishing a Plan
4. Building and Documenting a Collection
5. Organizing the Collection
6. User Services
7. Managing Internal Information
8. User Training Techniques
9. Building and Maintaining the Information Center Profile
10. Information Sources
11. Recent Developments in Software and Technology

The more specific section on "Oceanographic Information Management Processes" offers the subsections as follows:

1. Exploiting Information Resources in Ocean Sciences
2. Supporting Information Access to Developing Countries
3. Metadata Systems Specific for Marine Information
4. Developing Connections
5. Marine Information Organizations
6. Continuous Professional Development

The "Course manuals" correspond to what was called the "Training Manuals" in earlier versions; these are collections of outlines, notes, examples, and miscellaneous class work documents used in conjunction with the Digital Library to organise a training program in (marine) data management or information management.

All the materials can be browsed. To facilitate editing and browsing, a taxonomy is developed and applied. The contents can be searched using an external search system (for instance Google) or a search system implemented on the WWW server by UNESCO-IOC

The following are advances that have been realized or that are in the pipeline:

- In view of the great overlap between methods, tools and techniques for data and information management, a common part, a common "trunk", has been created. This deals with:
    - global oceanography today
    - information technology and scientific communication, which includes:
        - technology
        - metadata

        - information seeking
        - document production
        - information and technology programs and organizations
- The site contains more materials, so that more than 1 CD-ROM or a DVD disk is required to carry all the materials.
- Similar non-commercial projects are identified that overlap partially in order to include parts or to start some co-operation. Examples are other systems created in the framework of UNESCO and FAO.
- Various file formats are converted to PDF to save storage space, to decrease the number of viewers needed, and to avoid that a user cannot well read or view a file.
- A clear explanation of the aims of the project is made, mainly for potential authors of new texts.

OceanTeacher is in 2005 perhaps the largest stand-alone, single-topic teaching system on the WWW. It incorporates the following:

- 1.5 Gbytes
- More than 6000 individual files
- About 3600 illustrations
- More than 14000 internal cross-links that integrate the entire system
- More than 13000 links to external resources
- Many oceanographic textbooks

Plans for further development of OceanTeacher

Priorities for further development are the following:

- As OceanTeacher has been recognised as a suitable training tool by other programmes and organisations, such as GOOS and JCOMM. Therefore collaborative arrangement can allow that the subject domain covered up to now is expanded by including:
    - Remote sensing
    - Marine biological data management
    - Operational oceanography data management
    - Circulation modelling
- The target audience can be expanded and focus also on scientists in related areas, not only data and information managers.
- More or less standard proposed university curricula for various study programs, can be derived from OceanTeacher.
- Applications of OceanTeacher can focus not only on starting data and information centers in developing countries, but also on continuous professional development.

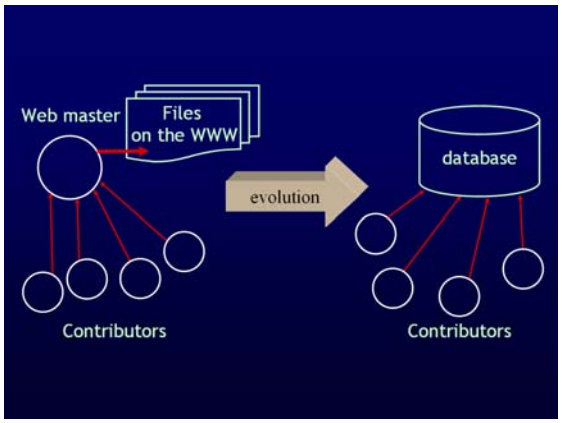
The technical basis of OceanTeacher is up to now a static web site. This should be migrated to a web site that is managed by a contents management system, which is of course based on a database management system. That should allow:

- better management and security related to input by several editors,
- well structured inclusion of metadata,
- better usage monitoring, and so on.

Ideally the new system:

- is based on open source development software that can be used and distributed free of charge
- has a substantial development and user community
- allows an easy migration from the current system, without loss of data and structure
- provides some functions of an electronic learning environment
- can not only be browsed, but also be searched by an internal search system
- allows easy export to a system on DVD-R
- can be harvested by external systems using the Open Archives - Metadata Harvesting Protocol.

Several computer platforms that fulfill most (but not all) of the functions on our wish list have been identified, considered and investigated. Examples are (in alphabetical order) BlackBoard, Claroline, DSpace, Fedora, Greenstone, KEWL, WebCT.



Challenges and bottlenecks

In this project we face several bottlenecks and challenges:

- It is hard to identify documents that are suitable as study materials that are available free of charge (open access), of high quality and up to date; today distribution of most suitable materials is still blocked by copyright. Materials on general aspects and widespread applications of ICT are relatively easy to find; however, materials more specific on information and library management are

harder to find. Furthermore, even when a document is available free of charge, it cannot necessarily be copied and included in the WWW site or the CD-ROM due to copyright restrictions.

- How to keep copies of documents and programs up to date in the OceanTeacher system, when the original master version content is updated elsewhere.
- International co-operation requires some face-to-face contacts, which is expensive.
- Funds are limited (of course).
- Communication, training and learning is hindered by differences in language among the users and potential users (English, French, Spanish, Portuguese…).

Assessment/evaluation of OceanTeacher

Assessment of the product developed during a project or during a phase in a longer, ongoing project, is of course desirable. How to evaluate a product like OceanTeacher that is still evolving fast? Up to now, the system has already been an essential component of several training courses
on marine data management and on marine information management. In this way it has already proved to be a valuable tool.

Invitation to contribute to OceanTeacher

You are invited to contribute documents that you have authored to the OceanTeacher digital library on information management for library and information staff.
The following are a few reasons why it may be interesting for you to contribute:

- The system on the WWW site is well "visible".
- The system is prestigious, due to quality control by the editors and the international character.
- We can be optimistic about the longer term stability of the system because it enjoys international support and because we apply standard well accepted and open technology.
- The degree of originality is not an essential aspect of contributions, because this can fall between the following extremes:
- Contributions can be completely original in the sense that they have not been published in any form earlier, but they can also be simple copies of work published elsewhere. Of course problems with copyright held by publishers should be avoided.

It is also appreciated when you make us aware of interesting, relevant and appropriate materials that are freely available, but that have not yet been included in OceanTeacher.

Note:
The slides created to support the live presentation should be available online through the Internet and WWW from

http://www.vub.ac.be/BIBLIO/nieuwenhuysen/presentations/
with “BIBLIO” in capitals, not “biblio”

Acknowledgements
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- Benjamin Sims working with UNESCO-IOC-IODE on computer software management.

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