34th WEDC International Conference, Addis Ababa, Ethiopia, 2009

WATER, SANITATION AND HYGIENE:
SUSTAINABLE DEVELOPMENT AND MULTISECTORAL APPROACHES

A web based communication and information system tool for water management in developing countries

C. Dondeynaz, P. Mainardi, C. Carmona-Moreno, Italy & A. Leone, Belgium

REFEREED PAPER 292

This paper deals with the development of an innovative web-based communication and information system tool for water practitioners in Developing Countries. We introduce briefly the functionalities implemented in the web-based Communication and Information System which allows the specialised users in the Water field to improve the network communication through a virtual web-based system. Two implementations have been developed for two communities: 1) the AQUAkNOW Information system (http://www.wkmp.net/new) for practitioners in the field; 2) the EUWI Communication and Information System (http://www.euwi.net/new) for policy makers in charge of the implementation of the European Union Water Initiative.

Introduction

Information and knowledge management are increasingly recognized as important features in effective and efficient work in the water sector. However this essential knowledge is not easily available and is often spread among various stakeholders worldwide. In addition, its enhancement is impeded by a lack of sharing and exchanges within either the "water community" in general or thematic communities. So, to facilitate collaborative work and knowledge management, EUROPEAID and the JRC of the European Commission have developed a web-based tool able to respond to this identified need and to make it suitable to user communities dealing with water issues. The content management system will allow the community of users to develop and share information around the community itself and toward the creation of a real knowledge base.

The first part of the paper introduces this tool through a synthetic description of its principles and the main functionalities available. The second part of the paper deals with presentations of its implementation for two different user communities: the European Water Initiative community in charge of the implementation of the policy aspects and the general water practitioner's community. In conclusion, we draw the first lessons from the implementation of these two projects.

Part 1: A Web-based platform for Communication and Information System

In the framework of the Integrated Water Resources Management approach, the development of the water sector in developing countries implies the involvement of an important number of stakeholders and this, at different decision levels. This implies the generation of complex information, data and knowledge that are often unstructured and fragmented in different working groups and projects. There is an urgent need for an information system which should federate this information. In a concrete way, such powerful tool for managing information has to ensure a very low learning curve and a free access to any actor in the domain.

The Web based CMS technology appears as a powerful solution that fulfils these requirements: it offers the last technologies in terms of collaboration and knowledge building at different levels ranging from global to small communities of practitioners. In addition, it provides simple and intuitive interfaces, and tools to promote the participation of users and the community building.

In our specific context, the CMS has to fulfill three main requirements.

First, it has to be based on Open Source standards that offer various advantages regarding the Information Technology environment in developing countries (reduced information technology resources), in particular in terms of copyright fee and restrictions.

Then, using an intuitive and user friendly interface, it will help reducing resources and time necessary for the training.

Finally, promoting the user generated content; the platform will give the priority to the user contribution reducing the administrator team intervention, to collect informal knowledge coming from individual experience.

In this context, after an extensive analysis of more than 30 CMS Open sources identified in the market (http://www.cmsmatrix.org/), DRUPAL was chosen because of the following advantages:

- **Modular and extensible.** it provides a slim, powerful core that can be readily extended through custom modules.
- **Quality coding.** High quality, elegant, and quite exhaustive documented code is a priority over roughed-in functionality.
- **Standards-based.** it supports established and emerging standards.
- **Low resource demands.** To ensure excellent performance, Drupal puts a premium on low-profile coding (for example, minimizing database queries) and should also have minimal, widely-available server-side software requirements.
- **Open source.** It is based on the open source philosophy of collaborative free software development and is licensed under the GPL meaning it builds on and supports other open source projects.
- **Ease of use.** Drupal aims for a high standard of usability for developers, administrators, and users.
- **Collaboration.** The development supports open, collaborative information sharing systems and approaches.
- **Extensive use by the user community.** Based on PHP standards, there exists a very wide community of DRUPAL users and developers which assure the extendibility of the system.

The functionalities of the communication and information system

The Communication and Information System is composed of two major parts: 1) General Public: This part of the system provides the general public with relevant information, data and activities of the community in order to increase the transparency and the visibility of the activities of the specialized community; 2) Working Groups: This is the private space where practitioners and specialized users can share information, data, knowledge and experiences in the field. The latter part is moderated by an administrator in charge of the management of the group, but any member of each working group is allowed to upload/download the most relevant information from/into the website. Figure 1 shows the different functionalities available by the system.

Part 2: The implementation of two specialized communities in the Water Management domain

The flexibility of this system allows a suitable customization to any thematic user community. EUROPEAID and JRC are developing platforms for two different user communities: 1) EUWI-CIS of the European Water Initiative community where international donors asked for the development of a new tool dedicated to share information and strategy documents; and, 2) AQUAkNOW Information System where experts on the project implementation in the field can share relevant information, implementation guidelines, experiences, implementation tools, i.e. GIS tools for data and project management.

In both cases, the underlying philosophy is to promote the **direct exchange** from the person owning the knowledge, and the person looking for it. Therefore, the system mainly relies on the involvement and the contribution of the user themselves. In concrete, the content management is mainly under the control of the community of users through an extension of theirs permissions and the functionalities available.

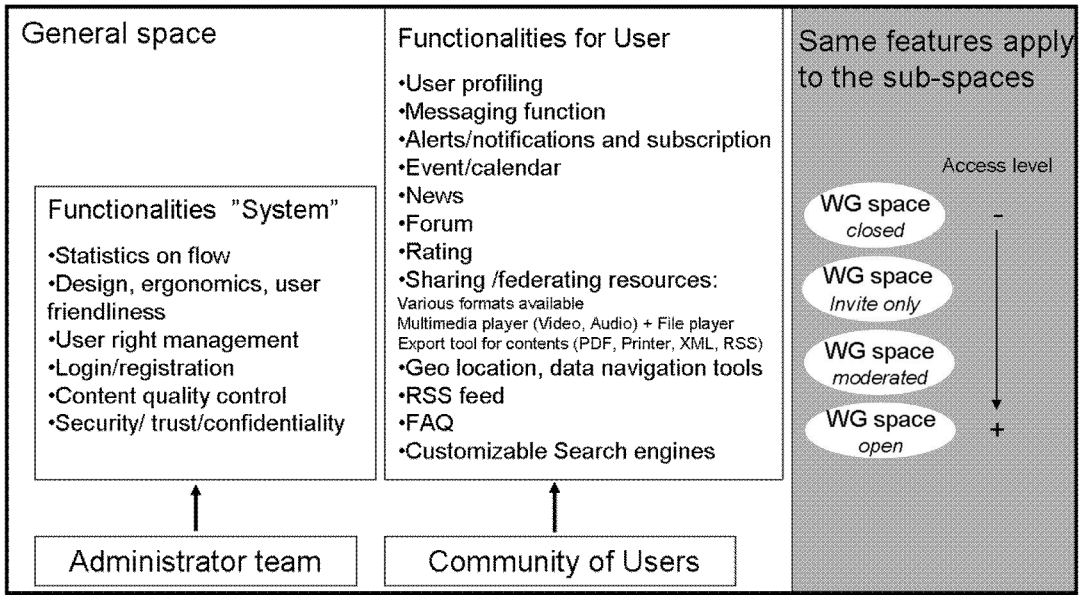

Figure 1. General organisation and main features

The European Water Initiative community (EUWI)

As a political partnership addressing water issues through multi-stakeholder dialogue and coordination, the European Water Initiative community brings together a wide number of stakeholders ranging from the international organizations to NGO's from all continents. The general objective of the new version of the EUWI-Communication and Information System emphasizes both the transparency towards the general public and the exchange among its members.

More precisely, the EUWI community expresses the following needs in a rather strong way:

- To have dedicated spaces and updated interactive tools facilitating a joint work. The user-friendliness of these tools was strongly stressed, and so those have to be intuitive and simple for any user, avoiding training session.
- To have an efficient channel to disseminate knowledge on water and to communicate around the EUWI activities fitting to the European general policy on transparency. This implies two working axes: the technical functionalities and the design facilities to allow the diffusion of any information on an efficient and attractive way.

Responding to these, suitable tools have been selected and customized from the functionalities already available in Drupal system.

The AQUAkNOW (Water Knowledge Management platform) – A hub for practitioners

The AQUAkNOW platform targets a wider public than the EUWI and follows an operational purpose: improving the knowledge management in the water sector for specialized practitioners in developing countries. The involvement of the African centres of excellence (under the NEPAD initiative) in the development and exploitation of the system provides the whole community with valuable information.

In concrete, this platform aims, on one hand, to sort out the knowledge and tools available online; and, on the other hand, to build a thematic community to facilitate the knowledge, information and data exchanges in a simple manner.

Several key elements were considered:

- Hardware/software facilities and internet accessibility in the context of developing countries represent a major issue. We have chosen DRUPAL as a CMS software running in multi-platform and the most standard and widely distributed browsers.
- It involves a maximum of partners (African centres of Excellence), donors and actors from the sector, in particular, the international one to enhance the gathering and the sharing of the knowledge.

Following the set objectives, the AQUAkNOW platform organizes itself around two workings axes:

- *Classifying the information available*
  The general approach is to classify the information available through thematic indexes combined with customized search engines both internal and external within the following sections: **the library** which stores various formats of documents or links; the **capacity building section** provides specialized users with an inventory of trainings, workshops, seminars and methodological tools; the **water data section**, displaying links or directly various raw data and database.
  In concrete, the thematic sections point out the existing information, data or tools, **without duplication** however hosting capabilities are offered to make data available and accessible online if necessary.

- *Building a community*
  Offering the various interactive and user friendly tools, the platform also aims to build a strong community to either capture the informal knowledge issued from personal experiences or improve the exchanges. The details, in terms of friendliness and simplicity, need to be well-worked to ensure the maximum involvement of the members, the essential element in this project. This is a powerful mean for enhancing the 'water knowledge'.

Conclusion

AIDCO and JRC of the European Commission have developed and implemented two web based information systems dedicated to communities involved in the water sector (policy makers and practitioners). The system was implemented around Drupal CMS open source because its performance and flexibility which takes into account the technical constraints in developing countries. The main challenge is to translate needs expressed by a very heterogeneous user community into a practical, suitable and user-friendly tool.

The result is a dynamic tool for improving communication and sharing knowledge, information and data between the specialized communities. Both web-based information systems are flexible and content pages and data bases (knowledge, data, library and information) can be updated by the whole user community and not only by or through a unique system administrator. An example of good practice in this project is the direct involvement and implication in the development of the African Centres of Excellence in the AQUAkNOW platform. They provide this web based information system with valuable information improving the quality and usability of the system around these final users. At the same time, the system supports and facilitates the capacity building and knowledge management of the African Centres of excellence.

References

D.Chen, C.Carmona, A.Leone, S.Shams (2008), "*Assessment of Open Source GIS Software for Water Resources Management in Developing Countries*", JRC publications, ISBN 978-92-79-11229-4, 26 p.
http://www.wkmp.net/new/files/EUR_TechnicalReport_GISOpenSources_0.pdf
CMS MATRIX, "*Comparator of the various systems available on the market*", http://www.cmsmatrix.org/matrix/cms-matrix.
DRUPAL, "*Open source content management platform*", http://www.drupal.org.
EC (23.04.2003), " *Communication de la commission au conseil et au parlement Europeen, Création d'un fond Européen pour l'Eau* ', COM(2003)211final, 28 p.
EUWI (07.03.2007), « *Review of the European Water initiative, Final report* » 44p.
http://www.euwi.net/new/files/euwi/926_tmpphpgO1rFo.pdf
R.Shreve (2008), "*Open Source CMS market share*", water &stone Publications, 51p.
http://waterandstone.com/downloads/2008OpenSourceCMSMarketSurvey.pdf

Contact details

Céline DONDEYNAZ
Joint Research Centre
Via Fermi, TP440, 21027 ISPRA Italy
Tel: +39 0332 78 5449
Email: celine.dondeynaz@jrc.it
www: http://www.euwi.net/new

Paolo MAINARDI
Joint Research Centre
Via Fermi, TP440, 21027 ISPRA Italy
Tel: +39 0332 78 3502
Email: paolo.mainardi@ext.jrc.it
www: http://www.wkmp.net/new