UNIVERSITY OF CRETE

A CASE STUDY IN OPEN EDUCATIONAL RESOURCES PRODUCTION AND USE IN HIGHER EDUCATION

July 2006

This report is written by Dr K. Kikis – Papadakis of IACM/FORTH on behalf of OECD/CERI in the framework of the OER project.

The content reflects on the interviewer's understanding of the situation on hand. The collection of materials and interviews held took place in the period between 11-21 July 2006.

The report has also been submitted to the Rector of the University of Crete.

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BACKGROUND

Scope of the report

This report outlines the use of Open Source Software, Open Content use and Open Content Production at the University of Crete.

The potential use and production of Open Contents at the University of Crete should be viewed in conjunction to institutions it [the University of Crete] and its teaching staff has / have close collaborations with. For this purpose it was felt as necessary to provide short descriptions of the research centres the University is (informally) linked to.

These are independent research institutions operating on the island of Crete. These are the Foundation for Research and Technology – Hellas and the Hellenic Centre for Marine Research (HCMR).

The University of Crete

The University of Crete, is multi-disciplinary, research- oriented Institution, situated in the cities of Rethymnon and Heraklion. It is a University with a well-known reputation both nationally and internationally, with state-of-the art curricula and graduate programmes, considerable research activity and initiatives that reflect its dynamic character. It was established in 1973 and operated during the academic year 1977-1978. Today, approximately 10628 students attend the University. The University's staff consists of 580 Teaching and Research Staff members. Its' operation is supported by more than 400 administrative staff. The University of Crete is developed in two cities and three campuses:

At Rethymnon Faculties operate in the recently constructed University Campus, located in the area of Gallos. The buildings cover an area of approximately 30,000 square meters.

At Heraklion the Faculty of Health Sciences and the Departments of Physics and Biology operate in the recently constructed facilities in Voutes, in an area of 49,000 square meters (Voutes Campus). The remaining Departments and the administrative offices operate at Knossos, in prefabricated facilities (27,0000 square meters). The gradual relocation in the Voutes University Campus will be completed within the next four years.

Faculties The following Faculties operate at Rethymnon, which is the seat of the University:

The Faculty of Letters consists of the Departments: Philology, History-Archaeology, Philosophy and Social Studies. The Faculty of Social Sciences consisting of the Departments: Sociology, Economics, Psychology and Political Science. The Faculty of Education consisting of the Departments: Primary Education and pre-School Education.

The following Faculties operate at Heraklion:

The Faculty of Science is consisting of the Departments: Physics, Mathematics, Chemistry, Biology, Computer Sciences, Applied Mathematics and Material Science and Technology.

The Faculty of Health Sciences consists of the Department of Medicine.

Administration

The University is a fully self-administered legal entity and operates under the supervision of the Ministry of Education. The highest administrative body of the University is the Senate, the chairman of which is the Rector. The Rector is assisted by three vice-Rectors and supervises the Rector Council that provides for the execution of the decisions of the Senate.

The University of Crete became an autonomous institution in 1986. For a number of years it operated under the legislative framework for Regional Universities.

FORTH

Worth mentioning is that in conjunction to the development of the University of Crete in 1983, we see the establishment of the Research Centre of Crete (RCC). The Centre was established under the auspices of the Ministry of Research and Technology, under the scope of introducing innovation to the R+D scenery in Greece (prior to that R+D was mainly conducted within the University institutions and was supervised by the Ministry of Education). At the time of its establishment, the Centre comprised of the Institutes of Molecular Biology and Biotechnology, Electronic Structure and Lasers and Computer Science. Two years later, the Institutes of Applied and Computational Mathematics and Mediterranean Studies were added to the Centre as was the unit of the Crete University Press.

Of particular interest is the fact that the Centre and its Institutes were initiated by senior staff of the University. These individuals shared a common vision for the development of R+D in Greece and before joining the University of Crete all were senior faculty members in University institutions in North America.

In 1987, RCC, the Institute of Chemical Engineering and High Temperature Chemical Processes (Patras) and the Chemical Process Engineering Research Institute (Thessaloniki), joined together to form the Foundation for Research and Technology (FORTH). Subsequently CPERI broke apart. Currently, FORTH is the second largest research centre in Greece.

FORTH, recognizing the importance of science, technology and innovation in today's world, is actively pursuing:

- High quality basic research
- Development of innovative technology
- Collaborations with industrial partners within and outside Greece
- Creation of spin-off companies
- Promotion of specialized services and products
- Development of Science and Technology Parks

- Educational activities in collaboration with Universities
- Publication of textbooks and monographs
- Specialized on the job training programmes

Realizing the need for university education to adapt to the rapid changes taking place world-wide and being aware of the important role of continuous and systematic training in the development of a modern society FORTH has developed and put into action:

- Post-graduate programmes and scholarships as well as under-graduate programmes in areas of vital scientific interest in cooperation with the country's universities. FORTH grants about 300 scholarships annually with funds that come from competitive programmes, mainly European. The number of graduate students working on their doctoral thesis at FORTH is approaching 200.
- A continuing education and training programme in informatics
- Training of technicians in new technologies-informatics, biotechnology, lasers, microelectronics – creating thus valuable human resources for the existing and future needs of Greece.
- Summer courses offered to students of Physics from all over the country as part of the ″summer School for Advanced Physics″
- The Crete University Press (CUP) – the only University Press in Greece. CUP, over 200 titles to its credit, has already noticeably raised the quality of university textbooks in Greece and is highly respected by the reading public.
- The ″Vasilis Xanthopoulos and Stephanos Pnevmatikos Award″ for excellence in University teaching. In memory of the two tragically lost scientists, Vasilis Xanthopoulos and Stephanos Pnevmatikos, FORTH has enacted this annual Pan-Hellenic Award.
- The ″Nikos Svoronos″ Award for young scientists with exceptional records in the field of historical studies.

Today FORTH is recognized worldwide as a centre of excellence in R+D. Future plans will have to – and in conjunction to forthcoming legislative regulation in Greece, (although not documented per se as of yet) – include the undertaking of degree lead programmes of studies.

HCMR

The Hellenic Centre for Marine Research (HCMR) was set up as a single institution in order to integrate government-funded marine science research in Greece. Formally established by government decree on June 3 2003, it combines the former research institutes NCMR and IMBC, together with their respective field stations. Its present structure consists of five institutes, which carry out research into specific thematic areas.

It enjoys top-level scientific support from its two research vessels, its state-of-the-art 2-man submersible as well as two deepwater ROVs. Three of the Centre's institutes operate mainly out of Heraklion and their staff highly associate with the University's Department of Biology.

The Regional University Hospital

In parallel to the development of the University of Crete and RCC/FORTH, we have the development of the Regional University Hospital. As it is obvious, and in conjunction to the Educational Activities of the

School of Medicine, the Hospital is still another context in which the notion of OS Educational Resources can find a proponent.

It is anticipated that under such a new educational context OS for Educational Resources in all of its expressions: Learning Content, Tools and Implementation resources will find rich territory for development.

WHY THE UNIVERSITY OF CRETE WAS CHOSEN

The University of Crete was chosen as one of the cases to study, above all, for four reasons:

1. The institution fulfils three of the criteria listed in the guidelines, meaning that they (a) use open educational resources (OER), (b) produce OER and (c) use open source software (OSS). Furthermore, networking (to a relative extend) is taking place. While the number of instructors using open content in their teaching is extremely small, the potential for OS engagement in the moment appears to be high.

2. The geographic distribution of the University offers a multitude of opportunities to utilise the software platform and to draw interesting observations. Likewise the co-existence of the University of Crete, FORTH, HCMR and the Regional University Hospital offers enormous networking opportunities for the utilization of OS Educational Resources.

3. The fact that the operation showed its appeal and utility both locally and internationally.

4. The fact that the University of Crete is a member of GUNet, (as are almost all of the major Universities in Greece)

5. The well integrated teleconferencing facilities of the institution.

STATE OF THE ART

Open Source Software use

The use of Open Source Software in the University of Crete is extensive and ever increasing. Over 50% of all software is open. This is attributed primarily on individual initiative as the university itself does not have an official policy on the use of Open Source Software. Rather, the practice has repeatedly been referred to as ad-hoc. Significant sectors are still users of commercial software and there is a perceived reluctance to use or even experiment with tools in the OSS realm. However, those interviewed were certain that there is a serious trend towards the wider adoption of the OSS paradigm even within the institution. Some of the factors mentioned contributing to this trend are as follows:

- Funding and cost pressures force or at least influence the selection of the most economic options

- Availability of solutions require and encourage the adoption of OSS

- Strong support structures and organizations put in place by university units assist staff and mitigate usability concerns

- Even apparently unrelated policies such as elimination of software piracy encourage the use Open Source Software

Concern has been expressed for the lack of contributing back to the OSS community. The development taking place has been described as small and incidental. The absence of institutional support coupled by the absence of a critical mass of developers were identified as the major inhibitors towards any trend to contribute in a meaningful way towards the Open Source Software inventory. In contrast, the individual intervention is strong measured in terms of posting bug fixes and Greek language updates.

Rather impressive is the amount of development that is taking place in order to solve specific problems in fields such as mathematics and physics. Unfortunately this is taking place on an individual basis and the source does not find its way in the body of Open Source. Contributing factor is the specialized nature of these programs, however, so is the cultural tendency that ignores the benefits of posting these solutions – fueled by the absence of incentives and adequate active promoting of Open Source.

Reported is that besides mathematics and physics individuals in the Schools of Medicine and Educational Sciences have (actively) expressed intentions for the use of OS Educational Resources. These have established collaboration with the Communication and Network Centre, the team within the University taking a proactive role in the use of OS.

The awareness development information days organized by the Communication and Network Centre appear to be extremely supportive of the faculty's interest in OS and generate interest by providing technical know-how. The Centre functions as an (informal) educational resource content for the University. To the present it organized 3 awareness development meetings elaborating on services it can provide to the

teaching staff. These were attended mainly by members from the Chemistry, Mathematics, Medicine and Physics Departments.

There is a definite movement towards OS by the Computer Science Department (as seen from the administrative side) which however has not as of yet been expressed in terms of course work.

The pedagogical added value from the use of OS is not well defined in the context of the University. The interviewees emphatically stated its value on student – teacher and student – student interaction.

GUNet

The University of Crete is a member of an umbrella organization, GUNet, which was formed by all higher education institutions in Greece. GUNet is a private, non-profit company dedicated to promote eLearning and to support its members in using the latest technologies. According to GUNet, its objectives can be summarized as follows:

- The development, support and management of the academic network of all Universities and ATEI of the country.
- The coordination in diffusion and promotion as well as the development of advanced network services and applications in the broad academic and research community of the country and via this the general improvement of the education and research processes.
- The provision of network services to its members and third parties (institutes, foundations) whose activities aim at servicing research and education.
- The participation in developmental, educational and research programs with regard to network technologies, services and applications aiming at the maintenance of the academic network at the peak of technology.
- The development of collaborations with respective academic, research, educational networks of other countries

GUNet is a pioneer user of eClass in Greece and is able to provide a large array of services to its member institutions, some listed bellow:

- Production of digital video-use of KYMA (Support Centre of eLearning and multi media) as production studio
- Digitalization, encoding and montage of digital video
- DVD production, dissemination of video via the Internet, synchronising video with slides (SMIL 1 and 2)
- Uploading of video files to VOD (video on demand) servers
- Asynchronous e-learning
- Videoconference and tele-collaboration
- Synchronous tele-education with two or more parts
- Live transmission of lectures
- Video recording and live transmission of conferences

- Technical consulting in the above subjects and production of technical specifications
- Production of guidelines and training of the staff of Network Operation Centres (NOCs)
- Co-ordination of horizontal actions of tele-education, training and e-learning [1]

GUNet's vision is clear and its focus is obvious. The ability it has already demonstrated to harness new technologies and new methodologies in the educational arena stands out. As its influence permeates the University's culture, one can be confident that the results will positive and far reaching.

The Computing Centre

The University's Computing Centre comprises of the units of: Library and Information Services, Training, Multimedia Production, Media and the Communication and Network Centre. The latter appears to stand out as the unit with the most concern and involvement in the dialogue on OS Educational Resources (both internally and externally to the institution).

Communication and Network Centre (UCNet)

The University of Crete has invested significant effort in the development of a state-of-the-art conference system infrastructure. They support bidirectional optical and sound communication, while they provide the possibility of simultaneous transport of data to and from remote systems.
In this way, to a large extent, the distance collaboration and communication is facilitated and the continuously increasing needs for alternative forms of education are covered.
The University has also equipped rooms of tele-education in its three points of presence.

In this context, the lecturers have the following possibilities:
- Lecture of special or interdepartmental courses in remote rooms of tele-training / elearning with bidirectional communication of the participants.
- Live transmission of lecture so that is possible the follow-up from the house or from other points (webcasting)
- Videoconference during events on the attendance of remote participants
- Support of inter-university postgraduate studies using the rooms of tele-training of University of Crete and other educational institutions in Greece and abroad.

Asynchronous tele-training/elearning comprises of educational tools that provide the opportunity to the learners and the trainer/teacher/instructor to maintain continuous contact with the educational resources beyond the classroom. It is regarded as supplementary to the classroom lecturing. The Centre's technical know-how supports the continuous and safe use of two platforms: Moodle and eClass. Three persons are involved in this support effort. They allow the teaching staff to support their class through:

- Provision of contents (text based)

- Provision of lectures (video, transparencies or combination of the two)

- Posting of links and bibliographies

- Postings of announcements

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[1] From the GUNet web site

- Uploading of students projects

- Design of multiple choice tests and automatic correctioning

- Chat function

The Centre further provides services for digitalization and video processing.

Despite rather limited funding and resources, it enables real time conferencing between its geographically disperse campuses.

A well thought out support system has been put in place to facilitate the use of the conferencing infrastructure. This perhaps constitutes the most innovative characteristic and the processes put in place are noteworthy and should be of significant interest.

Open content use

The University both creates and uses Open content. However, this is based primarily on individual initiatives as there is no official policy. Hence, the overall picture is spotty and successes are mitigated by the frustrations associated with doing things for a first time. The lack of institutional policy, funding inadequacy and support are recurring themes and are often presented as obstacles.

The primary form open content use takes is through web portals where material is posted and made available to the wider community. Users can find course material, articles and general information relating to academic subjects. These services utilize almost exclusively open source software (Linux for operating system, Appachi for web services) and the satisfaction level reported is universally positive.

The level of interactivity is however judged as low. These applications are rather static and lack potential for common sharing of the resource. It is estimated that approximately 5% of the overall content is in digital form out of which more than 50% is open. As indicated earlier, use of Open Source contents (and / or production) is made by the staff of the departments of Mathematics, Physics, Computer Science, Medicine (Social Medicine, Radiology and Basic Sciences) and Education. There are no feedback mechanisms put in place as of yet.

Open content production

Open content production is at the embryonic stage. The Moodle appears to be the most used platform for production. Courses have been developed in the Departments of Computer Science, Education and Medicine (Social Medicine and Radiology). eClass is used by/at least one member of the Computer Science Department. The team responsible for the development of the conferencing system also developed the appropriate components to support Open Content Production as well, thus providing a very well integrated environment. This environment has been successfully utilized a number of times, including a collaboration with an Italian institution in the context of an EC funded project (Mediterranean Network of Universities project). However, significant frustration has been expressed due to the very slow adoption rates.

Again, the question or rather, the lack of institutional support ranks very high. It is clear that the system created was under-budgeted and its success to-date reflects the extraordinary efforts of the individuals involved. It is also clear that the system will be underutilized without adequate funding and without instituting organizational incentives for its use.

In contrast, the organized effort of GUNet does have as one of its main objectives open content development. Moreover, GUNet has developed user friendly tools needed for managing content, including tools to load, edit and copy electronic educational resources. Additionally, the inclusion of tools to support 'Discussions' enhances father the platform and significantly increases its appeal and hence, potential.

CONCLUDING REMARKS

The enthusiasm for Open Source, be it for software or content was evident during each and every interview. There is no doubt that individuals subscribe and value the concept and recognize the benefits. However, this support time and again has been described as ad-hoc. The need to channel the positive attitudes is and will be a challenge as the University of Crete moves forward.

Adequate budgetary resources obviously will be a significant part of the University's response. However, this will not be sufficient: Developing the appropriate incentives for the various components of the community (such as professors, graduate and undergraduate students) will be an important part of a strategy to organize and promote the creative work already taking place.

Considering the infantile stage of Open Source Software and Content in the University presently, it should not come as surprise that operational issues such as licensing, interoperability and standards have not been addressed. Clearly, these concerns will have to attract the appropriate attention as the usage of the paradigm spreads and matures.

It would be wrong to conclude that the OSS picture in the University of Crete is bleak. On the contrary, one should be quite optimistic because the concept has found almost universal and unequivocal acceptance especially among the younger members of the community. This sector has fully accepted the benefits delivered by Open Source. Developing the culture to contribute back into the OSS is the next step and as the critical mass evolves, it is only a matter of time before that begins to become noticeable.

What holds significant promise is the existence of GUNet. This umbrella organization is able to leverage developments in technology and coordinate their use country-wide. As its members –including the University of Crete- and their communities become increasingly aware of the services it provides, GUNet can provide the backbone and the instructional structure needed to promote the benefits inherent in Open Source and Open Content.

Likewise, a changing (additional) role (institualization for the delivery of educational services for FORTH) can become the impetus for the use and production of OS Educational Resources at/by/for the University of Crete.

LIMITATIONS

This report does not contain a list of Open source courses / contents available by/at the University of Crete as such a list could not be identified by the interviewer.

Furthermore, the report does not contain information on the specific engagement nor the views of two professors / instructors identified by some of the interviewees as active in OS, namely Professor G. Mavrothalassitis (School of Medicine) and P. Anastasiadis (Education Department). This limitation is due to the fact that the first was not available for interview as during the period of investigation he was in the US; and the second due to the fact that he failed to respond to the author's invitation for an interview.

Elaborate accounts on the scientific use of OS by members of the Departments of Mathematics and Physics are not provided as these reflect very specialized type of uses that is believed to be outside the scope of this particular investigation.

ANNEXES

ANNEX 1

List of interviewees

- Professor Yiannis Palikaris, Rector of the University, secretary@rector.uoc.gr

- Professor Maroudio Kentouri, Vice Rector in Charge of Academic Affairs, kentouri@rector.uoc.gr

- Professor George Tsironis, Professor of Physics and Chairman of the Committee Networks, gts@physics.uoc.gr

- Professor M. Lambrou, Mathematics Department, lambrou@math.uoc.gr

- Ms Eva Michelidaki, in charge of the Special Accounts Unit, michelidaki@elke.uoc.gr

- Ms Chara Tomara, User Support Team of the Communications and Network Centre, tomara@physics.uch.gr

- Mr Yiannis Frangiadakis, Head of the Communications and Network Centre, jfragiad@ucnet.uoc.gr

- Mr Manolis Zouraris, member of the Staff of the Communication and Network Centre, zouraris@ucnet.uoc.gr

- Ms Ofilia Neofytou,, member of the Staff of the Communication and Network Centre, ophelia@ucnet.uoc.gr

- Mr Giorgos Vitsakis, Computing Centre, Division of Training, vitsakis@edu.uch.gr

- Mr Vasilis Kounalakis, Physics Department, coudim@physics.uoc.gr

- Mrs Maria Mamalaki, Computer Science Department, mariam@csd.uoc.gr

- Ms Christina Valini, Computer Science Department, cristina@csd.uoc.gr

ANNEX 2

Useful links

- http://www.gunet.gr

- http://www.uoc.gr

- http://elearn.uoc.gr

- http://www.ucnet.uoc.gr

- http://www.open-source.gr

- http://www.physics.uoc.gr/

- http://www.csd.uoc.gr/

- http://www.med.uoc.gr

- http://www.forth.gr