"Scientific information has the power to transform our lives for the better - it is too valuable to be locked away."

Neelie Kroes
European Union Commissioner for the Information Society

Academic Use of Open Digital Archives

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Abstract. Open access academic archives are the proper instrument to make visible the majority of the coursework done during the years and to propagate the results of already paid research activities, thus raising their value. By offering proper services, archives become the media which facilitates the forming of interim research and learning societies among students and teachers. This is the way to achieve an improved management of intellectual assets of the whole university community. In this paper the authors try to summarize the advantages of open access university archives and to discuss some issues arising from rules for deploying and accessing course materials and research papers.

ACM Classification Keywords. H3.5 On-line information services– Data sharing; H3.7 Digital libraries-Collection.

1. Introduction

Universities follow different policies when exposing their intellectual assets. Some of these institutions deliver open courseware, whilst others prefer to represent only their organization and facilitate the communication at their sites. Meanwhile, digital repositories have become significant though controversial means of communication among researchers and lecturers. Institutional digital archives are a natural environment for the deployment and public (even internal) assessment of various materials related to the teaching and research activities of the community members. Members of educational institutions can use the repository in many different ways. Here again, the local policy may facilitate and/or restrict these activities. Universities tend to deploy and exhibit different kinds of their intellectual assets such as learning content and research papers. It is a matter not only of user's convenience, but of representativeness and prestige as well. The rapid advance of information technologies made possible not only to manage large institutional archives and to equip them with various services, but to organize similar facilities at lower, departmental level.

During the last decade different types of repositories ranging from digital libraries through various institutional collections and e-journals up to collaborative learning environments have been built. Not surprisingly the main share of active repositories belongs to countries with advanced higher education and science. Members of educational

institutions and research centers deliver and use the repository content intensively. The main reason for their continuous activity delineates different purposes ranging from free access to deposited resources through using a variety of services.

Digital repositories for academic purposes mark a continuous development. In this perspective, universities and scientific institutions demonstrate a remarkable activity. Since the beginning of year 2007 the growth of such repositories listed in the OpenDOAR Database [8] shows a constant increase of 100 repositories per year up to its present number of over 2500. Currently OpenDOAR report over 2500 storage facilities. For the preceding calendar year, even there was an increase of about 300. There is a sustained interest from universities to the use of open digital archives. In Bulgaria there are registered six digital archives of open access: two at the Institute of Mathematics and Informatics; on at Medical University of Sofia, Bourgas Free University, Sofia University and New Bulgarian University respectively.

New Bulgarian University was among the first academic institutions in the country that developed and maintains an open digital archive. The archive represents a cardinal digital environment for long-term preservation of the electronic scientific output of NBU academic staff and post-graduate students. Currently New Bulgarian University Scholar Electronic Repository contains 1275 items consisting of the research output of the institution. Users may set up Atom and RSS feeds to be alerted to new content. The interface is in English. The subjects are multidisciplinary; the content comprises articles, conferences, books and learning objects [6].

Apart from this, but using the same technology, a departmental repository was developed to assist all non-auditoria activities. The main goal is to manage and disseminate digital materials created by the department and its community members [9]. The repository will be used for electronic publishing and housing of different digitized collections concerning the knowledge resources of the department. The final goal is to offer open but local access to scholarly research. So, the departmental repository is designed to deploy content not covered by the university infrastructure: investigations, learning resources, theses, students' projects and papers.

Some issues arising from rules for deploying and accessing course materials and research papers deserve close attention. Doubtless it is better to make visible the majority of the coursework done during the years, but copyrights should be respected and regulated properly. Open access archives are the suitable instrument to propagate the results of already paid research activities, thus raising their value. However the research teams should be informed about this possibility and encouraged to use it. Also, having appropriate services, archives would be the media which facilitates the formation of interim research societies involving students in them. This is the way to attain an improved management of intellectual assets of the whole university community. Digital archives have great potential for any kind of value added services as well.

In the context of the above, the main goal of this paper is to discuss the use of open digital archives. Taking into account our experience we present their benefits for community members, for the university and for the process of research generally. In Section 2 we present the key features of academic digital repositories that raise the representativeness of academia and intensify the scientific research. Section 3 deals with discussion of the local policy for management and internal use of repositories at subdivision level. We summarize our findings in Section 4.

2. Key features of academic digital repositories for the representativeness of academia scholar work

The successful management of digital resources is very important for any organization to realize a business advantage [1]. Not surprisingly they are considered as assets along with financial, material and human resources [2]. For higher education institutions digital resources can be used strategically to expose their intellectual assets such as learning content and research papers. Usually digital resources are organized as university-based institutional repositories, including long-term preservation and distribution thus permitting to derive their maximum business value. The collection of digital content into a repository enables higher education institutions to support research, teaching, learning, and administrative processes [3], [4].

According to the SPARC alliance [5] institutionally defined repositories are scholarly, cumulative, open and interoperable. The digital content is stored and managed to facilitate searching and retrieval of the collected items as well as their later reuse. The decision what to put into a repository depends on key institutional intentions and objectives. Some repositories store only particular items e.g. articles, books, works of art, etc. so long as others gather a significant amount of scholar work. The management of e- resources can be performed alternatively via virtual learning environments, wikis and other informal content sharing applications. However in our work we concentrate on digital archives capturing the intellectual product created by the stakeholders of the overall educational process: faculty, research staff and post-graduate students.

The repository of New Bulgarian University is governed by a supervising board called Evaluation Commission. The Head of Library and Information Services Department is acting as a repository editor thus enforcing compliance with certain rules when an item is going to be deposited. Academic staff and university PhD students are allowed to deposit their documents that might be not published or published via electronic or traditional means. In the case of published elsewhere documents the author who deposits have to hold the copy rights. If the copyrights belong to a publisher or other organization, a permission to deposit has to be granted. Academic staff can submit unpublished documents as well. In this case authors are expected to abide by ethical standards and to ensure quality content. The document types are listed in the user interface of the software used to implement the repository. E-Print [6] allows depositing articles, books, conference items, theses, artifacts, images, compositions, audios, videos etc.

The benefits of publishing in an institutional archive of open access can be summarized from different points of view:

1. For the university as an educational and research institution:
   - access to the intellectual output is provided

   The Scholar Electronic Repository represents the intellectual product created by the community members thus increasing the institution's visibility and its public value. The archive, by capturing and preserving collective intellectual capital, increases the overall institution's academic quality. There exists organizational support towards innovative means to research dissemination. In this way the sharing of ideas and know-how's as well as the rapid communication of research becomes feasible. Collaborative research is promoted. In addition an easy access to faculty papers is achieved. The demonstration of value can attract tangible benefits including project funding from both public and private sources. Documents are

searchable via the Internet as they are indexed by search engines and made accessible to a wider audience. In this way the production of the individual authors and the institution as a whole is promoted.

- enhanced scholar communication becomes possible

In the traditional system of scholarly communication much of the research findings are dispersed through different journals. However nowadays scholars use Internet intensively to disseminate their achievements. There is growth in the open access availability of research publications, both gold (author pays for publication) and green (self-archiving by the researcher). Approximately 30% of all articles are thought to be available as open access, two-thirds in green and one-third gold [7]. The university repository preserves and make accessible the staff intellectual output in a straightforward manner. In this way the foundation of a new lightened publishing model is set. Even articles published in academic journals can be placed in the repository to attain a larger audience. Global access to research literature is achieved. This is the way to complement and supplement journal publishing.

- sharing of learning and teaching materials locked in Virtual Learning Environments

Publication of educational resources in addition to the management of the curriculum is particularly important for dynamic areas of human knowledge. Provision of copyright curriculum in such areas is also a kind of advertising on campus. Making a learning content visible (open courses) increases the potential reuse of the materials.

2. For the academic staff
   - improved research knowledge management

Sharing of research outputs, unpublished ideas and know-how facilitates their public visibility. In fact researchers manage and store digital content connected with their investigations including research data. Thus collaborative work on institutional projects is promoted. Community members have a place where their scholarly works are permanently exposed. The available scientific results give rise to the preparation of new joint projects. Knowledge sharing and reuse is facilitated.

- broad dissemination of published research findings

Because of the short period after uploading the document, authors are stimulated to publish thus achieving a fast dissemination of their results and a greater impact. In rapidly developing areas of scientific knowledge e.g. computer science or communications researchers can offer preprints via the open access archive in order to claim priority and to get a fast feedback.

- increased citation of some papers

Open access favors the dissemination of published research in the archives and contribute to the growth of citing of the scientific production. Citation analysis demonstrates that research papers that are freely available are easier to cite.

- indexing

Open access archives are indexed by search engines, which promote both the production of the individual authors and the institution as a whole. This allows for the creation of personalized publication lists and increases the citation. Via the usage of different metrics the researchers obtain hit rates on specific papers. The impact factor is also derivable.

Last but not least we have to stress some shortcomings. The quality of documents submitted to the open access archives are estimated by the supervisors following formal criteria. The author's contributions might appear obsolete and/or disputable. Its author personal responsibility for the quality of content e.g. plagiarized texts, faults or junk.

3. Local management policy and internal use of academic digital repositories

In the dynamic domain of computer science it appears especially helpful to preserve some deliverables of the educational process itself like case studies, student's research projects, diploma theses, lecture notes and videos etc. It might be useful to deploy some intermediate results from various research activities, to announce ideas and proposals, seeking support, recognition and collaboration. In this way reports of research under development could be submitted to discussions and criticism among the members of a professional community. However similar writings are to be accessed thematically on a local basis. This is not to belittle such writings. Rather, they are generated as part of separate publishing activities. They might exhibit shortcomings, if any, not addressed by the present policies of an open access archive.

The goal of university research is the creation, dissemination, and preservation of knowledge. This is the way to disseminate good practices and tips among the learners. Sharing of the unpublished ideas and know-how's as well as a rapid communication among the researchers becomes feasible. Collaborative research is promoted. In addition an easy access to faculty papers by students is achieved.

Nevertheless that the Scholar Electronic Repository is announced as an open e- space some thematic subdivisions are to be with restricted (local) visibility. We propose local access to university projects in progress, the so called "gray literature", e.g. diploma theses, learning resources, students' projects, working papers, technical reports, presentations, etc. By depositing quality examples of students' paper work a significant support of students' endeavors is achieved and a location to deliver e-portfolios is submitted. Important students' works become easily available and good practices can be disseminated. Since no library can deliver all the resources students need, collecting quality examples of students' works creates a new layer of information that is readily locally accessible.

Publication of educational resources in addition to the management of learning content is particularly important for dynamic areas of human. In view of this, we have undertaken the creation of a departmental archive with main purpose to store additional teaching materials and well executed student works, assignments and theses. The departmental repository offers an efficient access to many useful deliverables of the educational process itself. It is well known that students in addition to learning and understanding existing knowledge need to produce new knowledge in order to be part of the knowledge society. So, the departmental repository by capturing and preserving collective intellectual capital becomes a vital component of e-learning and increases the overall institution's academic quality. The restricted access to files within the university limits the direct borrowing of texts. We believe that this is the way to warrant the correct usage of already published texts and the copyrights.

Considering the benefits to gain a restricted access to some deliverables of the educational and research activities it is up to the departments to take the necessary steps

towards building of similar units of the university archive. We enjoy full maintenance from the university IT department and firm support from the superior administration.

4. Conclusion

Open digital archives are of great importance for the public visibility and recognition of universities. By allowing an improved management of intellectual outputs and freeing up the process of dissemination, their main purpose is to rise up the representativeness of the institution.

In this paper we discussed the academic use of open digital archives. We shared the reason for limited local access to some documents. An underlying level of locally visible target oriented units of the university archive is appropriate in order to support the local scientific exchange, interdisciplinary research and students' paper work, etc. Additional services to encourage community sharing and exchange of both practice and content could be developed.

The Scholar Electronic Repository is an open e- space which provides long-term preservation of electronic documents and assists in the dissemination of research findings both at public and local level.

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