3C@HIGHER EDUCATION - CONTRIBUTION, COLLABORATION, COMMUNITY AT HIGHER EDUCATION

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Abstract

The appearance of the Internet presupposed the revolution that is not exhausted in this advent. The emergence of Web 2.0 is the (r) evolution that is currently underway and that has been changing the way we relate to the Internet, requires that we stop being mere consumers of information to start having an active and participant role in its production and publication.

The implementation of the Bologna Declaration implies another revolution, altering the paradigm of teaching-learning, necessarily forced to change, starting the teaching to be mainly focused on the student and in the work that he will develop along the academic path. It is intended that the student is the protagonist of his learning. This new paradigm implies that his work is assumed to be really active, through independent research and resolution of situations and problems of different natures, submitted by teachers and eventual external entities.

The teachers of the Degree in Science and Technologies of the Documentation and Information (Ciências e Tecnologias da Documentação e Informação - CTDI) are taking advantage of this conjuncture as a complement of their educational activity, promoting, for such, the Laboratory of CTDI and creating the research dynamics and development. In this context, they formed the research group PIGeCo - Integrated Projects for Content Management that intends, first, to implement the use of Web 2.0 tools in a way to reach the premises that currently govern the new generation web (cooperation, contribution, community), applying them to their teaching activity, and, second, stimulate teachers to the production of scientific papers and students to the production of academic papers, as well as its subsequent analysis.

Therefore, several projects were initiated within courses of CTDI degree, namely, the implementation of an institutional digital repository and the digital magazine. It is made the point of situation of ongoing projects and discussed the expectations estimated. Finally, we performed an analysis of the prospects and future ambitions of the group.

Keywords

Web 2.0 technologies, collaborative work, teaching methodologies, teaching-learning, Bologna Declaration, e-learning, digital repository, e-zine

1. INTRODUCTION

The use of Information and Communication Technologies (ICT) in teaching / learning methodologies at the Higher Education Institutions (HEI) entered in the habits of many teachers and students and it has increased with the adoption of new practices owed to the adaptation of the courses to the Bologna Process.

Making the contents available is a very important issue on this strategy. Along the time, the following course has been approaching several techniques: repositories of documents in a server of HEI, websites to support disciplines, most of them outside HEI domain.

Such techniques for providing contents are frequently complemented with asynchronous (e-mail) and synchronous (*instant messaging)* methods, where a direct relationship with the student is established.

Different techniques have been generalized into the applied methodologies, specially the ones derived from the *e-learning concept:* distance learning platforms.

These platforms, of which Moodle is probably the most used, they allow to make the contents available similar to the way that is accomplished by the web site of the course but it makes possible the use of new tools in the teaching-learning process, not only at the level of the asynchronous interaction (news, discussion forums, inquiry, etc.) and synchronous (*chat*) with the students, but also in their evaluation (publication and reception of scheduled works, on-line evaluation tests, inquiries).

In spite of all these techniques, it has been verified that the student´s involvement wasn´t the desired, above all of the least technologically motivated. It is also confirmed that, in spite of the techniques that they used in the scope of a course a way to developed interdisciplinary dynamics doesn't exist.

Impelled by the massification of the broadband access, a (r) evolution is at present in course that has been altering the way as we connect to the Internet - the Web 2.0 more than a technological revolution, there is an evolution of the way the technologies that already exist since the appearance of Internet are being used.

The explosion of popularity of this new variant of the Web is due, fundamentally, to the following facts:

- Triviality of the access to the Internet due to the largest availability of broadband at attractive prices;
- Easiness of use of the Internet and conscience of its potential by the users;
- Easiness of use of the content´s creation tools with free applications based on the Web, soon available anywhere and in several hardware platforms, due to the emergence of some innovative technologies as AJAX[1] and Flex[2], access simplified to databases through Javascript, Java or Flash, the language XML[3] and the RSS[4]

In practice, this takes what the new version of the Web is characterized by

- focus in the contents;
- Independent publication of contents created by the user;
- Network effects due to a participation based architecture;
- *Socialware* or collective user intelligence as a result of the contribution and shared experience among users with common interests.

The success of web sites such as *Blogger[5], Wikipedia[6], Hi5[7], Flickr[8]* or *YouTube[9]* is a result of more user-friendly environments, especially for the students' of the higher education age group, using simple and intuitive tools, now available to all. This allows us to sustain the idea that the use of applications Web 2.0 in Teaching can bring the following benefits:

- Better teacher/student relationship and communication, in an more friendly environment where they feel more comfortable to expressed themselves without embarrassments;
- To wake up students enthusiasm in the writing, creating habits of opinion construction and submission of texts to the analysis of their peers through the debate, working as a type of journal *peer review;*
- To foment the collaboration work that, through the collective research, it can increase the students' interest for the treated matters;
- The active intervention and participated by the students in the school activities foments the self-confidence.

[1] Asynchronous JavaScript and XML
[2] http://www.adobe.com/products/flex
[3] Extensible Markup Language
[4] Really Simple Syndication
[5] http://www.blogger.com
[6] http://www.wikipedia.org
[7] http://www.hi5.com
[8] http://www.flickr.com
[9] http://www.youtube.com

The quality teaching is not sustained, just in school activities. It must be a scientific-technological contribution that makes possible the constant actualization of the teacher, through the investigation, witch is considered pillar of the teaching profession.

The activities of scientific-technological investigation should originate articles and other type of scientific publications. Independently of their form and support, the scientific literature appears as a reflex of the activity taken by the investigators.

The study of those activities is relatively recent. Leydesdorf (1995) [4] assumes that the studies of the Science grow in an interdisciplinary way with the magazines, societies of experts, scientific societies and departments from the Higher Education Schools.

Traditionally the Scientometric studies are classified according to two types of indicators:

- Activities indicators - that provide data on the volume and impact of the investigation activities; disciplinary, thematic and institutional separations are assumed;
- Relationship indicators - where bounds and interactions between investigators and thematic areas are identified, in such a way that the contents of the activities and their evolution are described; they study unstable and permeable borders among the different thematic areas.

These two typologies lead us to two models of scientific and technical development.

On one side we have a model that assumes and faces Science as a normal productive activity, whose borders suffer variations but just in a long term. In this model, the most important variables are the *inputs* and the *outputs*, providing the measurement of the production and of the impact, as well as the identification of the relationships between said *inputs* and *outputs,* considering, however, that the scientific and technical investigation bases its effectiveness on the multiples bonds that are created between the several specialties and thematic areas whose borders are variable and floating along the time.

On the other hand, we have a model faced as a connector, where the various scientific communities are identified as a consequence of the role and strategies carried out by the several actors present in the scientific context. In this model, the relationships between scientists and specialists are privileged and analyzed, just as the thematic areas of investigation and the transformations that these suffer.

In fact, the publication will allow an institutionalized control that leads the knowledge to be:

- Shared and assumed by the community;
- More reliable and available after overcoming the more demanding critics of the scientific community.

Note, however, that the absence of scientific results cannot be synonymous of absence of scientific activity, as said activity does not always leads to (satisfactory) results. However, in bibliometric terms, for us to identify the scientific effective agent's[10], it´s *sine qua non* condition to have scientific results. However, nor all scientific agents are effective in their entire course as such and, as previously referred, said lack of results does not necessarily implicates a scientific passivity, as scientific effective agents are, according to Maltrás (2003) [6], just a subgroup of the scientific agent´s total, because there are also potential scientific agents [11].

Having said this, it is possible to affirm that Scientometric studies the quantitative aspects of the science through the use of metric techniques of Science evaluation, using bibliometric and socio-economic indicators. This type of analysis studies the Science as an economical activity, comparing investigation policies developed and used by different institutions as well as their results.

2. DIAGNOSES

For some CTDI teachers, mostly those of the 1st year, it become obvious that, for most students, the motivation was small. They came as basic users of the Internet and only a few went beyond that. They

[10] Scientific effective agent's, are those who have effective scientific production

[11] Potential scientific agents are those who, for some reason, are temporarily away from the investigation process and are therefore devoted to other activities

didn't had investigation and discussion of subjects habits in a class environment, the role of passive receiving student was fully assumed and carried out, and in the moments where active participation was requested, the adhesion was small.

Taking into consideration this scenario we embraced the posture of motivating, as of the 1st semester of the 1st year, the students to research in the web contents related to the lectured matters, in a way to complement the bibliography supplied by teachers, being equally motivated to take contact with publication tools in the web. Some of the themes would also be discussed in class.

Despite this methodology, it was verified that, whenever some investigation work was developed, the great majority would fall in the temptation of *copy+paste, which* implicated for the student failing the discipline or delivering a new work, and represented for the teacher an increase of its work.

In parallel to this situation, the habit of preparing and making available digital contents by the teachers of the course was only verified by teachers of the Technologies area, which restricted the use of the Web tools to that area. Teachers of other areas they tried to minimize that disadvantage through the sending of support texts and complementary material by e-mail, however, both techniques didn't had the chance of immediate feedback. After all, it is an asynchronous methodology.

The lack of uniformity maintained for some time was sustained by the absence of an institutional platform that allowed / made possible and motivated all teachers to make available on-line and in a dynamic way support material for the lectured matters.

When the eu.ipp.pt portal was launched (2005), then it was possible to make available to the students, in a digital repository incorporated for each course, material that the teacher considered useful for his courses. The portal did not have, however, much response from the part of the teachers and students.

With the implementation of the Bologna Declaration in ESEIG (in 2006/2007) and the natural evolution of the course and the teachers' acquired experience, CTDI degree suffered an adaptation process, taking advantage of this changing period to implement various changes, also at the level of the teaching methodology.

Therefore, the students that, although gradually along the course, were being used to consult documentation made available on-line, they saw that strategy enlarge to disciplines of other scientific areas. At this time the tools were already used thoroughly by some teachers, although its use was not homogeneous – it varied between teachers' personal pages, the e-learning platform - Moodle - or the eu.ipp.pt portal.

Teachers identified an evolution in the students' posture regarding the technologies and the investigation, as some students already use, in a personal title, tools of the new generation web - Web 2.0 - or social Web like *Hi5* or *MySpace*.

With the increasing use of the Moodle platform, we plan to bring some of the students habits into the academic atmosphere, taking advantage of the fact that this year, we have a very good group of students, technologically motivated and capable in the use of several publication tools.

If one of the aspects to improve was the educational dynamics between teacher/student, the other was to increase the scientific production of ESEIG and in particular of the CTDI degree..

The analysis of the scientific production based on bibliometric indicators is not strange to the society and all social activity. In fact, society influences the course of the Science. Therefore the bibliometric indicators must also be fully integrated, analyzed and interpreted regarding other indicators, like the socio-economics indicators. These, allow us to interpret the results and to establish relationships between investigations with the data that influence their development (Human and Financial Resources).

The inherent premise behind the importance of the socio-economic indicators is the following: the limits and conditions of any scientific investigation are directly related to human and economic resources, i.e., an investigator, group or community of investigators will be more or less productive depending on the human and economic resources available.

We are aware that the scientific production motor is the investigation. We know however that, in the Polytechnic Higher Education, for several reasons (budget cuts, increase of the extra-class work assumed by the teachers), there are almost none institutional incentives aimed at investigation activities. The habit of doing investigation *ad-hoc* and to write articles this way isn't also very common. It's urgent to increase the scientific production directing, for that, some resources available

3. METHODOLOGY

This group of weaknesses and opportunities have been felt and discussed among a multi-disciplinary group of CTDI teachers. From these discussions, several project ideas, works and initiatives that could be carried out in the extent of the referred course emerged. From these *brainstorms* appeared the project PIGeCo – Integrated Platform of Content Management.

The main objective is to engage the degree and ESEIG in way to allow the investigation development and the discussion of themes that foment the scientific production.

For considering that the investigation activity is essential to the healthy growth and statement of CTDI degree not only at professional level but also to academic level, PIGeCo, suggested to ESEIG's administration the creation of an Observatory of Investigation and Development of ESEIG– ObIDe. With the creation of the Observatory we pretend to involve different areas of the course, with the intention to proceed with the analysis of the several I&D activities, of the scientific production in the several fields embraced by ESEIG, to proceed to their evaluation, allowing the characterization of the actions, individuals and groups that develop this kind of activities in the institution.

It was proposed the creation of an interdisciplinary and integrating project among all the courses of CTDI degree, to make possible the creation of support tools oriented to the teaching / learning methodologies and the divulgation of the student's academic and teacher's scientific production.

In this project, some specific objectives were identified:

- The transversal framework of the projects since all the disciplines should contribute with preparatory and maintenance works, either of contents and structure;
- To dynamize CTDI laboratory, jointly with the implementation of the PIGeCo platform, allowing to create the conditions to render services;
- Development of initiatives that make possible to extend the extent of the project to the whole ESEIG community.

Other ideas and needs appeared with time, namely, the need to increase our contribution and relationship with the business community, giving larger visibility to the degree and to ESEIG, what lead to the inevitable evolution of the PIGeCo's project.

The actual project proposals are:

- **Digital repository**

  It consists on the development of a digital repository where the documents of the course will be maintained, implemented in a *Open Access* tool: CD Invenio[12] or DSpace[13]. Besides the implementation of the repository it is also our objective to normalize/standardize all the documents used by the degree, creating *templates* for the effect.

  It is intended, on one side, to centralize the whole documentation produced by the course and for other to give a real contribution to the community with our educational experience making these documents available thru *Open Access*.

- **Electronic *Magazine***

  This project seeks the divulgation of the students' academic and teacher's scientific production, with *peer review*, thru an *Open Access* tool.

  The team of reviewers will be constituted by ESEIG teachers as well as teachers and investigators from other institutions.

[12] http://cdsware.cern.ch/invenio/index.html
[13] http://www.dspace.org

The *e-zine* will make possible to discuss on-line the published works, linking them to a *blogging platform*.

- **Blog server**

  This server will input some dynamism into the discussions associated to the articles published in the *e-zine* or in the extent of the disciplines of the course; it should be implemented in Wordpress MU[14].

- **Teaching 2.0**

  To promote the use of *b-learning* methodology in teaching, applied by all CTDI courses, making use of some of the tools Web 2.0. As consequence, it's expected to enlarge this experience to all ESEIG courses.

  To develop small courses for teachers about the use of tools Web 2.0 and making them aware of how these tools can innovate their classes and to motivate the students' participation.

- **ObiDe**

  With the creation of the Observatory we pretend to involve different areas of the course, with the intention of to proceed to the analysis of the several I&D activities, of the scientific production in the several fields embraced by ESEIG, to proceed to their evaluation, allowing the characterization of the acts, individuals and groups that develop this activities in the institution.

  With ObiDe we intended to proceed to the:

  - Description and analysis of the I&D scenario in ESEIG, attending to socio-economic and bibliometric indicators;
  - Evaluation of the scientific production based in the production, impact, visibility and cooperation levels among others;
  - Study of the structure and dynamics of the investigation projects in the several areas of ESEIG;
  - Promotion of a better access to the scientific production through the development of products of increased value, eventually, in cooperation with other work groups.

  Through several actions as:

  - Study of the activities of the I&D of ESEIG
  - Establishment of internal and external comparisons
  - Identification of the positioning of the scientific production for thematic area

4. WORK IN PROGRESS

The beginning of this project is recent; it dates from the end of the 1st semester of last academic year. However, it was noticed an increase of the teachers' and students dynamism, for that the expectations are high.

At present, are already running the following projects:

Learning Management System Platform

There was an enormous use of the Moodle platform from several teachers of the course, mainly teachers of technologies. It is expected that next academic year, all the disciplines of the course are fully present in Moodle.

At the presente time we can assume that major part of CTDI 1st Semester courses are actively present in Moodle platform as we can see from the table shown

[14] http://pt.wordpress.com/

Courses Year	Existing Courses	%	Courses present at Moodle	%	Courses that use Moodle in a very basic/incomplete way	%
1st Year - 1st Semester	7	100	5	72	2	29
2nd Year - 1st Semester	5	100	5	100	0	0
3rd Year - 1st Semester	5	100	4	80	3	60
4th Year[15] - 1st Semester	5	100	3	60	1	20

Besides de conventional use of Moodle on learning activities related to the several degree courses, the learning platform is also used to facilitate the communication between the Degree Coordinator and CTDI teachers and the students. For that it was created a space called "CTDI coordination" that is divided in two different "courses" "CTDI teachers" and "CTDI general". The first is used to facilitate de communication between the degree coordinator and the degree teachers and, is also used, to launch debates on various themes and to submit documents that are mandatory for the teacher profession. The second is used to facilitate the communication between the teachers and the students regarding to themes that are general and mostly related to the degree.

- **Digital repository**

  This work was included in a student's final course project from CTDI and the objective was to select and install the more appropriate *Open Access* tool regarding the reality of the course and of ESEIG. The choice was the CDS Invenio.

  Actually the Digital Repository is installed, configured and ready to use. A handicap to this project is that, at this time, the Digital Repository is only available through ESEIG´s network. Some late administrative and organic decisions and aspects need to be taken so that this Project can finally function.

- **Electronic Magazine**

  This work was also included in a student's final course project from CTDI and the objective was to select and install the more appropriate *Open Access* tool regarding the reality of the course and of ESEIG. The choice was the Open Journal System (OJS)[16].

  The e-zine shares it´s condition with the Digital Repository – it´s installed and ready to be used. It´s also available, only, from ESEIG´s network and it needs some administrative and organic decisions so that it can function.

5. FUTURE WORK

Because of several delays (of various nature, as administrative) some projects had to enter in our future work.

[15] Bologna adaptation year

[16] http://pkp.sfu.ca/ojs

- **ObiDe**

  The questionnaire that was developed hasn´t been distributed yet. PIGeCo expects to distribute it to all the teachers of ESEIG, using QuestionPro[17]. The use of this tool derives from a partnership agreement signed among ESEIG and QuestionPro – U.S. software company that as created an easy to use solution based on the Web. Through the access to this tool, we intended simplify and develop the data acquisition and its subsequent treatment. It will be possible for us to create and make available on-line questionnaires or send them by e-mail with simplified and favorable proceedings. According to QuestionPro, ESEIG is the first Portuguese higher education institution accessing to this tool through *QuestionPro University Sponsorship*.

- **External Partnerships**

  The first contacts with a library were established in order to launch a partnership for the creation of a digital library of the institution.

  This contact will be resumed in the next month to determine the nature of PIGeCo´s role in the digitization project.

PIGeCo beliefs that CTDI students learn immensely from participating in projects that make them use the broadband knowledge that was obtained in CTDI degree. And to accomplish that goal, we belief that it's of major importance to engage our students in a project learning basis, preparing them to diverse situations but also to work integrated in a group of several other people some of witch have different skills and knowledge.

One of the objectives of CTDI course is to provide our graduates with competences in the several areas of the information management.

As we can verify from the Image 1, the evolution of the Web give indications for some ways:

- The use of the semantics as base for the on-line information management and research: *Semantic Web;*
- The change, more and more accentuated, of the paradigm of the information management for the knowledge management;
- New navigation experiences using three-dimensional ambiences: *Web 3D.*

[17] http://www.questionpro.com/corporate-sponsorship/

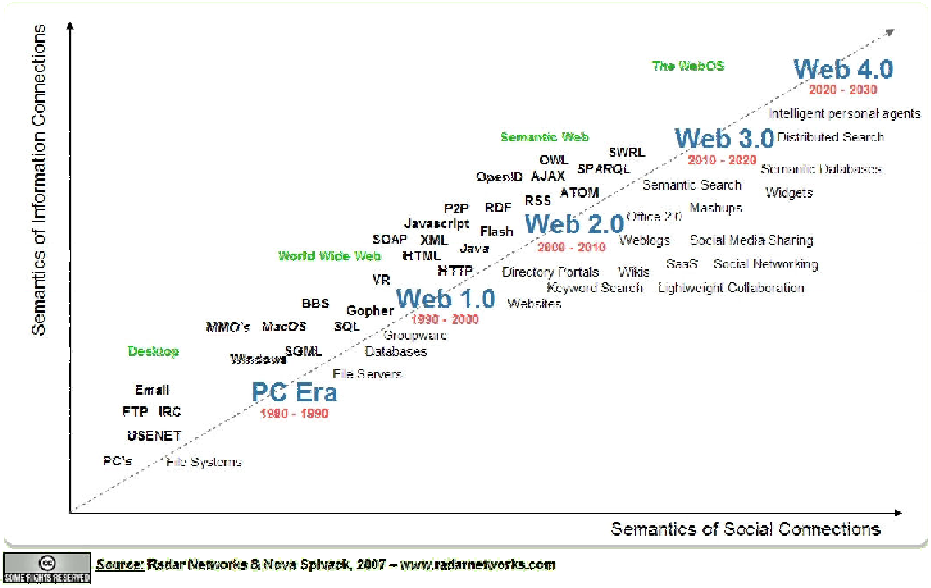

Fig. 1– Evolution foreseen for the Web

In this context, it's our concern that the information professionals and the CTDI graduates are capable to accompany the change in the best way, making use of the several available tools.

This way, in a close future it is expected that the students of the course of CTDI are familiar to some of the following applications:

- *Google AdWords* and *Google AdSense*[18]- for selecting the information that best serves the interests in a certain context;
- *Google Trends*[19]- to analyze tendencies in function of the words that are more searched;
- *Google CoOp*[20]- to personalize research atmospheres better adapted to particular scenarios;
- *Google Maps* and *Google Earth*[21] -to integrate context information with geographical information;
- *Mash-ups* - to integrate in a single place, information originally from several sources;
- *Second Life*[22] - to participate in three-dimensional on-line communities.

We still intend to:

- Stimulate the recognition of the investigation role as essential activity to the academic production;
- Motivate the teachers to the publication of articles;
- Promote the use of evaluation and analysis methodologies for the scientific production;
- Develop a database of the investigation works.

We thought that, this way, we are to turn our students capable to answer to the challenges that approach, in a scenario of information in constant evolution, prepared by teachers in constant update, based in an investigation culture.

[18] http://www.google.com/adwords e http://www.google.com/adsense

[19] http://www.google.com/trends

[20] http://www.google.com/coop

[21] http://www.google.com/maps e http://www.google.com/earth

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