Looking at ETDs from Different Points of View

Ana M B Pavani

apavani@lambda.ele.puc-rio.br

Department of Electrical Engineering

Pontifícia Universidade Católica do Rio de Janeiro,Rio de Janeiro, Brazil

Abstract

ETDs are products of higher education at the (post)graduate level. In general, they are remembered for the extensive bibliographic reviews and the state-of-the-art results they present. They are very important sources of knowledge for students attending graduate courses. But there are other ways of looking at ETDs – an opportunity to introduce digital library and digital publishing in an institution, a reason to address authors' rights in the digital era, a part of the institutional memory, and others that are associated to the local institution. Besides these points, ETDs can be thought of as items that tie communities together or that make graduate programs and institutions known worldwide due to their national and international visibility granted by the networked nature of digital libraries. From this perspective, there are additional ways of looking at ETDs – description and metadata availability, language of the document for better accessibility, compliance to standards and/or best practices and open access to results (OA). The various aspects of ETDs are bringing changes to graduate programs, students and faculty. They also allow cooperation and better knowledge and understanding among institutions and countries. This paper addresses many ways of looking at ETDs and some of the changes they have brought to those who are involved with them.

Introduction – Theses, Dissertations and ETDs

ETDs – Electronic Theses and Dissertations are products of the digital era. They are closely related to digital libraries since the latter are the platforms to describe, store, preserve and make the former available. Digital library projects started in the early 1990s.

One of the first projects was Vatican Library Accessible Worldwide. It was a partnership among the Biblioteca Apostolica Vaticana, the Pontifícia Universidade Católica do Rio de Janeiro and IBM (Brazil, Italy and USA). The items to be digitized were selected from the manuscript and rare book collections. The prototype server was first tested in July 1995. Some results of the project were presented in July 1996 by Mintzer et al [1].

In 1995, another project began at the University of California, Santa Barbara. It was Alexandria Digital Library (ADL) and the digital items were geographically referenced materials. Unlike the Vatican Project, ADL is still operative and information about it can be obtained from the *What is ADL?* option on the project website [2].

However both projects involved universities, none of them focused on materials created by faculty or by student. They aimed at making available collections of very specific items that were produced outside the higher education process.

Almost at the same time, in 1996, at Virginia Tech – Virginia Polytechnic Institute and State University [3], the first electronic theses and dissertations were ready to be published [4] following an initiative of the graduate programs.

Theses and Dissertations (T&Ds)

Theses and dissertations are very special contents – they are at the same time results and inputs in the educational process. Even in the traditional situation, graduate students have always used T&Ds as references to their research.

T&Ds are also documents about the history of graduate programs and of the institutions, and in this sense they are to be viewed as items of an archival collection.

In general, T&Ds are accessed in the libraries of their institutions or, perhaps, through and interlibrary loan project. This means that they do not have worldwide visibility. Results of T&Ds become known through articles in scientific journals, with a possible delay of many months or one or two years. This subject will be addressed in a later section when OA – Open Access is considered.

Electronic Theses and Dissertations (ETDs)

A first idea about ETDs is that they are items to be made available from a digital library for students and researchers to find, browse and read. This seems to be a quite reasonable view of ETDs since theses and dissertations hold innovations, research results and bibliographic reviews. ETDs are the digital, full-text and online counterparts of T&Ds. They inherit from the traditional works some characteristics that are of paramount importance to graduate education and research. At the same time, their digital networked nature adds value due to functions that are impossible to implement in a different context.

In this work, ETDs and ETD projects mean the use of digital objects to make contents of T&Ds available, but not only that. It is also implicit that: (1) there is suitable treatment of the information (items are described according to established metadata sets); and (2) the objects are managed by a digital library system that supports control of authors' rights and that has search/retrieve/access functions.

Between 2000 and 2004, UNESCO Regional Office for Science in Latin America and the Caribbean [5], ISTEC – Iberoamerican Science and Technology Education Consortium [6] and some universities in the region sponsored 15 short courses on ETD projects. In all of them, there was a discussion on the importance of ETDs and the reasons for universities to have them. Among the many reasons, four deserve being mentioned:

· They contain up to date bibliographic references;

· They present state of the art results in their fields;

· They make it easier to access the works from any place of the globe at any time;

· They make graduate programs known beyond their countries and/or regions.

It is interesting to observe that the first two reasons are characteristics of T&Ds. The third and the fourth exist because ETDs are based in digital libraries that are connected to the Internet.

ETDs entered universities in two different ways. In some universities, they were the first digital library projects and in others they were an additional functionality of an existing digital library. The first situation had interesting consequences, as it will be discussed in a following section.

T&Ds and/or ETDs

Currently, there are different situations concerning the way theses and dissertations are published. Some institutions, as for example Virginia Tech, do not publish printed versions. This has been going on for some years and all works are submitted in digital formats. Other institutions do not have ETD projects although, sometimes, they make digital files available from websites. The third group is of universities that have ETD projects and still print, at least, one paper copy for archival purposes.

ETDs in the Universities

ETDs have impacted the universities where they were defended. The universities are the first focus of this work. The discussions and changes have occurred within universities in different parts of the world.

Digital Publishing

When the general-purpose digital libraries were created, many times the authors were not students; sometimes the digital collections were made up of digitized special or rare items. When an ETD digital library was the first digital library in the university, it brought the culture of digital publishing to campus.

As far as ETDs are concerned, students are the authors and their supervisors are contributors to the work. In [7], McMillan and Peters mention that students as future scholars learn how to publish electronically and how to use digital libraries.

It is possible to add another point to their statement: authors' rights and levels of access to works have started receiving a lot more attention than before ETDs existed. Students and faculty became aware of issues related to the intellectual property of scholarly works. Very often these topics were not a specific concern when items were deposited in libraries.

The culture of digitally publishing students' works has influenced other university groups. In South America, PUC-Rio – Pontifícia Universidade Católica do Rio de Janeiro [8] in Brazil and ULA – Universidad de Los Andes [9] in Venezuela started digital publishing of undergraduate final projects. This was a consequence of ETD projects that became well known around campus. At PUC-Rio, it is under consideration making this a requirement for the undergraduate degree; now only the courses of Business Administration, Economics and Mechanical Engineering are requiring it.

Multimedia and/or Conventional Text

In the same presentation [7], the authors address the point and present examples on how more creative students can be because digital technology allows multimedia to be included in the works. An interesting example is the multimedia doctoral dissertation defended by Shannon Leigh Bradford at the University of Texas Austin [10], whose only version was digital and hypermedia. It is about the Australian Theater ot the Deaf and the use of hypermedia makes it a lot richer than if it were to be published using the traditional printed formats. T&D in the Fine Arts, Music, Drama and Dance would benefit from multimedia. At the same time, Sciences, Engineering, Economics and Business Administration could use simulators, spreadsheets and animations.

The use of multimedia as part or for the whole theses or dissertation has been discussed under different aspects. One is the way they are managed in terms of preservation, "production team", file management, standards and delivery. These were the topics discussed by Nielsen et al [11] in a panel discussion during ETD 2002. Another was that presented by Edminster and Blair [12] in their work at ETD 2004; they discussed the resistance faculty have towards multimedia ETDs.

Fox et al [13] stated that the extending ETD contents to include multimedia is an improvement that can easily be achieved since digital publishing is involved. At the same time, preservation issues are addressed as a motivation to the use of international well-established standards.

The ETD community believes that multimedia can enhance T&Ds, for this reason, NDLTD – Networked Digital Library of Theses and Dissertations [14] presents the Innovative ETD Award to recognize the works of students that use software, multimedia, photos or other digital contents that transform and improve their works. The awards are presented every year during the conference.

ETDs can thus be viewed as means to bring up the discussion on the formats of scientific works and, eventually, modify the traditional ones into more flexible alternatives.

ETDs and Graduate Programs Assessment

Maybe this point is very particular of the Brazilian graduate education scenario, but it is interesting anyhow. In Brazil, there is an agency of the federal Government called CAPES – Coordenação de Aperfeiçoamento do Pessoal do Ensino Superior [15] that is encharged of assessing and grading Brazilian graduate programs. The grades are important in terms of funding and of recruiting the best students.

There are many items that are examined to assess a program and one is international visibility. In this item, the main parameter is the set of international journals in which articles from theses and dissertations are published. However, items allow additional information to stress a point.

At PUC-Rio, the ETD digital library is the Maxwell System [16]. The system has many functions that measure accesses to ETDs – by country, year/month, graduate program, ETD, etc. In the last two years, the directors of graduate programs have used the statistics to show how visible their programs are due to the number and the international profile of the accesses.

It is interesting that they are considering ETDs to be a benefit to the management of graduate programs. This is a new point of view.

ETDs and Languages

This is a situation that is happening at PUC-Rio, but it has been caused by the ETD digital library and the number of accesses from outside Brazil. The fact that T&Ds have always been published in Portuguese has never been a concern.

As far as ETDs are concerned, all were in Portuguese too. There was only one exception: a doctoral level work in Electrical Engineering that had two versions and the author submitted the English version for publication, because it happened on a voluntary basis, before ETDs started being required by the university.

When statistics became available, graduate program directors found out that ETDs are accessed from all over the world, although they are written in Portuguese. Some directors reasoned that international accesses could be higher if ETDs were published in English.

Now ETDs can be certified for publication either in Portuguese or in English. The first was in Electrical Engineering and it was published last March; the second will be in Computer Science and is due shortly.

ETDs changed a practice that was over 40 years old – T&Ds were to be published in Portuguese. The reason is simple – ETDs are accessible worldwide and English is the international language.

ETDs can thus be viewed as agents of transformation of institutional culture concerning something very strong – the language.

Comments

There is no doubt that ETDs change old institutional habits, introduce new cultures in the institutions, bring new and old items up for discussion, and make graduate programs more visible.

ETDs among Universities

ETDs have affected the universities. But this is not the only effect of ETDs – projects that include various universities in a country or a region have brought new relations among institutions. The relations can happen either with an upper level coordinating instance or in a peer-to-peer situation.

Universities Helping One Another

There is no doubt that ETDs change old institutional habits, introduce new cultures in the institutions, bring new and old items up for discussion, and make graduate programs more visible.

The first example to be mentioned is that of Virginia Tech, the institution that pioneered ETDs. VT developed ETD-db [17] in the1990s and made it available to other institutions. Since it is based on free products and it is open source, institutions were able to make the necessary customizations to fit local requirements.

USP – Universidade de São Paulo [18] in Brazil used ETD-bd to implement the ETD project. The software was translated into Portuguese and customized to local needs that included MTD-Br and MTD2-Br [19], the Brazilian metadata standard for ETDs.

IBICT – Instituto Brasileiro de Informação em Ciência e Tecnologia [20] is the headquarter of Brazilian ETD Consortium, called BDTD – Biblioteca Digital de Teses e Dissertações [21]. One of the products that IBICT developed for BDTD was a system called TEDE – Teses e Dissertações Eletrônicas [22]. TEDE is an open and free software based on the Virginia Tech model of ETD publishing, as implemented in ETD-db. It has the required customization to satisfy local needs and legislation.

ULA translated TEDE into Spanish and made two sets of customizations: (1) to suit local needs to publish ETDs; and (2) to publish undergraduate final projects. Instituto Balseiro [23] in Argentina translated TEDE and customized it for local ETDs. During the process of translation and customization, IBICT supported the two institutions.

From this simple example, it is possible to identify a chain of cooperation among institutions.

Cooperation with Coordination

Some regions or countries developed union catalogs of ETD metadata records. One example is ADT – Australasian Digital Theses Program [24]. It started as the Australian Digital Theses Program and became a consortium of institutions in the Pacific Region. Another type of consortium in the Appalachian Regional ETD Consortium [25] composed of institutions in the Appalachian Mountains Region of the United States. A third type of consortium in Brazilian BDTD – all universities are in the same country but the scope is national and not regional.

The product of a consortium is integration of resources, but to achieve it, coordination and cooperation are necessary conditions [25].

The largest and most important ETD consortium is NDLTD; its members are 67 universities, three consortia and one individual. It covers the whole world and the member institutions offer their metadata to be harvested and stored on the union catalog of over 300,000 records. At the same time, NDLTD's union catalog is harvested by other organizations that make them available from different web systems. This means that ETDs are visible from many sites in different parts of the world and, for this reason, have many accesses.

Comments

The ETD movement has brought together institutions that have never been aware of the existence of each other. They work toward the common goal of making scholarly information easier to find and available as soon as possible. They share experiences, problems and solutions.

This international cooperation was made possible because all institutions have ETD projects.

ETDs and Open Access to Information

In 2000, Hagen and McMillan [27] presented some interesting points related to ETDs; two are worthed being mentioned. The first is that much of the research developed during graduate work ends up by not being published in journals and for this reason is not known. Digital libraries make this knowledge easily and widely accessible; the whole process is much faster than traditional publication. Virginia Tech started requiring ETDs in 1997; the total requests for theses and dissertations rose from 31,171 in 1996 to 1,090,113 in 1999. The second important point is the decrease in administrative costs: paper, binding, handling and shelf space.

Another interesting point about viewing ETDs is the one presented by Hagen et al [28]: 'ETDs are part of a growing trend of technological development that is transforming economies by providing access to research results to the world while bringing reciprocal investment to the local level'.

Countries have laws to protect intellectual property rights (IPR). ETDs must be published according to the will of the authors. For this reason, many ETDs are public and others are permanently or temporarily restricted. The numbers at Virginia Tech in 1999 were that 47.1% had unrestricted access (public), 30.7% had restricted access, 20% were inaccessible and 2.2% had mixed access [7].

Currently, there is a worldwide effort towards Open Access (OA) to information. Some remarkable events towards this goal can be cited.

The first is the event that was held in Budapest, Hungary, in 2002 – representatives from various types of institutions signed a document of support of Open Access to information; later on, over 4,000 individuals and 300 institutions subscribed it. This meeting is known as Budapest Open Access Initiative [29]. The second is the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities [30]; it was signed during the Conference on Open Access to Knowledge in the Sciences and Humanities in 2003. The third is an action of the Humboldt University [31] in Berlin; in May 2006, the Senate of the university approved the Open Access Declaration of the Humboldt University Berlin [32] encouraging its scientists to publish in open access journals and making available technological infrastructure for this to happen.

It is good to assess the importance of Open Access to higher education. It can be viewed from two different points.

Initially, the student or researcher looking for references must be considered – the more contents are made available the better. Knowing previous results avoids duplications and waste of time and funds. At the same time, the search must be efficient and this is accomplished with digital libraries that are compliant to standards and best practices. ETDs are excellent references for research, for the reasons that were mentioned before.

The second role is that of the author of the works – in the academia citations are a measure of quality of the works. This second vision is directly related to the impact factor introduced by Garfield in 1955 [33]. Many discussions have been devoted to impact factors and how they can be biased, imperfect, etc. An interesting item of this discussion was introduced by Garfiled [34] almost 40 years after his first work, where he states that review articles are more cited because they contains extensive bibliographies; this is a characteristic of ETDs and students always mention this is an important motivation to access them.

Stevan Harnad et al [35] presented interesting results comparing the impact of articles published in OA journals when compared to traditional ones. They suggest there are two roads for articles to be accessed – the golden road of OA journals and the green, where both traditional and OA versions exist (green because the authors granted "green light" for OA publishing). After examining the numbers, there is no doubt that OA articles are more cited and even cited much earlier due to the latency time of traditional journals; this generates a positive feedback in terms of citations. Another work [34] shows the shift in the behavior of editor that allows OA versions in parallel to the traditional printed article (pre-prints, pos-prints, both).

In [13], the support of ETDs is presented as "one of the easiest and most effective ways to promote open access to research and educational contents". It is shown that this support makes possible to have hundreds of thousands of ETDs available everywhere. According to [7], most basic and significant applied research in the United States is done in universities through studies in the graduate level. The same reference mentions that derivative publications do not cover the whole extension of results, which are available in T&Ds; if they

are printed on paper, results get lost. Thus, it is easy to agree that supporting ETDs is a contribution to Open Access.

OA ETDs are an important way to grant young researchers citations in a faster and wider way than that achieved only by traditional scientific journals. The two are not mutually exclusive.

Final Comments

There are many ways to look at ETDs and they come from different perspectives. All of them show that ETDs are a win-win game. All stakeholders are benefited from ETDs – from graduate students to libraries and directors of graduate programs.

It is the author's opinion that an ETD project is worthed all the work it requires.

References

[1] Mintzer, F C, et al., "Toward online, worldwide access of the Vatican Library materials", *IBM Journal of Research and Development,* Vol 40, No 2, 1996, pp 139-162, available http://www.research.ibm.com/journal/rd/402/mintzer.html,

[2] Alexandria Digital Library, available http://www.alexandria.ucsb.edu/adl

[3] Virginia Tech – Virginia Polytechnic Institute and State University, available http://www.vt.edu/

[4] McMillan, G, "Electronic Theses and Dissertations: Merging Perspectives", draft (dated November 10, 1995) of the article that was written for a special issue of *Cataloging and Classification Quarterly,* that focused on *Electronic Resources: Selection and Bibliographic Control*, Vol 22, No 3/4., 1996, available http://scholar.lib.vt.edu/theses/GailsCCQarticle.html

[5] UNESCO Oficina Regional de Ciencia para América Latina y el Caribe, available http://www.unesco.org.uy/

[6] ISTEC – Iberoamerican Science and Technology Education Consortium, available http://www.istec.org/

[7] McMillan, G. & Peters, L, "Electronic Theses and Dissertations at Virginia Tech", presentation at *ECURE 1999 – Preservation and Access for Digital College and University Resources*, United States, 1999, available http://scholar.lib.vt.edu/staff/gailmac/presentations/ArizonaETDs.pdf and http://www.asu.edu/ecure/1999/

[8] PUC-Rio – Pontifícia Universidade Católica do Rio de Janeiro, Rio de Janeiro, Brazil, available http://www.puc-rio.br/

[9] ULA – Universidad de Los Andes, Mérida, Venezuela, available http://www.ula.ve/

[10] Bradford, S. L., "The australian theatre of the deaf: essence, sensibility, style", University of Texas Austin, United States, 2000, listed on http://utdirect.utexas.edu/lib/utnetcat/diss.html

[11] Nielsen, B, Cargnelutti, T., Hagen, J. & Savage, B, "Multimedia ETDs: Challenges for Management", panel discussion held at *ETD 2002 – The Fifth Symposium on Electronic Theses and Dissertations*, United States, 2002, presentation available http://docs.ndltd.org:8080/dspace/bitstream/2340/205/1/multimedia-etds.pdf

Formaterade: Punkter och numrering

[12] Edminster, J. & Blair, K. L., "Addressing Faculty Resistance to Multimedia ETDs: Models for faculty develpment and training in the assessment of multimedia texts", presented at *ETD 2004 – The Seventh Symposium on Electronics Theses and Dissertations*, United States, 2004, abstract available http://www.uky.edu/ETD/ETD2004/abstract1.html

[13] Fox, E. A. Yang, S. & Kim, S., "ETDs, NDLTD,and open access: a 5S perspective", *Ciência da Informação*, Vol 35, No 2-2006, 2006, pp 75-90, available http://www.ibict.br/cienciadainformacao/

[14] NDLTD – Netwroked Digital Library of Theses and Disserations, available http://www.ndltd.org/

[15] CAPES – Coordenação de Aperfeiçoamento do Pessoal do Ensino Superior, available http://www.capes.gov.br/

[16] Maxwell System, available http://www.maxwell.lambda.ele.puc-rio.br/

[17] ETD-db, etds@vt, available http://scholar.lib.vt.edu/ETD-db/

[18] USP – Universidade de São Paulo, available http://www.usp.br/

[19] MTD-Br & MTD2-Br – Padrão Brasileiro de Metadados de Teses e Dissertações, available http://oai.ibict.br/oai/mtd2-br/MTD2_Fev2005.doc

[20] IBICT – Instituto Brasileiro de Informação em Ciência e Tecnologia, available http://www.ibict.br/

[21] BDTD – Biblioteca Digital de Teses e Dissertações, available http://bdtd.ibict.br/

[22] TEDE – Teses e Dissertações Eletrônicas, available http://tedesite.ibict.br/

[23] Instituto Balseiro Bariloche, available http://www.ib.edu.ar/

[24] ADT – Australasian Digital Theses Program, available http://adt.caul.edu.au/

[25] Hagen J., "The Appalachian Regional ETD Consortium", updated presentation of *ETD 2006 – 9th International Symposium on Electronic Theses and Dissertations*, Canada, 2006, available http://www.wvu.edu/~thesis/Presentations/Appalachian_Regional_ETD_Consortium_2006_Update.pdf

[26] Pavani, A. M. B. & Southwick, S. B., "Some Practical Points in Organizing ETD Consortia", presented at *ETD 2004 – The Seventh Symposium on Electronics Theses and Dissertations*, United States, 2004, available https://eidr.wvu.edu/files/4136/ETD_04_consortia_pavani&southwick.pdf

[27] Hagen, J. and McMillan, G., "ETD Implementation: The Two Virginias and Their Strategies for Successfully Requiring the Electronic Submission of Theses and Dissertations", presented at the Third International Symposium on Electronic Theses and Dissertations, University of South Florida, USA, 2000, available http://scholar.lib.vt.edu/theses/presentations/2VAsHand.pdf

[28] Hagen, J., Dobratz, S. & Schirmbacher, P., "Electronic Theses and Dissertations Worldwide: Highlights of the ETD 2003 Symposium", *D-Lib Magazine*, Vol 9, No 7/8, 2003, avaliable http://www.dlib.org/dlib/july03/hagen/07hagen.html

[29] Budapest Open Access Initiative, available http://www.soros.org/openaccess/index.shtml

[30] Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, available http://oa.mpg.de/openaccess-berlin/berlindeclaration.html

[31] Humboldt Universität zu Berlin, available http://edoc.hu-berlin.de/

[32] Open Access Declaration of the Humboldt University Berlin, available http://edoc.hu-berlin.de/e_info_en/oa-declaration.php

[33] Garfield, E., "Citation indexes to sciences: a new dimension in documentation through association of ideas", originally published in *Science*, Vol 122, No 3159, July 1955, available http://garfield.library.upenn.edu/essays/v6p468y1983.pdf

[34] Garfield, E., "The ISI impact factor", originally published in the Current Contents print edition June 20, 1994, when Thomson Scientific was known as The Institute for Scientific Information[®] (ISI[®]), available http://scientific.thomson.com/free/essays/journalcitationreports/impactfactor/

[35] Harnad, S. et al., "The Access/Impact Problem", *Serials Review*, Holland, Vol 30, No 4, 2004, available http://www.ecs.soton.ac.uk/%7Eharnad/Temp/impact.html

[36] Harnad, S & Brody, T., "Comparing the Impact of Open Access (OA) vs Non-OA Articles in the Same Journals", *D-Lib Magazine*, Vol 10, No 6, June 2004, available