ETD Tutorial for Rookies and Beginners:
Resources for Effective Implementation and Promotion

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Abstract
The successful implementation of electronic thesis and dissertation programs on campus can at first seem to be a daunting task. The Networked Digital Library of Theses and Dissertations consortium will prove extremely helpful in assisting you through this process. Armed with a team of experts, the "Tutorial" session will introduce you to concepts such as the myriad of free resources available through the NDLTD, ETD implementation and political strategies, discussion of various models of home grown ETD systems and pre-packaged open source and commercial systems, the role of University libraries in ETD program implementation and archiving, as well as the usefulness of and approaches to consortia and networking to build ETD programs.

Introduction

Implementation of Electronic Thesis and Dissertation (ETD) programs have proven to be one of the most effective marketing tools to promote the graduate research of students, faculty and academic programs. The merits of adopting ETD and other digital document publication programs will be emphasized in terms of positive exposure for the student and institution, new modes of communication, facilitation of research via Web distribution, and cost efficiency. More importantly, the successes of digital library programs have contributed to a process that is transforming economies by shifting the base towards technology and diversification by providing academic research access to the world.

ETD Goals

The goals of the WVU ETD Program are for students to learn about electronic publishing and digital libraries, to provide for timely technology and knowledge sharing, for Universities unlock the potential of their intellectual property and products and to improve library services. Through the achievement of these goals universities are transforming graduate education and research.

Background

In 1996 Virginia Tech (VT) began holding discussions with regional university groups to discuss plans to create digital libraries of ETDs. By 1997 VT implemented a requirement that all master's theses and doctoral dissertations be submitted in electronic format, and the resulting digital archive was made available on the World Wide Web. WVU was the second institution in the world to have implemented a required ETD program in 1998. Students are given a variety of access levels ranging from "World" to "No Access" in order to protect the student's research and publishing endeavors.

NDLTD Consortium

There are over 200 institutional members worldwide; however, most institutions have only implemented preliminary studies or pilot programs. Presently only 37% of institutions have mandated an electronic filing requirement. More academic institutions need to require ETD submissions in order to achieve the NDLTD vision of globally federated digital library of graduate research. The good news is that we are quickly reaching the critical mass necessary for this to happen. National efforts have been underway for several years in Africa, Australia, Canada, India, Germany, Portugal and the UK; these projects have so far met much success. As of summer 2002, the University of Texas at Austin began to require ETDs as well. UT at Austin has the largest graduate program in the United States, so the progress of its ETD program has been closely watched. In addition, factors such as the development and availability of open source and commercial systems over the past several years have contributed to an increased awareness and interest in deployment of programs at most universities. As predicted by academic librarians, this has encouraged a tremendous growth in commitment to ETD program and digital library development among pilot consortium and non-consortium members alike.

Program Implementation Considerations

Successful implementation requires much advance planning about the ETD server, software, Web information site, administrative policy and task force, politics and public relations, training and information, computer lab assistance, technical support, as well as providing access to the ETD collection. It is vital to have support from top-level administration, the Graduate School, the University Library, faculty and students. Support can be achieved by including the ETD Program in the Information Technology Strategic Planning documentation, recruiting a dedicated and caring implementation team, developing networking both social and virtual, through education, promotion, press releases and publication, by engaging discussion, designing careful planning, building a support infrastructure, and setting reasonable timelines for implementation.

Program Models of Scale

On the small scale one would consider implementing a single ETD collection and program; this is the simplest model and is a great way to start. A more complex model would be to consider the ETD program as one of many digital library collections under the institutional repository (IR) concept. Often institutions begin with the simple ETD collection and build momentum toward espousing other collections such as bachelor's honors theses, faculty scholarly resources, administrative planning documents, indigenous digitized audio and visual collections and learning objects and electronic reserves to support distance education.

WVU Team Collaboration

At the invitation of the Southern University Regional Association and the NDLTD, the WVU Office of Academic Affairs and Research along with the University Libraries initiated the ETD movement on the WVU campus in 1997, spurred by a personal interest of the Provost and the Library Dean.[1] It should be noted that WVU operates under a decentralized graduate programs structure, whereby the Office of Graduate Education oversees graduate programs at the institutional level, while individual colleges and schools maintain respective accreditation authority, and the University Libraries handle thesis and dissertation submission issues in lieu of the traditional "Graduate School" approach. An ETD Task Force comprised of administration, faculty, staff and student representatives was appointed to oversee planning, policy, administrative, legal, educational, and technological issues. The Office of Information Technology Customer Support unit provides student technical support, workshops, walk-in clinics, Web resources and specialized technical services by appointment. The Office of Academic Computing provides computer labs, database implementation and maintenance, programming and archiving services. And finally, the University Libraries provides submissions advising, review and

approval, Web resources, cataloging, reference and document delivery and archiving services.

Strategic Directions
As part of planning initiatives for the new millennium, in 1999 the University President's Information Technology Advisory Council studied the University situation and compiled recommendations in a Strategic Plan entitled "Empowering the University Community through Information Technology", the plan was approved and implemented on campus. The goals of this plan were to engage students, empower the faculty, infuse the curriculum, and enhance the Universities' research capabilities to fulfill the duty to serve. The inclusion of an ETD program as part of the master plan helped to spur interest and implementation in other areas of digital collections and campus support for world class technology and computing facilities and services. The WVU ETD program was nurtured through the support of university administrators, the education of graduate faculty, students and staff, and a collaborative spirit between various diverse groups on campus. The merits of adopting ETD and other knowledge management systems was emphasized in terms of positive exposure for the student and institution, facilitation of research via Web distribution, and cost efficiency.[2]

WVU ETD Program Implementation Case Study
The benefits of having an ETD program on campus have greatly outweighed the costs incurred to implement and maintain. The following outlines the cost and benefit considerations to the University and students.

Staff - Only existing staff have been utilized as follows:
- Libraries / Graduate School: 1.0 fte consultant to review submissions and serve as developer and archivist, 0.75 fte shared among librarian and assistant to catalog ETDs in local library catalog and OCLC
- OIT: 0.10 fte (shared among 4 consultants) contribute time to ETD clinics, workshops, help desk / 1.0 fte (shared among 3 developers and 1 database administrator) to build and implement local systems

Equipment: Minimal hardware investments were incurred initially; used existing old server to implement on MS Access platform. We are currently using Oracle platform and a 1+ terabyte server (expandable memory).

Students
Master's Theses:
- $55.00 submission fee
    - UMI submission of $45 + $10 library archiving fee*
    - $45.00 copyright fee (copyright service is optional)
Doctoral Dissertation:
- $65.00 submission
    - UMI submission of $55 + $10 library archiving fee
    - $45.00 copyright fee (copyright service is optional

*Note: The submission to ProQuest (formerly UMI) covers abstract service for publication in <u>Dissertation Abstracts Online</u> and the archival microfilm conversion or alternate digital preservation of the original electronic document (i.e. CD-ROM). This is in keeping with the "LOCKS" concept – Lots of copies keeps it safe. The Library archiving fee is factored in to help defray potential future costs for collection migration and maintenance. The cost to our students is largely the same as our pre-electronic era where bound copies were submitted to the libraries.

Libraries cost savings: money is actually saved by the elimination of physical handling and binding costs and the reduction of over 120 linear feet of shelf space used per year.

Web Distribution Options: Student Submits ETD Online
The ETD is made available according to student's Web distribution choice. The available options are as follows:

1. **World**
   All students are encouraged to consider making their ETD available to the world without restriction.
2. **Campus Only**
   Students who are unsure of their prospective publishers' stance on Web distribution of an ETD generally use this option. Limited to on-campus access, interlibrary loan (ILL) electronic or print access, restricted up to 5 years.
3. **Campus Encrypted**
   Students who have a derivative journal article already published or soon to be published generally use this option, where the publisher has requested at least initial restrictions. Documents embargoed by personal request are limited to campus-only access and are encrypted (password protected). ILL print-only access, restricted up to 5 years.
4. **No Access**
   This option is reserved for students who have a patent pending or whose research has involved proprietary data. ETDs are withheld from public access for one year following submission. Embargoed up to 1 year.

Realities of Digital Publishing
With the advent of Web distribution of ETDs, students and faculty are often faced with publishing concerns. They are interested to know how publishers have reacted to submission of derivative articles from ETDs. Additionally, how will University tenure systems be impacted by the proliferation of digital publishing? Is digital publishing being recognized for basis of granting tenure and promotion to university faculty?

Web Posting Is Not Prior Publication
According to Eugene Garfield, Chairman Emeritus of ISI [®] and publisher of the <u>Scientist</u> [®], "the role of the journal should be as a disseminator and archive for the academic record, and as a peer review facilitator. Redundancy is part of long-term educational process, and so self-acknowledged archiving does not interfere with but rather enhances the peer review process. Ultimately, economics will convince publishers to adopt liberal Web policies". [3] Garfield has found that if a given topic is interesting enough to a particular audience, they will take interest not only in the freely available original Web distributed electronic material, but these same people are willing to pay to read the revised and peer reviewed version in print or electronic media distributed by the major publishers in the industry.

Evidence from the WVU ETD Program
From 1998 to 2004 WVU has seen a 21% increase in the number of students willing to distribute their ETD worldwide without restriction, having grown from 56% to 75% in just four years time (see Figure 1). We have found that education is the key factor in determining how a student and committee members will approach the notion of Web distribution of the ETD.

As an historical note, in 1998, one year following implementation, the WVU ETD Task Force approved a new restrictive category "Embargo by Personal Request", which allowed for encrypted (password protected) campus only access. Initially created as a response to students in the humanities who were concerned about the prospective publishing issue and did not want Web distribution of their ETD to interfere, the Campus Encrypted option is now seldom used and only by students who have a derivative journal article already published or soon to be published at the time of graduation, where the publisher has requested at least initial restrictions. Print-only copies as requested through the University Libraries' interlibrary loan program provide alternate access to campus-encrypted ETDs, electronic distribution is prohibited. Students also have the option to limit UMI distribution, available upon request.

Figure 1
Web Distribution: Levels of Access
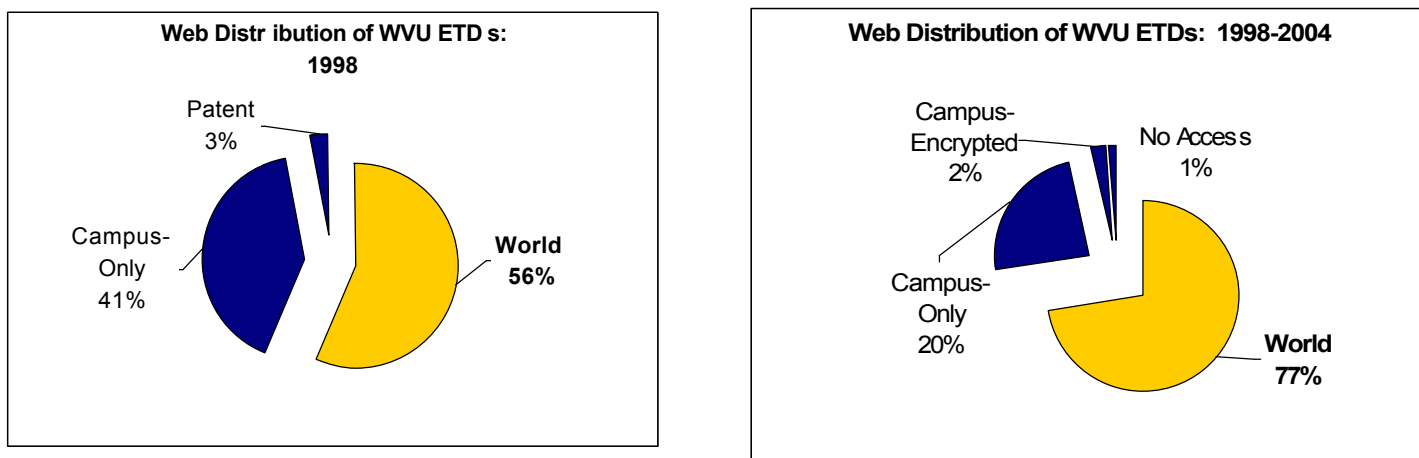
The Relationship between "Published" status and peer review
We find that the notion of prior publication (i.e. Web distribution) of an ETD is discipline dependent. For example, in the area of Physical Sciences the approach is non-restrictive. However, for the life and medical sciences, the emphasis is on the level of access, and for the social sciences, the emphasis is on the revision of content. [4] We could conclude from this evidence that myth and tradition create much of the miss-perceptions surrounding the issue of "publish-ability". In time, as more students and faculty offer their works online, and as publishers reorganize in response to this phenomenon, this will become a non-issue.

Ultimately, nothing has really changed in the fact that for most people, the thesis or dissertation as it is presented at the time of graduation should be considered a preliminary work, which is a very different thing from the revised and polished derivative journal article or monograph based in the original manuscript. In fact, as has been suggested, allowing unrestricted access to ETDs will enhance the peer review process, which would lead to expediting the process between preliminary work and final publishable product. And so it appears that for the moment publishers will continue to find their role as disseminators of the final peer reviewed journals. In the end, however, economics will be the greatest determining factor. In the continual pursuit to reduce costs, we have seen in recent years a proliferation and flourishing of peer reviewed independent electronic publishers, such as professional and academic societies, university libraries and

presses. Commercial publishers will simply have to adapt by finding additional value added approaches while they co-exist with their independent counterparts. Recent statements from publishers such as Elsevier and Academic Press have revealed precisely the attitude that the Web distribution of ETDs in no way interferes with acceptance of revised and peer reviewed material for the formal final publication, but rather, in fact they consider the former (ETDs) to be advantageous in that they are free promotion of the latter (the journal article or book).[5] The fact that there are increasingly more students who are willing to grant world access, as evidenced at Virginia Tech and West Virginia University would appear to correspond to publishers' relaxed attitudes as well as a better informed academic audience.

Library Access to ETDs
The WVU Libraries offer a variety of access avenues to find ETDs. The MountainLynx electronic catalog offers direct online full-text access from the bibliographic citation. The ETD collection can also be searched and browsed directly from the WVU ETD Archive. The Libraries' Document Delivery Service offers access of restricted ETDs to participating interlibrary loan institutions. ProQuest (formerly UMI) offers free on campus access and publication-on-demand based access to the general public. And finally, the NDLTD offers a Web based Federated Search feature to search all ETDs around the world, and is currently working on building a Union Catalog of ETDs worldwide in a joint venture with VTLS Inc. and OCLC.

Library Access to Restricted ETDs
The University Libraries' Document Delivery Service offers access of restricted ETDs to participating interlibrary loan institutions. The respective institutions track all transactions, which prevents anonymous unauthorized access. Campus Only ETDs are freely available in electronic format, usually sent as email attachments. Printed copies are also available for a fee via the Library Copy Services unit. Campus Encrypted ETDs (embargoed by personal request) are made available in print format only. Restricted or "No Access" ETDs are secured from public access until patent and/or proprietary concerns have been resolved.

West Virginia University ETD Collection Profile Highlights

- Access to WVU ETDs has increased 145,000% over their printed counterparts (figure 2)
- WVU ETDs have been accessed over 5 million times since inception in 1998 (figure 3)
- WVU ETDs are accessed an average of 2,400 times per day (75,000 times per month or over 1 million times per year)
- Over 93 countries all over the world access WVU ETDs (figures 4, 5)
- The most popular WVU ETD has been accessed over 15,000 times in the first year
- As of Spring 2005 there were over 2,500 ETDs in the WVU collection (there are over 20,000 worldwide) (figure 6)
- There are a growing number of multimedia ETDs being submitted to the WVU collection, (about 0.5% increase per year), including enhanced pdf, jpeg, mp3, html, XML, PowerPoint and movie formats (figure 7)
- WVU graduate students submit an average of 400 ETDs per year (figure 8)
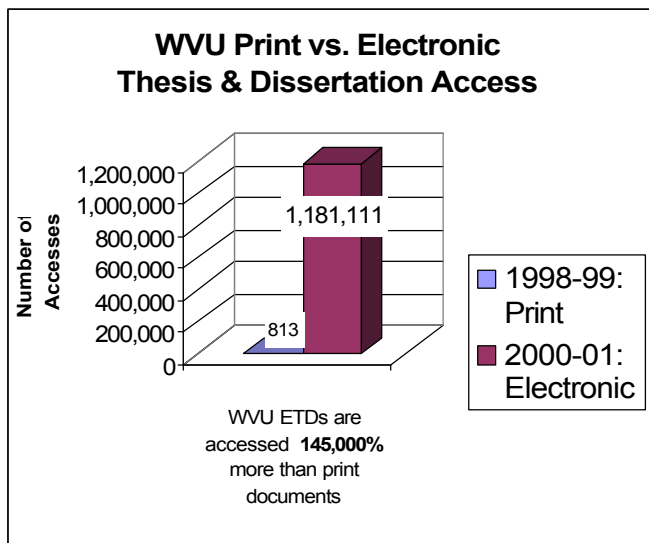
Figure 2
Circulation - Print Format vs. ETDs

Figure 3
Total ETD Accesses

WVU Print vs. Electronic Thesis & Dissertation Access

Number of Accesses: 1,200,000 / 1,000,000 / 800,000 / 600,000 / 400,000 / 200,000 / 0

1,181,111

813

1998-99: Print
2000-01: Electronic

WVU ETDs are accessed **145,000%** more than print documents

Total WVU ETD Accesses: 1998 - Present

Number of Accesses: 6,000,000 / 5,000,000 / 4,000,000 / 3,000,000 / 2,000,000 / 1,000,000 / 0

5,068,894
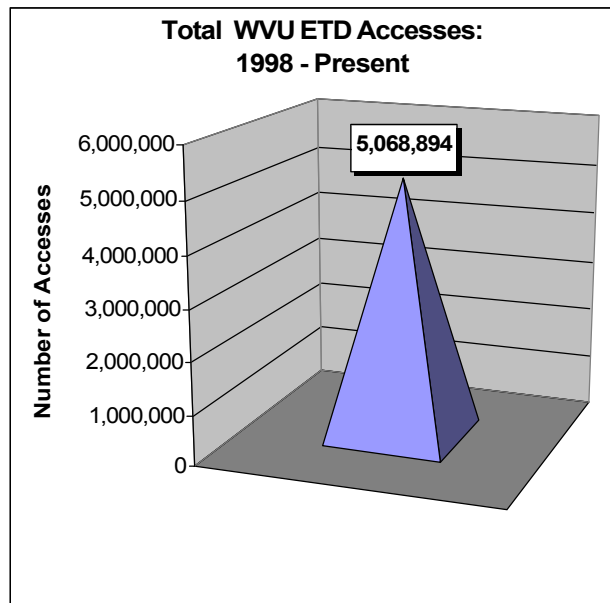
Figure 4
ETD Access by Geographical Domain

WVU ETD Access by Geographical Domain

- Commercial (.com)
- Educational (.edu)
- Network (.net)
- United Kingdon (.uk)
- Germany (.de)
- Singapore (.sg)
- Australia (.au)
- Spain (.es)

(.com) 25%
(.edu) 24%
(.net) 16%
(.uk) 3%
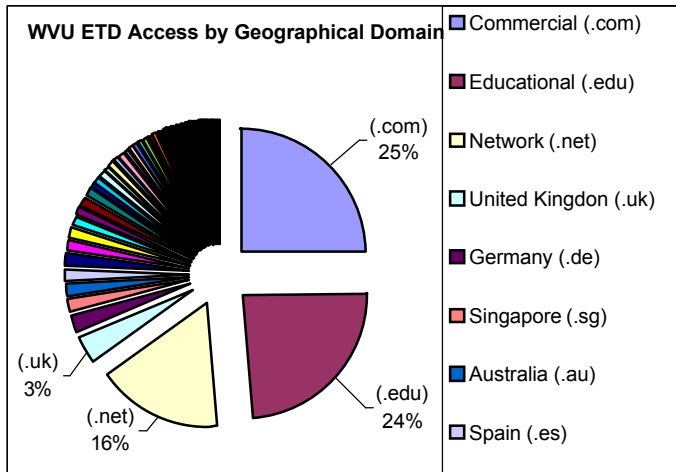
Figure 5
ETD Domestic Access

WVU ETD Access by U.S. Domain

- Commercial (.com)
- Educational (.edu)
- Network (.net)
- United States (.us)
- Government (.gov)
- Military (.mil)
- Non-profit Organization (.org)

Government (.gov) 1%
Military (.mil) 1%
United States (.us) 2%
Non-profit Organization (.org) 1%
Network (.net) 24%
Commercial (.com) 36%
Educational (.edu) 35%
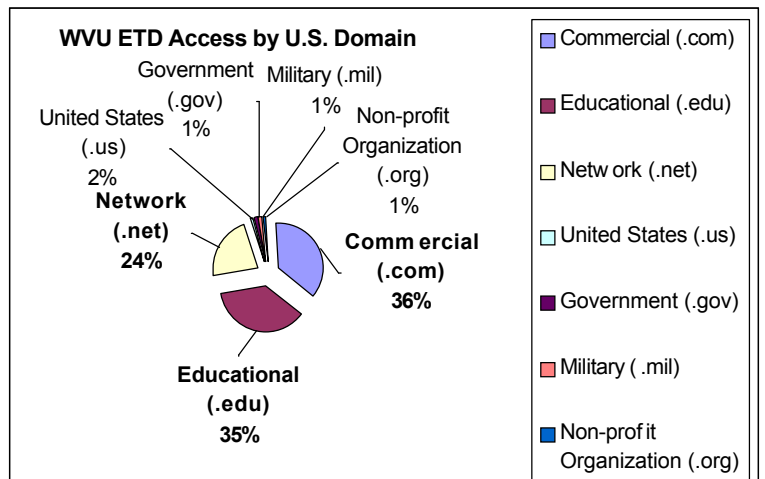
Figure 6
Total Number of ETDs in Collection

Total WVU ETDs as of Spring 2005

2,500
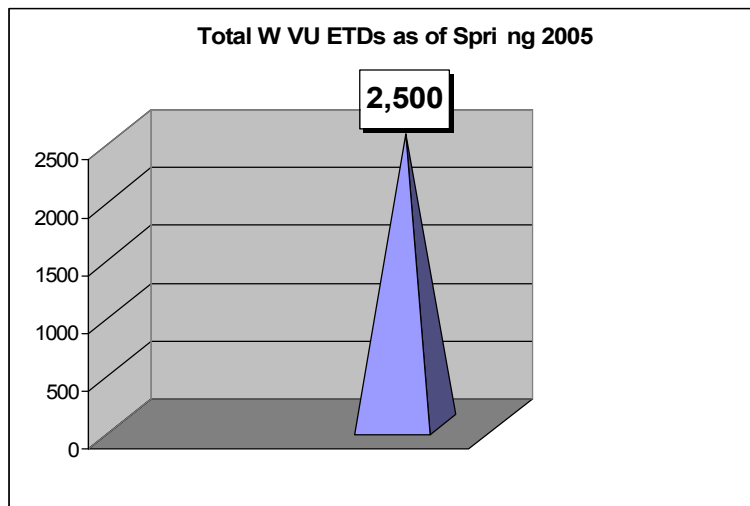
Figure 7
Format Types in Collection

WVU ETD Format Types as of Spring 2004

97% pdf

3% Multimedia

100%
80%
60%
40%
20%
0%

pdf, pdf & pdf, pdf & links, pdf & jpeg, pdf & video, pdf & html, pdf & SGML, XML, pdf & mp3, pdf & xls, pdf & ppt, pdf & vrml
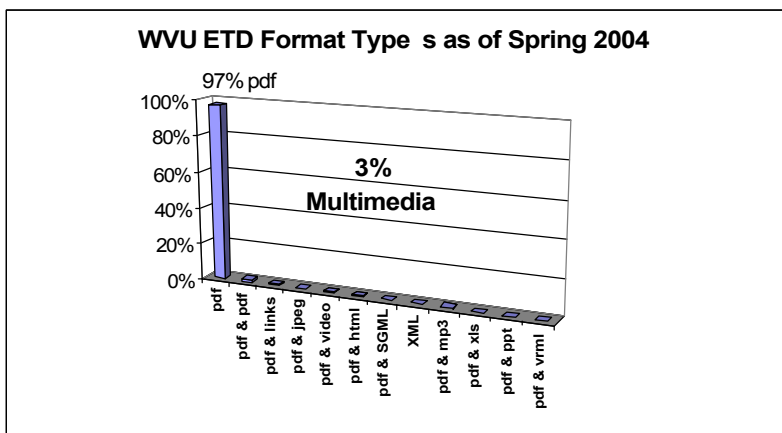
Figure 8
Number of Submissions per Year

WVU ETD Submissions

371 345 352 342 377 345 418 431

450
400
350
300
250
200
150
100
50
0

1997-1998 1998-1999 1999-2000 2000-2001 2001-2002 2002-2003 2003-2004 2004-2005

- Theses
- Dissertations
- Totals
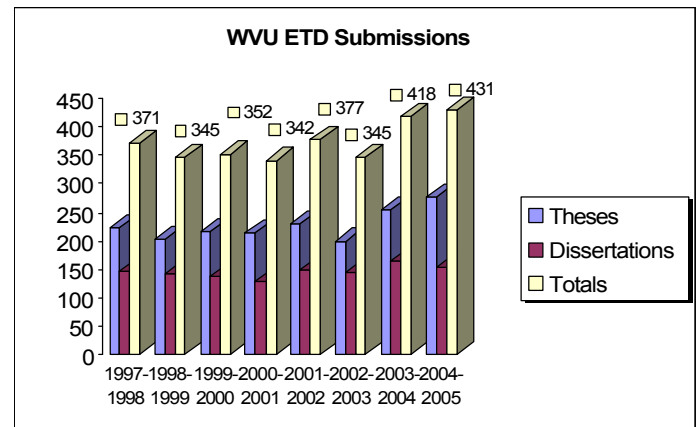
Positive Outcomes from Information Technology Implementation

Through WVU information technology planning, the WVU ETD program, as well as other information technology initiatives, there has occurred a heightened sense of awareness on campus of the profound effects of information technology. A rapid transfer of technology is taking place, transforming West Virginia's economy by providing research access to the world. Upon implementation, these information technology programs and services provide astronomical exposure; deliver greater benefit at less cost, all of which contribute to the research cycle. In the near future, controversies such as digital management of intellectual property issues will be resolved, most likely with the balance of control being returned to the rightful owner, the academicians and the research community itself. These technological initiatives have also brought diversification and stability into the State of West Virginia by replacing its dependence on a declining natural resource exploitive industry with a growing service and technologically oriented foundation. Additionally, the technology flow is reciprocal. Providing unrestricted access to WVU research benefits the world, and perhaps most significant, third world and under-privileged regions can find immediate benefit. This cross-diversification will prove increasingly fruitful as the growing global economy expands. In sum, education and technology continue to play an increasingly important factor in our lives. Continued investment by the University, the legislature and industry not only affirms the importance of information technology implementation, but also guarantees a brighter economic horizon. West Virginia University is becoming well equipped to fulfill the duty to se rve. As we seek to improve the lives of everyone from the local to the international scene, we are truly seeing results.[6]

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