

## ScholarBank@NUS

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### Abstract

*As a publicly funded organization, the mission of the National University of Singapore (NUS) comprises three mutually reinforcing thrusts: transformative education, high impact research and dedicated service. Within this mission, we seek to create, disseminate and apply knowledge through research and education for the benefit of Singapore and the global community. With this in mind, the University has committed much effort to put in place a variety of access arrangements to the results of work done within the university community. To achieve this, efforts to address Intellectual Property and other issues were necessary.*

*This paper presents the developments in the ScholarBank@NUS project which NUS embarked on to make available online the research results of our graduate students in their theses. In the course of doing this project, the University encountered various challenges, particularly in overcoming the legalities in intellectual property issues associated with the setting up of ScholarBank@NUS, our institutional repository on the NUS Digital Library. Our paper also documents the challenges we encountered in our implementation process from requiring students to submit their theses online on our Electronic Thesis & Dissertation (ETD) System in the first instance, before eventually making available the theses online on ScholarBank@NUS. For access arrangements, we eventually adopted the approaches below:*

- i) Unrestricted Internet Access*
- ii) Access Restricted to the NUS Intranet for a Limited Period*
- iii) Totally Restricted Access for a Limited Period*
- iv) Totally Restricted Access for an Indefinite Period*

### 1. Introduction

The National University of Singapore (NUS) as a publicly funded organization has a mission with three mutually reinforcing thrusts in education, research and service. NUS aspires to transform the way people think and do things through education, research and service by the creation, dissemination and application of knowledge through its research and education. The establishment of

ScholarBank@NUS is a strategic project that NUS embarked on to realize its mission in the dissemination of knowledge. ScholarBank@NUS is our institutional repository in the university's digital library and it collects and preserves the scholarly output of NUS as well as makes it accessible worldwide.

What motivated the University to set up such a repository? As a research-active university, NUS deems electronic thesis submission and access as being beneficial to the university, to Singapore and to the global community at large for the following reasons:

- i) Reduce printing, photocopying and binding costs for students
- ii) Reduce space and storage costs for the library
- iii) Allow for wider exposure for students' research by facilitating access to research data, thus contributing to the dissemination of knowledge

As a requirement for doing such a project, the University conducted a comprehensive review to ensure that our intellectual property policy on student theses is relevant and up to date. This review proved to be a lengthy process and as a result, it took a total of six years from 2003 to cover all the anticipated implications of our policy before ScholarBank@NUS was successfully launched in 2009. Because of the complexity of the issues involved, many units in the University were brought into the discussion and consulted to ensure all foreseeable issues and implications were carefully addressed; in this regard, the following offices participated in this project at some point before the implementation: Office of the Provost, Registrar's Office, Office of Legal Affairs, Industry Liaison Office, Library and all Faculties/Schools with graduate research programs. The revised Policy came into being in December 2008 before online access to the theses was launched in November 2009.

### 2. Project Development

It became clear in 2003 that the University community would benefit from having online access to research data in the finalized theses of graduate students, and the go-ahead was then given to develop or purchase an online repository that will allow such access. Acting on that decision, an in-house system

(the NUS Electronic Thesis & Dissertation (ETD) System) was set up to serve as a collection centre, and the Registrar's Office proceeded to immediately require research students to upload their final theses onto this system. This arrangement then became part of the thesis submission requirement henceforth.

With the above in place, the work in the comprehensive review to study issues in our intellectual property policy relevant to electronic thesis submission of student theses and their ultimate online access then began. The review was done bearing in mind that there may be the need to provide for a variety of access arrangements catering for different situations. The challenges we encountered are described below.

### 3. Challenge: Intellectual Property

Before we can actually make available thesis information, there was the need to clearly establish ownership of copyright to students' theses. If the ownership lies with the students who have written the theses in the first place, there is then the requirement for students to grant the University a license to reproduce and publish the work on the internet and other means.

For students who submitted their theses onto the ETD system from September 2003, the necessary policy was put in place to govern the ownership of copyright to students' theses. The policy was stated in the clause below:

"The ownership of copyrights in student thesis is governed by the following:

- a) Copyright ownership of theses generated by research that is performed whole or in part by the student with financial support in the form of wages, salaries, stipends, scholarships or grants from funds administered by the University shall be determined in accordance with the terms of the support agreement or in the absence of such terms, shall become the property of the University.
- b) Copyright ownership of theses generated by research performed in whole or in part utilizing equipment or facilities provided to the University under conditions that impose copyright restrictions shall be determined in accordance with such restrictions or in the absence of such terms, the theses shall become the property of the University.
- c) Students will own the copyrights to theses not within the provisions of a) and b) above.

However, a student shall hereunder, as a condition to the degree award, irrevocably and unconditionally grant in perpetuity to the University the royalty-free right by way of license to print, publish, reproduce and publicly distribute copies of his thesis in all languages, including but without limitation the right to publish on the Internet or by means of any other electronic medium throughout the World."

Students were given a form to sign before they upload their theses onto the ETD system. By signing the form, the student, as the copyright owner of the thesis grants NUS a license to reproduce and publish the work on the Internet and other means. As the copyright owner, the student has the responsibility to obtain all the copyright clearances and undertakes to indemnify NUS against any breach of copyright or defamation. We subsequently found these clauses difficult to administer in practice.

After much deliberation, a revised intellectual property policy on students' theses was put in place which simplified the administration process.

Under the new policy, students own the copyright to their theses in all situations, except for patentable ideas or other useful intellectual property and research data arising from university research, which will belong to the University. Hence the University is granted a broad license by the student to print, copy and publish the thesis on the Internet. The necessary clause allowing for this reads as follows<sup>[1]</sup>:

"The University acknowledges the student's ownership of copyright to his/her theses and/or dissertations. However, where the student's theses and/or dissertations were submitted to the University to meet course requirements, the following provisions shall apply:

- a) If the student's theses and/or dissertations contain patentable ideas or other Intellectual Property the University deems useful, then the University shall be the owner of such ideas or Intellectual Property.
- b) If the student's theses and/or dissertations contain research data arising from University Research, then the student's copyright will only extend to the form of expression of the data in the theses. Ownership of the research data and the data base itself remains with the University.

The physical document and/or device on which the student's Authored Work was recorded or stored or printed, which was submitted to the University (for

example, the thesis document, the examination scripts, term papers, CDs, DVDs, tapes, etc.) will become the property of the University unless returned to the student by the University.

The University Member shall be deemed to have granted to the University an irrevocable, unconditional, perpetual, transferable, sub-licensable, royalty free license to use, print, publish, reproduce, copy and publicly distribute the University Member's Authored Work, in whatever form, including without limitation the right to publish on the Internet or through an Electronic Medium, for the University's teaching, research and academic purposes and any business usual to a university or institution of research and/or higher learning (such as publishing and licensing activities), provided that:

- a) the University shall acknowledge the copyright ownership of the University Member;
- b) the University may, at its absolute discretion, elect to limit its use of this licence on such terms as it sees fit.

The University may at any time, require an assignment of the University Member's copyright over an Authored Work for the purposes of commercialising the Authored Work and the University Member shall take such action as required to complete the assignment provided that the assignment of copyright will contain terms which will enable the University Member to retain the right to reproduce the text of their Authored Work to ensure that their careers benefit from publishing the results of their work.

If the University was to commercialise an Authored Work (for example, through the University's subsidiary NUS Press Pte Ltd or its Centre of Instructional Technology), then the University and the University Member who owns the copyright to the Authored Work shall enter into appropriate agreements to share revenue or make payments in accordance with standard practices and guidelines usual to educational institutions.

The University Member shall ensure that he/she:

- a) is not in breach; and/or
- b) has obtained the consent,

of Third Party owners of copyright or other intellectual property rights to use their works as incorporated in the University Member's Authored Work and a license back to the University for

teaching, research and academic purposes. The University Member shall use reasonable efforts to assist the University to obtain the consent of Third Party owners of copyright and other intellectual property rights if the University seeks to commercialise the Authored Work."

In order to accommodate theses being made available via the digital library, a new paragraph defining "electronic media" has also been added into the document on Intellectual Property policy defining "electronic media":

"Electronic "Medium" shall include but not be limited to digital optical and magnetic information storage and retrieval platforms or systems (including not limited to videos floppy disk-based software CD-ROM CD-I DVD-ROM DVD-RAM interactive software compact discs, ROM-card silicon chip and any other similar or dissimilar offline platforms or systems) online electronic or other transmission (including but not limited to satellite or microwave transmission video-on-demand and/or near near-video-on-demand and the Internet) and the Digital Library (or any such digital online collection developed and maintained by the University) whether now known or subsequently developed."

The new policy was adopted from 1 December 2008 for students who have submitted their theses henceforth. All newly admitted students are required to declare that they have read and agreed to the NUS Intellectual Property Policy at the time when they are accepting admission into the University.

#### **4. Challenge: Differing Views on Access Options**

The task to get the university community to agree on a set of access levels was not a simple one as it required extensive and intensive deliberations among all the Faculties/Schools to get the parties to agree on a set of options that are not difficult to deal with administratively. Much research was done to find out how other universities <sup>[2]-[8]</sup> handle their electronic thesis submission.

It was finally decided that online access to the theses would be provided on four different levels of accesses as described in this paper.

#### 4.1 Unrestricted Internet Access

Most theses would generally come under this category and they are usually released immediately for public access worldwide.

##### *Suitable for:*

- Theses without any patents or confidentiality issues.

#### 4.2 Restricted NUS Intranet Access for a Limited Period

Theses in this category are released for access only on the NUS Intranet for up to a maximum period of two years. When theses are put into this category, the following guidelines will apply.

- During the specified restricted period, only the thesis title, abstract, student's name, degree, department, and year of submission will be made accessible worldwide.
- After the specified period, the thesis will be released for access worldwide.
- Extensions of the restricted period of up to two years at a time may be requested.
- Extension requests are subject to approval by the Associate Provost (Graduate Education).

##### *Suitable for:*

- Theses which are to be made accessible to only the NUS community for specific reasons (e.g. some contents in the thesis are in the process of being published in a journal).

#### 4.3 Totally Restricted Access for a Limited Period

In some instances, it may be necessary to totally restrict access to the work in a thesis for a certain time period. Here, the thesis will be embargoed for up to a maximum period of two years in the first instance, and in cases like this, there will be no access even on the NUS Intranet.

- Only the thesis title, student's name, degree, department and year of submission are accessible.
- The abstract will not be accessible.
- At the end of the embargo period, the thesis will be released for access worldwide.
- Extensions of the embargo period of up to two years at a time may be requested.
- Extension requests are subject to approval by the Associate Provost (Graduate Education).

##### *Suitable for:*

- Theses which contains proprietary/confidential information which the student will use for incorporation into a patent application.
- Theses which contain third party proprietary/confidential intellectual property (including, without limitation to, patents and/or software).

#### 4.4 Totally Restricted Access for Indefinite Period

Finally, we have this category where the theses will be embargoed indefinitely under the following conditions.

- Only the thesis title, student's name, degree, department and year of submission are accessible.
- The abstract will not be accessible.
- Requests to access the thesis are subject to approval by the Vice Provost (Education).

##### *Suitable for:*

- Theses containing material to be published as a book, a series of articles or as a monograph, where release on the Internet will be construed as prior publication.

- Theses containing creative work which will be published. Theses containing confidential, private or politically-sensitive information.
- Theses containing commercially-sensitive information.
- Theses containing third party copyright items for which copyright clearance cannot be obtained.
- Theses containing material that might endanger the physical/mental health or the safety of an individual if released.

The four categories we have identified sufficiently cater for the various needs of the NUS community with the following working principles:

- i) All theses should be made available to the public where possible.
- ii) The period of embargo should be limited, with possible requests for extension.
- iii) The greater the degree of embargo/restriction (with respect to access and period), the higher the level of authority for approval is required.

Students can request for a restriction period of up to two years for ii) and iii). The first two options can be approved by the Head of Department, except in the case when student has originally been granted ii) but is again requesting for an extension to the restriction period. Such extensions will subject to the approval of the Associate Provost (Graduate Education).

For theses with copyright/patent issues, students and their supervisors requesting for restricted access for their theses must specify the reason and the period the thesis is to be withheld. Students are advised that non-critical but confidential/proprietary information which they have not obtained copyright clearance from the information owners, should be excluded from their final theses submission. For theses where the information has to be in the theses and where there are copyright clearances to be obtained, students are advised to obtain the clearances first before they submit their final theses and submit the endorsed clearance forms from the copyright owners. For theses of which the students did not manage to obtain the clearances, they can request for restricted access of their thesis for up to a period of two years, within which they have to obtain the clearance or submit a request for extension of the

restricted period or permanent restriction if they are unable to obtain the clearance.

For theses which cannot be released because it has contents awaiting patent applications, the students are supposed to indicate and request for restricted access. The system will alert the NUS Industry Liaison Office which will give the approval to proceed to release the theses into the Internet when it has successfully filed the patent applications.

## 5. Challenge: Implementation

To implement the new policy and to launch the use of ScholarBank@NUS, the following steps have to be taken:

- the ETD form has to be revised;
- the web pages of the new developments and hyperlinks to the new Intellectual Property policy document electronic upload of thesis have to be amended; and
- the entire community (comprising graduate students, administrative staff and faculty members) has to be informed and trained through emails/briefings/demonstrations of the changes and the online system.

There was also a need to check through all ETD forms submitted previously to ensure that they have been completed properly. A revamp of the ETD submission portal was done to improve on the security measures, and the contents on the portal was improved on, as well as, the system-generated email messages to students and staff.

Before the use of the new set up was implemented university-wide launch, there was a pilot run done with two departments to iron out potential teething issues. Tests were also done to ensure that data capturing and system flow were smooth and that the data were ported and reflected correctly with their transfer from ETD system to ScholarBank@NUS.

## 6. Electronic Thesis Submission Process

We describe here the process which is now in place at the NUS for electronic thesis submission. Students provide proof to the Registrar's Office that they are ready to submit the final version of their passed thesis by submitting a form endorsed by the supervisors or oral panel members. They also submit the completed ETD form with the necessary endorsements. A PDF copy of their theses would

have also been submitted to their Department administrators to eventually verify that the theses eventually uploaded into the ETD are the final versions and the uploaded versions have the formatting intact.

Upon receipt of the forms from a student, the Registrar's Office administrator will login to the ETD system to grant access for the student to upload his/her thesis within one week. The system will send auto email to notify the student on this. The student will also be asked to indicate his/her level of access which has supposedly been approved in the system and to indicate if the thesis has patentable content. Upon upload by the student, the system will send an auto email to Department administrator to verify the thesis online. If amendments are needed, the administrator will contact the student to make the amendments and upload gain.

After the Department administrator has verified the uploads, an email will be sent to the Registrar's Office administrator who will check the level of access, and whether patent issue is involved, against the information indicated on the ETD form submitted by the student. The administrator will clarify with the student if there are inconsistencies. After ensuring that the ETD form is consistent with the system indication, administrator will then proceed to submit the name for conferment of the degree on the student. It is with the successful uploading of the thesis will a student is considered to have completed all requirements for the degree and can be conferred the degree. All conferment has to be approved by the Board of Graduate Studies and the Chancellor of the University.

The theses which have been identified for Unrestricted Internet Access will only be transferred to ScholarBank@NUS the day after the student has been conferred the degree. For theses which have been approved for embargo of any level, they will be transferred to ScholarBank@NUS (internet/intranet) on the respective scheduled dates (where applicable).

## 7. Conclusion

The National University of Singapore is proud to report that after much hard work, we have a system that cater to different requirements to enable the final version of the theses of graduate research students to be uploaded online so that the public can access them via the NUS Digital Library. While at one point, the project seems unachievable with insurmountable differences in views and a whole host of issues to address, we are glad that by engaging the community in a positive manner, we have been able to overcome many of these in a collegial manner to successfully launch the access of theses via ScholarBank@NUS.

## 8. References

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- [4] West Virginia University, <http://thesis.wvu.edu/>
- [5] University of British Columbia, <http://www.grad.ubc.ca/current-students/final-dissertation-thesis-submission>
- [6] University of Glasgow, <http://theses.gla.ac.uk/gettingstarted/deposit.html>
- [7] University of Sheffield, <http://www.shef.ac.uk/ris/pgf/code/first>
- [8] University of Melbourne, <http://www.lib.unimelb.edu.au/eprints/thesis/>