



**Sowing the seeds: towards reaping a harvest using social web applications in Nanyang Technological University Library**

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**Abstract:**

***Purpose of this paper:*** In this paper, we share why and how Nanyang Technological University (NTU) Library has explored and implemented Web 2.0 technologies extensively to reach out to our users using a range of social web tools such as blogs, share this widget, library toolbar and RSS feeds as well as online services like Facebook, Flickr, and Google Analytics. These digital library innovations have enabled us to meet the needs of our users more effectively and resulted in a tremendous growth in online visitorship.

***Design/methodology/approach:*** Over the last 3 years, NTU library has initiated a total of 7 social web projects : (1) Library Subject Blogs, (2) Library Facebook, (3) Library Database Page (Information Page), (4) Library FAQ (Share this function & Permalinks), (5) Library Toolbar, (6) Uses of RSS Feeds and (7) Library Statistical and Analytical System to enhance online user experiences in accessing and retrieving relevant information from NTU digital library. Using a combination of usage statistics, surveys and focus group interviews, a thorough study was conducted to evaluate the impact of the various project initiatives and to capture the

lessons learned along the way. In the process, we are able to identify several key factors underpinning the success of our social web projects.

**Findings:** *Our study reveals that our target users are becoming more sophisticated and they expect a greater degree of interaction, flexibility and accessibility in using the information provided by the Library. Hence, they readily embrace most of the new applications which we have introduced and have recommended that such features should be embedded in all library products and services. It is reflected in the tremendous increase in visitorship. These social web projects have enhanced our traditional web portal and offered new opportunities for us to engage our users.*

**Research limitations/implications:** *This paper captures only the experiences of NTU Library and does not claim to be comprehensive. Other Singapore libraries are also exploring and developing social web tools. Future research could be conducted to compare the impact of the various social web technologies implemented in Asian Libraries.*

**Practical implications:** *This paper gives a background of the social web projects implemented in NTU Library and shares some the lessons learned. In particular, it highlights some of the critical success factors which must be taken into account.*

**What is the original/value of paper:** *The paper shares the experiences of developing social web projects from a non-technical perspective in an academic library. It provides librarians and practising professionals who are considering or developing social web projects some insights into the impact of such projects and the challenges faced.*

**Keywords:** *Digital Library, Social Web Application, Social Networking, Information Sharing*

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Brief Bio-data **Nurhazman Abdul Aziz** (Hazman Aziz) is a Librarian (Library Technology & Systems Division) and a Business Librarian (Information Technology & Operations Management) with NTU Library. He applies design methodologies, skills, and principles to create and refine the strategy and user experience of new and existing tools & technology, such as Library 2.0. Hazman has presented a couple of presentations on social web locally, sharing from the academic library's perspective. Prior to joining NTU Library, he worked on a number of projects such as NHG e-Learning (for Tan Tock Seng Hospital) and SAFTI Self-Paced on Time on Need (SPOT-ON) project (for School of Infantry Specialist). Presently, Hazman has just completed his postgraduate studies at Nanyang Technological

University. His current research interest is in the area of Library 2.0 webology, where he is looking at ways to present information via an intuitive platform for library users. Hazman is also interested in expanding his ideas of the library as a knowledge-concierge.

**Chia Yew Boon** is the Head of the Humanities & Social Sciences Library. He is also holding a concurrent position as Head of the Projects Division at NTU Library, where he tracks emerging technologies and trends which are relevant in the higher education landscape. His background in library science and knowledge management has also inspired him to examine how library services can be better integrated into the campus e-learning infrastructure. Yew Boon pioneered the development of subject library blogs in NTU and is currently leading an interdepartmental team to implement a campus-wide social media platform under the university's *Cool Campus* initiative. He collaborates closely with faculty and other users to design blogs and apply appropriate social media strategies that effectively support the teaching, learning, research, marketing and administrative needs of the community.

**Hazel Loh** is the Deputy Director of the Library Technology Group which oversees the Library Technology & Systems Division and the Projects Division at NTU Library. She has been pioneering digital initiatives and was involved in digital library projects and the NTU campus portal since the late 90s. Hazel started out in Technical Services and moved on to head the Circulation, Media Resource Divisions and to her current post. Today, her division oversees the Library Systems and IT infrastructure, the development and management of the Library portal, maintenance of access and user interfaces to e-resources and VOD, development and management of the institutional repository system, IT projects and coordinating the Library IT budget and maintenance contracts. Recently, NTU Library has embraced the adoption of Web 2.0 technology into the digital library's online service model with her guidance, in alignment with the Library's mission, goals and strategic plans.

## Introduction

Since the establishment of the Nanyang Technological Institute (NTI) in 1981 (renamed the Nanyang Technological University (NTU) in 1991), the Library has been at the forefront of new technology exploration and adoption. From the beginning of library operations, we invested in the 3M security system, bypassed the use of a physical card catalogue and ventured directly into machine readable cataloguing to maintain our bibliographic records and microfiches for end users to search our library catalogue. This paved the way for the implementation our first integrated library system in 1988 with minimal effort and disruption to user services during the conversion of bibliographic records and migration process. We also implemented an automated email reminder system for overdue and book reservation notices to users in the same year. In 1994, we were one of the first libraries in South East Asia to introduce self check kiosks for self service loans (Ong, 1994) followed by a state-of-the-art digital library portal in 1999. From the mid-2000 onwards, we explored and implemented the institutional repository for archiving the scholarly output of NTU faculty and students using an open source software called DSpace, a RFID system using 3M technologies, Subject Library blogs using WordPress and a Library Facebook.

Chew (2009) shared the importance of harvesting web 2.0 technology concepts in today's library technology initiatives for South East Asian libraries. From Chew's study results, the Hong Kong University Libraries (HKUL) seemed to be the only library active in implementing Library 2.0 applications including the next generation SMARTCAT Library Catalogue based on Scriblio and a wiki which provides information about the library services. For other libraries in Asia, the Indian Institute of Information Technology and Management-Kerala (IIITM-K) has a library blog and the Library @ Kendriya Vidyalaya Pattom in Kerala uses Twitter to broadcast messages to patrons on new books, library notices and other Web 2.0 tools. Over in Indonesia, Japan, Malaysia, China, Taiwan and the Philippines, most libraries have adopted blogging whereas for Singapore libraries, there has been progression beyond blogging and RSS feeds adoption for web 2.0 initiatives.

In this paper, we will focus on our experience and the practical use of social media at the Nanyang Technological University (NTU) Library. In line with the technology trends, we have explored and implemented Web 2.0 technologies extensively to reach out to our users using a range of social web tools such as blogs, share this widget, library toolbar, fulltext @NTU library bookmarklet, RSS feeds as well as online collaborative services, namely Facebook, Flickr, and Google Analytics. These digital library innovations have enabled us to reach out and meet the needs of our users, especially the Millennial or Net Generation more effectively and resulted in a tremendous growth in our library online visitorship.

## **The Social Web**

Many libraries around the world today have adopted the concept of the social web as a means of delivering their online information services to users. Yet, many librarians involved in technology are still pondering the real definition of social web applications and the benefits of adopting the concept. According to Bell & Romano (2009), building a web application that attracts and retains regular visitors is tricky enough. On the other hand, creating a social application that encourages visitors to interact with one another requires careful planning to align strategic plans to meet key deliverables and operational goals (Berlanga, et al., 2007). The Social Web is currently used to describe how people socialize or interact with each other in the online world (Harasim, 1993). These applications have the potential to promote participatory networking where both information services and patrons communicate, collaborate and co-create content in their areas of interest. Moreover, these applications are rich in context, easy to use and also provide the interactive experience upon which libraries are able to develop their online services.

Traditionally, libraries have been the hub of information creation and flow in many communities and institutions (Chua, Goh, & Lee, 2008). With the advent of today's blooming social technologies, libraries have had to evolve their brick and mortar service models through embracing new technologies to augment online services in a collaborative and interactive way, yet ensuring the mode of accessibility (ease of use) is still present. Undeniably, the way patrons use the Web has changed dramatically since its inception in the mid 1990's. Users have changed from passive consumers of information to active contributors as much of the content on the Web today is the result of knowledge sharing and exchange of ideas by individuals using current web technologies. The challenge is to tap on the different strengths of each social web application that currently exists in the online industry, for example, use of web blogs, social utilities sites, toolbar, RSS feeds and use of analytical tools to justify the services provided through these means.

With the next generation of online patrons, libraries have to look towards investment in a new digital library concept. This is due to the sheer magnitude of the potential in social web technologies (Zhang, Chen, & Wu, 2006). Even though the core business of traditional digital libraries is to provide remote access to subscribed e-resources in an organised manner, libraries should not ignore the power of social technologies. It brings a different dimension in terms of real time publishing and sharing of information by librarians with high user interaction. This is important as a new user experience will be created in the provision of online information services.

Library 2.0 is targeted towards a social network interface (Kelly, Bevan, Akerman, Alcock, & Fraser, 2009), whereby patrons are able to exploit use of RSS feeds, blogs and collaborative tagging including communication and knowledge sharing. Another aspect is the improvement of functionalities and incorporation of social web technologies to improve search and retrieval features in library catalogues. There is indeed a wide platter of options for libraries to explore in terms of online presence and interactive user experiences to attract potential and current patrons to use information services provided by libraries. Moreover, investment in this area will increase libraries' online popularity and visitorship.

Another recommendation for libraries to consider is to build an information concierge model through web marketing practices (Feifei, 2001). There are a number of tools and technologies on

the web today which could be used for this purpose. Libraries, for instance, could create their own model using the available tools provided from the open-source industry. For example, to market library services, resources and events through blogging, libraries could use WordPress software and customise according to their needs. In fact, with the WordPress platform, libraries could promote their books through social networking sites such as Facebook, either via RSS feeds or a widget plug-in that is specially created to parse information into the Facebook environment. With these web tools and channels, we actually have the potential to model libraries into a network of true collaborators.

Hence, in the long run, libraries could enhance their current role in supporting their respective user communities and life-long learning through performing the role of an info-concierge, or as a network of inter-connected info-concierges and true collaborators (Foo, Ng, & Soh, 2008). The info-concierge model has currently been well-practiced in the hospitality industry. For example, the Hilton Hotels and Resorts website has introduced an “electronic hotel concierge” that suggests to their guest to try other services of the Hilton Hotel by displaying short messages (Gilbert, Powell-Perry, & Widijoso, 1999). Likewise for libraries, librarians can also use new web marketing tools, like micro blogging or widgets advertising, to be deployed on their main corporate site to promote or create a small promotional “buzz”. This could also extend to other parts of their library cyber structure via micro sites, portals or customised sites (such as library blogs).

### **The Net Generation & Information Searching Behaviour in the University**

The current strength of the NTU Library portal is that it is the electronic shop front interface providing links and information to services and resources in an organised and systematic manner. From the NTU Libraries Annual Report for Academic Year 2008/09, it is one of the most popular websites on campus chalking up 2.7 million sessions for the year. In addition, there were more than 2.4 million sessions on the databases and e-journals (via the Ezproxy service) and 1.2 million sessions on the Library catalogue. There were also 231,000 sessions on the A to Z e-Journal search and access to e-books was fairly consistent over the last academic year, averaging about 21,140 sessions or 1.7 sessions per e-book title per month.

It was noted from the statistics that the e-resource usage pattern by students appeared to be different from staff. While usage by students dipped drastically during the vacation period, staff usage peaked at that time. Use of e-resources by students rose sharply from December - March period, possibly due to the preparation for their final year projects and theses. In terms of the intensity of use, statistics collected on access to e-resources via Ezproxy by students and staff showed that on the average, a faculty or research staff accessed e-resources 246 times a year compared with 56 times for a student.

This is important statistical information that helps illustrate the importance of the Library to the campus community in terms of content, collections, services and access. For the past few decades, libraries have been trying to adjust to changes in demand and supply in information to better serve the communities in the University. Throughout the years of service experience, libraries have observed a changing evolution in the needs and behaviour of the different generations, i.e., Matures (1900 – 1946), Baby Boomers (1946-1964), Generation X (1965-1982) to Net Generation (1982-1991) as indicated in the table.

	<b>Matures</b>	<b>Baby Boomers</b>	<b>Generation X</b>	<b>Net Generation</b>
Birth Dates	1900–1946	1946–1964	1965–1982	1982–1991
Description	Greatest generation	Me generation	Latchkey generation	Millennials
Attributes	Command and control Self-sacrifice	Optimistic Workaholic	Independent Skeptical	Hopeful Determined
Likes	Respect for authority Family Community involvement	Responsibility Work ethic Can-do attitude	Freedom Multitasking Work-life balance	Public activism Lates: technology Parents
Dislikes	Waste Technology	Laziness Turning 50	Red tape Hype	Anything slow Negativity

**Figure 1: Generations Highlight Trends.**  
(Oblinger & Oblinger, 2005)

Currently, the Net Generation makes up the majority of patrons in NTU Library and they have a common characteristic in terms of finding and use of information resources. They prefer to search the internet or connect with their peers to find information resources. The characteristics of this group gravitate towards the following traits (Oblinger & Oblinger, 2005):

- Preference for group activity
- Believe it's cool to be smart
- Are fascinated by new technologies
- Are focused on grades and performance
- Are busy with extracurricular activities

They are also brought up with the computer and the internet and therefore deal with information differently compared to previous generations - "they develop hypertext minds, they leap around." They are more likely to prefer visual images, possess visual-spatial, inductive discovery & attentional deployment skills and are able to respond quickly and expect rapid responses in return (Oblinger & Oblinger, 2005). Thus, this generation can be described as: (1) digitally literate, (2) connected, (3) immediate, (4) experiential, (5) social, (6) structured, (7) visual & kinaesthetic (Oblinger & Oblinger, 2005). It is very important to be aware of these behavioural patterns so that libraries can innovate with new technologies to present the appropriate design and architecture that meets the information needs of the net generation.

With these considerations in mind, NTU Library has attempted to build the digital library architecture to meet the information seeking behaviour of the Net Generation through measures such as integrating library information into Google or other popular search mechanisms, offer a simplified and graphical way for students to approach subject searches, integrate searching of "open" Web resources and materials owned or licensed by the library.

### **Sowing the seeds in NTU Library**

From the mid-2000s, NTU Library has been actively engaged in a number of social web application developments, such as (1) Library Subject Blogs, (2) Library Facebook, (3) Library Database Page (Information Page), (4) Library FAQs (Share this function & Permalinks), (5) Library Toolbar, (6) RSS Feeds and (7) Library Statistical and Analytical System. The key

reason for NTU Library to build these applications at the initial stage was to sow the seeds for the experimentation and adoption of Web 2.0 technology in an online information era. In short, the strength in Web 2.0 adoption enabled the Library to design systems akin to an information concierge service model to enable greater exposure, consolidation of data sources and ease of access to our information resources by end users.

NTU Library has explored seven social web applications to-date. These social web applications are treated as seeds investment as they have a potential to grow into a scalable library and information science project to create value for the institutional knowledge creation, access and sharing platform.

### **(1) Library Subject Blogs**

Our first official blog was created in 2006. With the rising popularity of blogs and the proliferation of blogging software, we were keen to experiment with this social media platform. A key initiative was to do a local installation instead of using a hosted service. This decision required our librarians, in partnership with the Centre for IT Services (CITS), to pick up the necessary skills quickly. It was a challenging exercise and, in the process, enabled us to build strong expertise in the software and hone our skills at customizing blogs.

Leveraging on the WordPress platform, we hoped to offer a richer and more interactive library experience for the campus community. The postings include new book listings, book reviews, database updates, library workshops and many other topics. This also provided a channel for the community to give us feedback and to share their views online.

A year later, we extended blogs to all subject libraries. All librarians began to embrace blogs as an outreach tool. Every blog had a different look and feel to cater for its specific group of users. For instance, the Art, Design & Media Library blog highlighted its extensive collection of art works with a rotating banner.

As we accumulated more experience, we began to explore how we could help users tap on blogs to enhance their teaching or marketing efforts. We took on an evangelizing role to share this platform in our meetings with faculty and administrative staff. Over time, we helped to build several course and school blogs. In 2009, our blogs attracted about 67,600 visits and 172,000 page views. By expanding on our “library portfolio”, we were able to intensify our collaborations with users and promote the use of library resources.

This year, we would be taking the blog initiative one step further. NTU Library had been appointed to lead a cross divisional team to roll out a campus-wide blog platform. Besides upgrading to the more robust WordPress Multi-Users (MU) platform (which is later will be known as WordPress 3.0 in late 2010), we would create a main landing page where users can read the most recent or popular postings, culled from all the blogs in NTU. The harvesting and highlighting of postings from various blogs would enable users to easily discover the major happenings in our campus!



## (2) Library Facebook

We made our first foray into Facebook in July 2009. It was mooted by several librarians who were active Facebook users. They proposed that NTU Library should leverage on Facebook Page as a “syndication network” to build a community by encouraging friends, patrons, colleagues and others in the network to become fans (“Join us on Facebook.”).

The Facebook News Feed is also one of the site's most addictive elements, containing an ever-changing aggregation of activities, images, videos links, and other information targeted at the library circle of friends and connections.

As of May 24<sup>th</sup>, 2010, we have a total of 1,315 fans with over 80% in the 18-34 age groups. We have noticed a surge of activities when NTU Library organised major outreach events such as Freshmen Orientation and eResources Day. It was evident that the “viral marketing” characteristics of Facebook community helped to multiply our publicity efforts many folds. When a user becomes a fan (or likes) of our Facebook Page, all of his/her friends are informed. It is likewise, when librarians comment on someone else's status update, their network of friends view the comments too. One fun and engaging idea was inviting users to photo-tag the pictures which NTU Library had uploaded into Facebook.



**Figure 2: NTU Library Facebook Page**  
URL: <http://www.facebook.com/ntu.library>

To make our Facebook Page more useful, we have added a library catalogue search box to allow users to check our holdings within the application. In addition, we have also streamed content from our subject library blogs into Facebook. Every time a librarian writes a new post, it will appear as a status update on our Facebook Page!

Recently, Facebook has introduced the "Open Graph," and the potential of this service able to connect disparate corners of the Library Micro-sites that other social sites are building. The potential intent of this Open Graph, we can bring together social actions from all over the Library's online resources and allow for a rich depiction (and semantic memory) of what people are liking, reading, reviewing and rating. In addition, we can incorporate this to the library subject blog.

## (3) Library Database Page ('I' Page)

NTU Library subscribes to over 130 databases and creates an 'I' page to accompany each database. This project seeks to develop an integrated workflow for updating and managing the 'I' pages using a snappier and intuitive user interface. Users can also easily share the 'I' page with their peers, thereby promoting greater user interaction. The initial

workflow was cumbersome and involved several parties in creating the 'I' pages for the subscribed databases. This frequently delayed the process of getting relevant database information, updates and tips to the users. Over 3 months, a project team brainstormed and developed a content management solution with controlled templates so that subject librarians could publish and update 'I' pages for databases under their purview independently and in real time. They no longer need to know HTML coding as a What You See Is What You Get (WYSIWYG) user interface is provided.

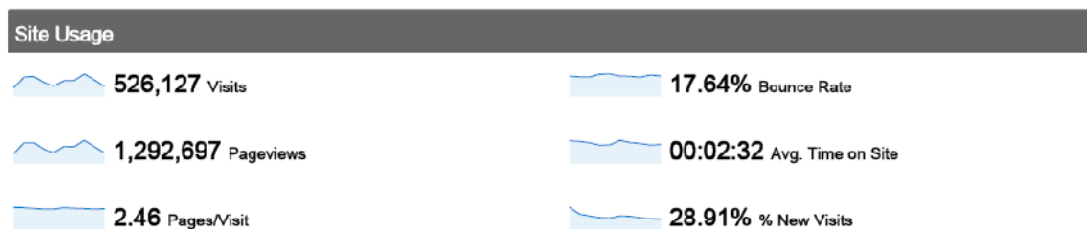


Figure 3: Google Analytics – Library Database Page

In addition, they can enrich the page by embedding useful video clips created by them or sourced from the database vendors and YouTube. Another interesting feature is the implementation of usage tracking using Google Analytics. We could now better analyse the database usage patterns and plan our promotional activities and workshops accordingly.

#### **(4) Library FAQ (Share this function & Permalinks)**

Library FAQ is one of our strategic initiatives to create a web-based knowledge system to capture answers to general and reference queries. Before this initiative was implemented, users' enquires and feedbacks were communicated through conventional ways, such as through the telephone, email and face-to-face consultation.

By creating this repository, we are able to:

- Create a systematic, effective and efficient workflow ;
- Disseminate and organise information a proper way;
- Introduce a new learning organisation environment;
- Promote better community awareness in the academic environment and
- Operate and improve the service level.

We have added several useful social media features such as "Share this" widget, 'AddThis' widget and permalinks. By integrating social bookmarking utility into the each FAQ, users can disseminate and share the FAQ articles with their friends quickly. Clicking on the 'Share this' button allows users to share library's content in over 200 popular social networking services such as Facebook, Twitter, Delicious and others in a fun way.

With the implementation of 'AddThis' widget, we could gather useful statistics on sharing trends, such as identifying articles which are commonly shared and the types of

interactions. Lastly, the introduction of permalinks makes it easier for users to remember URLs and dramatically increase the discovery of our FAQ articles by internet search engines. Other systems such as the Library Database Page ('I' Page) and Subject Blogs are also using the concept of permalinks. Taken together, these new facilities enable NTU Library to better understand how users are using and sharing our FAQ content.

### **(5) Library Toolbar & Bookmarklet**

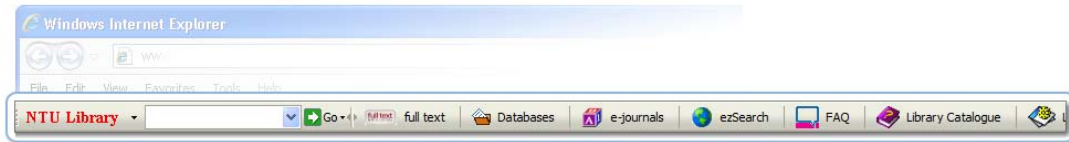


Figure 4: NTU Library Toolbar

One of the favourite tools offered by NTU Library is the web browser bookmarklet. This allows the users to seamlessly retrieve full text articles or e-books subscribed by NTU Library while they are surfing the internet. To provide greater convenience, the bookmarklet has been embedded into the library toolbar.

The library toolbar also provides links to databases, e-journals and library catalogue. To date, the tool bar has been installed up to 3,432 times. There are 985 active users and 7 new users are added daily. This toolbar can be downloaded via <http://NTULibrary.OurToolbar.com/>.

### **(6) RSS Feeds**

Web Feeds (or better known as Really Simple Syndication (RSS) feeds) is a lightweight XML format designed for sharing headlines and other web content provided by the information providers or services. Many content distributors syndicate web feeds, allowing users to subscribe to them easily. NTU Library has creatively aggregate web feeds so that users can obtain relevant information in a single site. For instance, we have mashed up feeds from technology databases such as Gartner and Scopus and present these feeds on a web page which is updated dynamically. The Economics subject librarian had incorporated feeds from the Economist into a course on Blackboard course management system so that students could directly read the latest articles in their course site.

### **(7) Library Statistical and Analytical System**

In this initiative, the project team evaluated several software and decided to install Google Analytics to track the users' online behaviours and study the motivations behind their search for information. Google Analytics is able to provide information on where the patrons came from, what pages they have visited, how long they stayed on each page, how deep into the site they navigated, where their visits ended and where they went from there in a visually appealing and easily understandable format.

For example, in 2008 Library Database Page website had one of the highest numbers of online users, with a monthly average of 38 000 visitors. After the enhancement of Library

Database Page, visitorship increased by 15 to 30 percent and that each user spent an average of 2 minutes on the site.

Overall, Google Analytics offers us objective and multi-faceted statistical data in a visual manner and enables us to better understand the interaction between our visitors and websites or blogs. By the analysing data periodically, we are able to identify trends and suggest relevant changes to enhance our websites and blogs.

### **Lessons Learned in Managing Social Web Projects**

Over the last 3 years, NTU Library has explored and implemented a number of social web applications to reach out to our users. When we started out, we were merely setting up another channel for us to push content to our intended users, just as we would regularly update our web portal. The social interaction, which is the key to the success of a social web project, was rather weak.

With the experience gained, NTU Library is preparing a more cohesive and inclusive strategy to create a supportive and vibrant community. Beyond pushing content, we will examine ways to promote greater social interaction. A major initiative in this direction is the creation of a landing page for the campus-wide blogging platform.

Adapting loosely from a Gartner report (Bradley & Drakos, 2008), the key lessons learned include -

1. **Magnetic:** The initiative must be able to draw people directly to participate. It has proven to be difficult to rally users and create a vibrant community. This could be attributed to a variety of factors. For instance, some users may have external blog accounts with Blogger and do not see the need for a NTU blog. It is therefore crucial that the value of participation must be clearly spelt out and is accepted by the targeted user community.
2. **Aligned:** The initiative must be aligned with business value. Similarly, it is also important to address the question of “what's in it for the business”. Besides delivering direct benefits to the users, the initiative must also contribute to library’s overall strategy. An earlier Library FAQ project was discontinued as the growth in visitors was low and cost of maintaining the proprietary system became prohibitive, though visitorship had remained constant. In this instance, the community value does not translate into business value.
3. **Low Risk:** The initiative must allow the selection of low risk over high reward. It is important to reduce the risks of adoption. For instance, it is often futile to try to change the culture of a community with social software. NTU Facebook project will not be sustained if the librarians are not themselves active Facebook users. If our users have equated Facebook with friends only and do not welcome library’s participation in their social sphere, this would be a risky project.
4. **Properly Scoped:** Start with a minimal scope and focus on growing your community's scale as fast as possible. It is useful to start small and create some ‘easy wins’ or ‘champion users’ so that we could quickly demonstrate the value of the social project. The initial buzz helps greatly to draw more users and support, driving the impetus to expand the project scope. When we are able to demonstrate the successful delivery of a

course conducted over a semester on a blog platform, it piqued the interest of other lecturers and led to more requests to create course blogs.

5. **Measurable:** You can measure the success of the social project. It is expedient to establish specific parameters and milestones at the start of the project. This allows us to make timely tweaks to our strategy and establish clear community and business value. For instance, we could link increased participation in the alumni blog to the amount of donations received.

## Conclusion

Our target users have become more sophisticated and they expect a greater degree of interaction, flexibility and accessibility in using the information provided by the library. Hence, NTU Library has actively explored and implemented Web 2.0 technologies extensively to reach out to our users using a range of social web tools such as blogs, share this widget, library toolbar and RSS feeds. These library innovations have enabled us to meet the needs of our users more effectively and resulted in a tremendous growth in online visitorship. We hope that by sharing our experiences of developing social web projects in an academic library, other librarians and practising professionals would gain some useful insights into the impact of such projects and the challenges faced.

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