



August 20, 2009

Information Technology Council
University of Massachusetts Boston
100 Morrissey Boulevard
Boston, MA. 02125-3393

RE: Final report for the technology and teaching grant "learning can be delicious"

Dear Committee members:

Following is a final report on our activities and accomplishments under the personal teaching improvement grant, "Learning can be delicious: Using social tagging to facilitate asynchronous research collaboration in undergraduate management courses." Although this was funded as a Personal Teaching Improvement grant, I hope you agree that we have engaged in activities that meet the terms of the more rigorous Research on Teaching and Learning program. In addition to demonstrating how social tagging can be used in undergraduate classes, we have developed a method (and accompanying code) to make it possible for others at UMass to collect and analyze their students' tagging activity. We have presented these results to other colleagues at UMASS and look forward to writing up these results for presentation to external audiences in 2009-2010.

In the following, we update our description of the tasks that were included in our interim report and those completed since that time. In particular, we provide a more detailed description of the methods we used to collect and analyze data on students' use of delicious tagging in two undergraduate management courses. We conclude with a summary of the findings from this work.

Summary of activities to date

As outlined in Table 1 below, we have completed all of the proposed tasks as well as an additional task not included in our original proposal. Specifically, in August 2009, our consultant made the code written for this project available for other teachers and scholars interested in analyzing their students' use of delicious tagging in the classroom. We are particularly excited about this contribution and hope that it stimulates others in the UMass system to adopt and extend our work.

Table 1. Proposed schedule and status by task

Project Activity	Timing	Status
Small pilot study in one section of MGT303 to demonstrate feasibility	Spring 2008	Complete
Scoping the evaluation effort with consultants, designing the project and integrating the assignment into the spring syllabi	Fall 2008	Complete
Implementation in 2 sections of MGT 303	Spring 2009	Complete
Periodic collection of the del.icio.us site during the semester	Spring 2009	Complete
Survey implementation in 2 sections of MGT 303	May 2009	Complete
Data analysis and final presentation of results	May 2009- June 2009	Complete
Public release of code developed for this project (<i>not included in original scope</i>)	August 2009	Complete

In the spring of 2008, I conducted a small pilot study in two sections of MGT303 to assess the feasibility of using social tagging as a research tool in undergraduate classes. I intentionally made the tool optional to see whether students would adopt it without being required to do so. I discovered that without some incentive, there was little adoption with most students not participating. Indeed, some even mentioned that it was hard to find the web pages I was tagging. Students had difficulty in recognizing the value of social tagging let alone learning how to use it.

As a result of this pilot, I decided to make social tagging a class requirement and include it as part of student participation grades for the current project. Due to some unexpected changes (described below), it was only required in one section of MGT450. The instructor in the second section (MGT303) merely offered it as an option (as I had done last spring). It will be interesting to compare these two approaches to see whether requiring use of the tool makes a difference in student adoption rates.

In the fall of 2008, I engaged a consultant (Jesse Kriss) to help us develop a method of automatically tracking student adoption and use patterns. After several weeks of discussion and meetings, we agreed on a method that uses keywords to identify users and then downloads that data automatically. The consultant wrote a Ruby program that parses a delicious.com RSS feed, converts it to a tab-delimited text file, and stores the output. Delicious only returns, at most, 100 items per feed, so each time the program runs, it appends the new data to the old data, removing any duplicates. The program is set up to run from the consultant's web server twice every hour: once for the feed for the tag mgt303, and once for the tag mgt450. The text file output for these two feeds are available at:

<http://jklabs.net/tags/mgt303.txt>
<http://jklabs.net/tags/mgt450.txt>

In August 2009, Jesse Kriss made the code for this project available to other academics and people interested in collecting and analyzing data on their students' use of delicious tagging. A detailed description of his approach is included as Appendix 1. The code he developed for collecting student delicious tags is available at <http://github.com/jkriss/delicious-scraper>.

At the beginning of the spring semester, we conducted an informal paper survey on students in MGT450 and found that few were even familiar with social tagging and none were users of Delicious. This is an interesting finding and suggests that we could do more at the UMASS School of Management to inform our students about the use of emerging Web 2.0 technology like social tagging. At the conclusion of the semester, we conducted a second informal survey with students in one section of MGT450 and MGT303. We found that use of the tool varied dramatically across sections and individual students.

To explore student use patterns, we used Excel to transform the data collected by our consultant into a form that is readable by a widely available social network analysis program. First, we used Excel to import the tab delimited list of student delicious names and tags collected at <http://jklabs.net/tags/mgt303.txt> and <http://jklabs.net/tags/mgt450.txt>.

This data includes the time, day, title, URL, delicious user name and tags for each bookmark containing the tags "mgt303" and "mgt450" respectively. To explore the pattern of student tagging behavior, we extracted the list of usernames and tags for each bookmark and exported them as a plain text file. Using UCINET (Borgatti, Everett & Freeman, 2002), a widely available social network analysis program, we imported these data and visualized them as a group of user tag clouds. Figures 1 and 2 below depict the tag clouds for Mgt450 and Mgt303 respectively. The largest cloud surrounds the instructor (mgtprof) which is perhaps not surprising.

More surprising is the relatively low adoption rate across both sections. While one student in Mgt450 seems to have used the site extensively, most students used it relatively little. The adoption rate was even lower in the Mgt303 section (which is consistent with the fact that use of delicious tagging was not required in this section).

While we have clearly demonstrated the feasibility of using this technology in undergraduate classes (and provide methods for others to do so), we have not yet demonstrated the value of the tool. By using the tool in a larger section which is engaged in team research and perhaps including it as part of other on-line tools (like Web CT), we might be able to encourage more active use. We plan to explore this in future semesters.

delicious as a collaborative research tool. In addition, some students reported that the delicious interface was hard to use and a bit unclear. One student found it hard to register for an account and only signed up half way through the semester. Some of these user interface issues may have contributed to a low adoption rate as well. Finally, since the section did not rely heavily on other online tools (like Web CT), students were not interacting with each other on line in other formats.

Based on our work thus far, we suggest the following modifications to future implementations:

1. Make tagging a required part of class (clearly, not doing so reduces participation rates dramatically)
2. Implement in larger sections that contain other on-line forums for students
3. Focus on use in team-based research projects where students have a natural set of shared topics to explore
4. Perhaps integrate with reading commentary or some other specific assignment in which students have to conduct web-based research

References

Borgatti, S.P., M.G. Everett, and L.C. Freeman. 2002. *UCINET 6 for Windows: Software for Social Network Analysis*. Harvard: Analytic Technologies.

Appendix 1. Delicious tag scraping methods

The Delicious bookmarking service provides a number of data feeds (<http://delicious.com/help/feeds>) in RSS format. RSS, which stands for Really Simple Syndication, is an XML-based format for publishing updates. RSS is most commonly used for blog posts, but it has been adapted to a wide range of uses.

For this study, we were interested in tracking the use of particular tags on Delicious across all users of the site. As an example, a portion of the feed for the tag "mgt404" looks like this:

```
<?xml version="1.0" encoding="UTF-8"?>
<rss version="2.0" xmlns:atom="http://www.w3.org/2005/Atom"
xmlns:content="http://purl.org/rss/1.0/modules/content/"
xmlns:wfw="http://wellformedweb.org/CommentAPI/" xmlns:rdf="http://www.w3.org/1999/02/22-rdf-
syntax-ns#" xmlns:dc="http://purl.org/dc/elements/1.1/" xmlns:cc="http://web.resource.org/cc/">
  <channel>
    <title>Delicious/tag/mgt450</title>
    <link>http://delicious.com/tag/mgt450</link>
    <description>recent bookmarks tagged mgt450</description>
    <atom:link rel="self" type="application/rss+xml"
href="http://feeds.delicious.com/v2/rss/tag/mgt450?count=100"/>
    <item>
      <title>Northern Ireland Office // Key Issues // The Agreement</title>
      <pubDate>Wed, 13 May 2009 07:15:11 +0000</pubDate>
      <guid
isPermaLink="false">http://delicious.com/url/635f8e20ade3c7bf08fa168aac3c0185#alex819</guid>
      <link>http://www.nio.gov.uk/the-agreement</link>
      <dc:creator><![CDATA[alex819]]></dc:creator>
      <comments>http://delicious.com/url/635f8e20ade3c7bf08fa168aac3c0185</comments>

<wfw:commentRss>http://feeds.delicious.com/v2/rss/url/635f8e20ade3c7bf08fa168aac3c0185</wfw:com
mentRss>
      <source url="http://feeds.delicious.com/v2/rss/alex819">alex819's bookmarks</source>
      <category domain="http://delicious.com/alex819">ni</category>
      <category domain="http://delicious.com/alex819">goodfridayagreement</category>
      <category domain="http://delicious.com/alex819">mgt450</category>
    </item>
    <item>
      <title>Negotiations to Set Up Joint Ventures in China</title>
      <pubDate>Wed, 13 May 2009 04:09:36 +0000</pubDate>
      <guid
isPermaLink="false">http://delicious.com/url/72c7b0dd57dcb5aca1a1bd5e43394636#keaichen</guid>
      <link>http://web.ebscohost.com.temp8.cc.umb.edu/ehost/pdf?vid=5&hid=14&sid=ce58e6e3-
689f-4439-88e7-f067b8842b8c%40SRCSM2</link>
      <dc:creator><![CDATA[keaichen]]></dc:creator>
      <comments>http://delicious.com/url/72c7b0dd57dcb5aca1a1bd5e43394636</comments>

<wfw:commentRss>http://feeds.delicious.com/v2/rss/url/72c7b0dd57dcb5aca1a1bd5e43394636</wfw:co
mmentRss>
      <source url="http://feeds.delicious.com/v2/rss/keaichen">keaichen's bookmarks</source>
      <category domain="http://delicious.com/keaichen">mgt450</category>
```

```
</item>  
... </channel> </rss>
```

While machine readable, this is very verbose output. For the purposes of this study, we wanted a much more compact representation of the tagging behavior, ideally in a format that lent itself to easy analysis using standard tools such as Excel.

In addition, the feeds provided by Delicious for all instances of a tag only show the most recent 100 bookmarks. To address both of these shortcomings in the native data format, we wrote a data collection script that could aggregate data over time, and save it in a more compact summary format.

Using the Ruby programming language, we wrote a simple script that downloads the feed for the most recent 100 bookmarks for a specific tag. After downloading the new data, the script merges the new data with any existing data, sorting by date and eliminating any duplicates. This script was then run automatically every hour, capturing the new bookmarks each time.

The code for this project is available at <http://github.com/jkriss/delicious-scraper>