

EMPOWERING BUSINESS STUDENTS

Using Web 2.0 Tools in the Classroom

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Keywords: Learning, Learning Infrastructures, Social Software, Social Construction.

Abstract: This paper discusses the design of a course to empower business students using Web 2.0 technologies. We explore the learning phenomenon as a way to bring forward a process of continuous improvement supported by social software. We develop a framework to assess the infrastructure against expectations of skill proficiency using Web 2.0 tools which must emerge as a result of registering in an introductory business information and communication technologies (ICT) course in a business school of a Canadian university. We use Friedman's (2007) thesis that the "world is flat" to discuss issues of globalization and the role of ICT. Students registered in the course are familiar with some of the tools we introduce and use in the course. The students are members of Facebook or MySpace, regularly check YouTube, and use Wikipedia in their studies. They use these tools to socialize. We broaden the students' horizons and explore the potential business benefits of such tools and empower the students to use Web 2.0 technologies within a business context.

1 INTRODUCTION

New learning infrastructures have emerged with the advent of Internet applications in business and education. As shown in several business curricula, one way to have an impact on students' views of business practices is an introductory business course in which many of the different areas of business are discussed at once. A course of this nature is typically not designed for depth, but for breadth and for a way to make sense of how all these areas fit together. The available infrastructure of an introductory course seemed an excellent opportunity to support these goals for the incoming 'net gens' (Bennett, Maton and Kerwin 2008, Tapscott 1997, Tapscott and Barnard 2005, Tapscott 2008) who have started to arrive on campus.

This paper discusses the design of such a course and the application of Web 2.0 technologies as a learning infrastructure. Such an infrastructure is a primordial component of how the students begin their engagement with their chosen discipline. We use the course to foster learning on becoming professionals in their chosen area, i.e. information systems, accounting, marketing or finance, etc. We also want to empower students to use these tools to develop skill that will help them succeed in a global

economy, that Friedman (2007) calls, "Globalization 3.0" –where individuals globalize due to advances in ICTs.

Empowerment is a discourse that has been used in training and education since the late 80s (Dede 1987) but has evolved into a major topic of interest around possibilities arising with the development of new ICT (Bement 2007, Bennett et al. 2008, Little and Page 2009, McNamara 2009, OECD 2008, Pence 2009, Rivoltella 2008, Rosen and Nelson 2008, Sheehy and Bucknall 2008, St. George 2007, Williams 2007).

The structure of the paper is as follows: In section 2 we briefly discuss the issue of learning infrastructure in the age of Web 2.0. This is followed by section 3 which describes the course in which we introduced Web 2.0 tools as learning infrastructures. In section 4, the course design and expected learning outcomes as well as related tasks/assignments are described. Section 5 concludes with a discussion of the learning outcomes as well as our reflection of the past and speculation on the future. It also identifies some future research endeavors.

2 WEB 2.0 AND LEARNING INFRASTRUCTURES

Since the introduction of the personal computer, there have been many advocates working on using computers to deliver learning materials. There have also been, of course, people who have critically commented on the lack of tangible results associated with the introduction of computers in the classroom. For instance, one article published by Oppenheimer (1997), *“The Computer Delusion,”* sent a strong message regarding the lack of accountability of many projects using computers in classrooms in the US. Also, Katz (1999) argues that today’s colleges and universities are faced with an environment in which information technologies are rapidly becoming the preferred mode of instruction to a point that institutions cannot rely on traditional methods to survive and prosper. Knowledge and learning assisted by an organizational learning infrastructure is not only about technology, it is about culture, policies, processes, procedures, tools, templates, incentives, etc. These infrastructures include courses, communities, assessing the current state of the technology, identifying long-term goals, establishing metrics, prioritizing short-, medium-, and long-term goals, and assessing them regularly.

Web 2.0 technologies allow people to converse, communicate, collaborate and take collective action as never before (Rosen and Nelson 2008, Shirky 2008). O’Reilly (2005) conceptualized the Web 2.0 phenomenon as a reaction to the claims that with the burst of the dot-com bubble, the Web was finished. The term is used to describe how the World Wide Web has changed to a collection of technologies that have encouraged the evolution of communities and services known as social software – Facebook, MySpace, Bebo, LinkedIn; video sharing – YouTube, Metacafe, Revver, Google Video, Yahoo Video; wikis – Wikipedia; blogs – WordPress, TypePad, LiveJournal, Blogger; and productivity software – Zoho, Google Docs, ThinkFree Office, Writeboard (Kroski 2008). MIT’s iCampus project, a recently concluded seven year, \$25 million R&D effort (funded by Microsoft Research) that focused on building technologies that enable more effective learning, is a good example of a Web 2.0 learning infrastructure (Morrison and Long 2009). Users can access the iCampus portal, observe its design, get information about accessing material, and download the open-source courseware. This project is entirely open source, so you can implement material of your own using their architecture. And visitors can try it out; there is material that is publicly accessible.

Anybody can create an account by registering on the welcome screen.

From a learning perspective, the advent of Web 2.0 has enabled students to use the Internet in a completely new, participatory way. They can use it to read about specific topics, but also to write and contribute, as the barriers to content creation have become so low. It is through this participation that students are able to author their own online experience, allowing them to have group conversations as part of their learning experience. Basically the only skill we assume our students have is how to use a Web browser, and this has been met without exception.

From a learning assessment perspective, the use of Web 2.0 tools provides an opportunity for instructors to observe the way students progress along the stages of expertise (Dreyfus and Dreyfus 1986). There is a range of proficiency within student groups. Working together, skills are transferred from the more to the less skilled, facilitating a slow but sure increase in proficiency and movement from novice to advanced beginner and perhaps even along the scale to competent user. By continually working within the Web 2.0 learning infrastructure, individuals will eventually reach the proficient and expert levels, even though such achievement is likely beyond the scope of our course.

From a problem solving and decision making perspective, problem solving using computers has been a predominant paradigm. Many courses are dedicated to teaching skills in particular applications’ features and functions. Yet it is equally important to know *when* to use a tool as it is to know *how* when the time comes to solve specific problems. The framework of problem solving and decision making introduced along the use of spreadsheets in a business context offers the opportunity of presenting both the tool and the type of problems in which they are used. Spreadsheets are widely used in businesses. They are not only powerful calculators, but also powerful tools for the manipulation and analysis of data for decision making. Spreadsheets allow discussions on what-if analysis, financial analyses including rate of return, amortization, and forecasting, and in converting data into information. The goal is that students learn ‘how to map a problem into a two dimensional application using columns and rows.’ They are encouraged to explore new features and functions to solve problems and support decisions. Along the problem solving framework, the importance of recognizing a problem is encouraged as well as the analysis of available data to generate a problem

statement that can then be solved using any of the tools within the application. Students can be exposed to problems having different degrees of structure and levels of complexity. The computer becomes a means to think about problems, solutions and decisions.

It is within this structure that we want to empower our students. Empowerment, according to the Oxford English Dictionary has two meanings. One is to give authority or power, and the second is to give strength and confidence. It is the second interpretation that we reference when discussing the empowerment of our students. After learning how to develop skills using Web 2.0 tools, we expect our students to gain confidence to use them effectively in their careers.

3 AN INTRODUCTORY COURSE ON BUSINESS INFORMATION AND COMMUNICATION TECHNOLOGIES

The course is a first-year core course in a bachelor of commerce program in a Canadian university and is offered in eight sections in a university calendar year. Total annual enrolment is approximately 560 students (70 students per section on average). We designed and introduced the course in fall 2008. The course requires three hours/week of lectures and one hour/week in a computer lab. Labs are run by teaching assistants. Students enrolled in this course are not necessarily novices in the use of Web 2.0 technologies or spreadsheets, but most likely have not used said technologies in a business setting. They have been introduced to spreadsheets during their secondary school years at a very basic level. Those familiar with Web 2.0 tools are not necessarily aware that such tools have things in common or even that they are Web 2.0; students have used these technologies mostly for personal tasks. Many have a presence on Facebook or MySpace, most have watched videos on YouTube, a few of them blog while others have contributed to a wiki and all use e-mail regularly.

Our goal was to use the framework of business problem solving using new computer tools. At the same time, we wanted to bring in aspects of how organizations have changed as a result of advances in information and communication technologies. One thesis we found relevant and accessible to incoming students is Friedman's (2007) *The World is Flat: A brief history of the Twenty-First Century*.

The main theme of the book is that ICT have leveled the playing field of business world-wide, creating a new Globalization 3.0 (driven by individuals and groups) in which our students will have to work once they have earned their bachelor of commerce degree.

We introduce the theme using a video of Friedman addressing MIT students. For this generation of students, the video is very appealing. Once they see it, they are willing to invest the time in reading the book. Students are required to read the first chapter and then, week by week, they are required to read each of the ten flatteners that Friedman (2007) identifies in his book. The ten flatteners are the new age of creativity, the new age of connectivity, work flow software, uploading, outsourcing, offshoring, supply chaining, insourcing, informing and the 'steroids: digital, mobile, personal and virtual.' Along these topics, the impact of ICT in a globalized world is clearly present, and students start to see the importance of these technologies and the need to develop skills using them.

The book is full of examples of companies using Web 2.0 technologies. Those examples are introduced as evidence of how the world of business has been leveled, but at the same time, provide relevance to the tools themselves, their adoption by individuals and organizations and the benefits they present. It is easy to see how those tools can make a difference between succeeding and failing. Students see examples of potential role models that they can emulate.

Friedman (2007) also addresses the issue of empowerment and education directly in chapter 8. He says that wealth in the age of flatness will increasingly gravitate to those countries that: 1) have the infrastructure to connect as efficiently and speedily as possible, 2) the right education programs and knowledge skills to empower more of their people to innovate and do value-added work, and 3) the right governance – the right tax policies, investment and trade laws, support for research, intellectual property laws, and inspirational leadership.

The course is designed in three main modules: Social Software, Microsoft Excel, and Productivity Software. Each module takes about one fourth of the term, while the other fourth is dedicated to the introduction of a framework for problem solving and decision making as well as Friedman's thesis and how they are relevant to the modules. Students then are expected to grasp Globalization 3.0, understand Friedman thesis and develop some skills at different levels, depending on the module in which they are

working. At the same time, there is a “*learning by doing*” component in which they learn to manage their time and the expectations to work on several, sometimes concurrent, tasks.

4 EXPECTED LEARNING OUTCOMES

The course includes several tasks/assignments in which specific learning outcomes are facilitated. These are tailored differently depending on whether the outcome is expected to be achieved individually or as a result of group work.

Assignment 1 and Portfolio: Individual Aspects of Learning

Students have two tasks that they must complete individually based on assigned reading material. Expectations from these tasks are that students become more versed in the language of Friedman’s thesis and Globalization 3.0 and will familiarize themselves with material describing business situations that they read using the problem solving framework. For example, we have used Carr (2008), Renaud, Ramsey and Hair (2008) and Baker (2009) in different semesters. These papers discuss issues regarding society and/or businesses and ICT. Generally, there is a level of criticism that students must consider while looking for ways to describe those issues as problem statements and then to propose alternative solutions. Once completed, they upload their documents to the course’s WebCT site. Similarly for the Portfolio, which is basically a take-home mid-term examination, students were required to discuss their understanding of Friedman’s thesis as presented in his introductory chapter, *While I was Sleeping*, and a second assigned chapter. Students present their reflections on the material guided by specific questions and then write their views on how the text opens possibilities to understand the world of business differently. They have up to six weeks to go through the material at their leisure and submit their document through WebCT. Students are provided with rubrics that guide them in preparing their documents. They know in advance how they will be evaluated and what our minimum expectations are. Portfolios capitalize on students’ natural tendencies to work at their own pace, save work and meet deadlines without the stress associated with examinations (Canada 2002). Portfolios are valued as an assessment tool because they are very useful in observing advancements

allowing some time for feedback that can be used by students to better perform in their courses.

Assignment 2: Collaborative Problem-solving using Web 2.0 Tools

The purpose of this assignment is to provide students with hands-on experience with Web 2.0 collaborative tools and to provide experience in working collaboratively in virtual teams. Web 2.0 technologies have the potential to enable and facilitate collaboration and knowledge sharing within the organization via corporate intranets as well as with customers, partners and suppliers in both internal corporate intranets and on the public Internet. This fact is one we have tried to emphasize in the design of the course and in particular in the design of Assignment 2. Assignment 2 requires students to work in teams of n , where n represents the number of sections of the same course being offered concurrently. At our university, n is either 3 or 4 depending on the semester. Students had four weeks to complete the assignment. Teams were created by randomly choosing one student from each section. Given this is a first year course we were reasonably assured that students within a team had no history together. This was important, as we wanted students to appreciate the challenges of working in an ad-hoc virtual team where team members have no previous knowledge of each other. Students were asked to create introductory YouTube videos of themselves and embed the video in a collaboration space so other team members had access to them. All teams were required to collaborate to create a unified problem statement using a wiki. Each team started with each individual’s problem statement from Assignment 1. By extending work from Assignment 1, and given the reasonably long amount of time to complete the assignment, students were able to appropriately reflect on their work and their interactions and accommodate and assimilate new knowledge into their existing cognitive schemas.

All teams were required to research and collaborate to generate several possible solutions to said problem statement as well as expand on a chosen single solution. All problem statement and solution generation was done inside a wiki. Consistent with constructivist theory, students were left to make their own inferences, findings and conclusions through extensive collaboration. The patterns of interaction and knowledge construction naturally allowed the structure of the wiki to emerge (as opposed to dictating a structure for the wiki). In supporting the single solution, individuals were

required to use external web sources to support their views. Referenced sites were tracked using social bookmarking and each team member was required to tag each bookmark. Furthermore, each team member was required to set up an RSS feed from the team's wiki so that changes in the wiki were automatically pushed to the students' RSS reader environment. A criticism of the "*learning by doing*" approach is that students (as novices) often do not have sufficiently well developed cognitive schemas to assimilate and accommodate newly generated knowledge (Sweller 1998). To alleviate this concern, we ensured that lectures provided a solid grounding in Web 2.0 tools and virtual teams, such that the positive impacts of "*learning by doing*" could be maximized.

Assignment 3: Communicating using Online Office Tools

While Assignment 2 focused on collaboration, Assignment 3 focused on using communication tools to make weekly stock market picks. This was a team-based assignment and students were allowed to pick their own within section team members. The assignment took place throughout the semester and had weekly deliverables. Similar to Assignment 2, the length of the assignment allowed students plenty of time to reflect and incorporate new knowledge into their cognitive schemas. Teams were instructed to research and create a portfolio of stocks traded on the S&P TSX using the Globe and Mail's GLOBEINVESTOR.COM site. Teams were required to participate in regularly scheduled (weekly) strategy meetings regarding the management of the stock portfolio using email, Web CT, Instant Messenger, or face to face. All interaction was required to have an electronic trail. Teams were required to use a shared spreadsheet application from Zoho.com to track their stocks performance throughout the semester. Near the end of semester, teams produced summary statistics and charts of the trajectory of the stock portfolio both by itself and in comparison with the overall performance of the TSX using Zoho spreadsheet and chart applications. Teams were required to present their results to the class using Zoho Show. In addition, individual students were required to write about their experiences with the Internet enabled office tools and make technological recommendations.

Assignment 4: Using Microsoft Excel to solve Business Problems

The fourth assignment was designed to enhance the students' problem solving skills. For this

purpose, the assignment was designed to give the students opportunities to use Microsoft Excel to solve business problems. In assignment 4, students were given four separate mini cases. For each mini case, students were required to identify related business problems, potential solutions to the problems, and implement their solutions using Microsoft Excel. Prior to the due date of the fourth assignment, students were given the opportunity to familiarize themselves with basic Excel operations in the weekly scheduled labs. This included creating and formatting graphs and charts, basic data operations, formatting and presentation, etc. Teaching assistants help the students gain experience through hands-on exercises in a computer lab. In addition to the hands-on labs, instructors taught four modules in class related to problem-solving concepts and methods using Excel. In-class material covered statistical analysis, relational and logical operations, what-if and sensitivity analysis. In-class, hands-on exercises were used through class demonstrations and student engagement (by encouraging all students to bring their laptop computer to the wireless classrooms). The first teaching module was designed to allow students to use formulas, and boolean and logical functions in the context of the human resources function. The second module dealt with a business loan application where students were given the opportunity to learn and apply Excel financial functions. The emphasis was on business decision-making logic and the use of tools to derive the solutions. Modules three and four dealt with business data processing, such as data representation, categorization, reporting, statistics, and sensitivity/what-if analysis. Students receive "evaluation/grading" rubrics at the time the assignments are posted online, so they know exactly what is expected in each component of the Excel exercises. All students are required to submit their assignments online through Web CT before the deadline.

5 CONCLUSION, DISCUSSION AND FUTURE RESEARCH

In this paper we have opened a discussion around whether adopting emerging ICT-based learning infrastructures in university-level business school courses empowers students to acquire the necessary knowledge and skill to survive in a global economy. We have presented an example showing how ICT-

based learning infrastructures can be used to support different components of learning: individually, and as part of teams, and virtual teams. It has been argued that using Web 2.0 tools allows students to use the Web in a participatory way that enhances their learning experience. Furthermore, students developed an understanding of how to use new Web-based business tools in organizations. Focus was on collaborative tools for different types of problem solving so that students could explore potential business benefits.

Individual, team, and virtual team assignments were used to develop necessary skills proficiency. Being able to effectively use Web 2.0 as individuals as well as in a collaborative setting is important for the students to survive in a flat world where globalization and the role of ICT in business are central (Friedman 2007). It is vital therefore that students understand Web 2.0 tools to accomplish business benefits when leaving university and entering the market. We not only let the students know about the tools but ensured that they become a part of the students' everyday toolkit.

"Do we practice what we preach?" Going back to beliefs such as Aristotle's (2004) that we learn by doing, or using empiricism as a learning technique (Bower and Hilgard, 1981; Gardner, 1987), suggests that we need to not only tell students how to use Web 2.0 tools but also use them ourselves. This requires us to continuously re-evaluate our teaching practices, which has some practical implications. For example, when we teach the use of modern ICT in our courses, we should use ICT in them. It is by far the best way to empower students because it directly shows the relevance of learning how to master the tools.

Practicing what we preach is, however, not always an easy task. The analytical way that was introduced by philosophers such as Descartes (1968) and several rationalists (Audi, 2000; Bourke, 1962; Lacey, 1996) have dominated scientific learning and is institutionalized in educational curricula. Changing such institutionalized practices demands a lot from the profession, but it is essential to acknowledge, understand, and incorporate new ICT-based learning infrastructures in courses. Using ICT-based learning infrastructures and showing how they can be beneficial in both education and business is critical to optimally prepare students for survival in the global market. By changing the described course, we have shown how this can be accomplished and what the expected benefits are for our students.

This course change was a complex undertaking. It required a long-term commitment and still

requires a longitudinal study to evaluate the course outcomes. We suggest for future research to follow up on whether skills are better acquired by the students based on the newly adopted ITC-based learning infrastructure. We have received ethical clearance to request student consent to use their portfolios to see how the experience has changed their views of the business world, of globalization, and on the use of computers to solve business problems, pursue opportunities or fulfill directives. We will use a qualitative research technique, Discourse Analysis (Potter 1996, 1997), to analyze them in search for ways to understand how the students are moving along the stages from novice to expertise (Dreyfus and Dreyfus 1986).

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