

# **An Empirical Study of the Factors Affecting Weblog Success in Higher Education**

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## **ABSTRACT**

The use of classroom blogs in higher education serves to engage and motivate students as well as to help them build a professional online profile and connect with fellow classmates. Although many studies have focused on the implementation and benefits of blogging in education, few have investigated best practices in design, which can have a critical impact upon success. In this study, we proposed a success model for classroom blogs considering the impact of system quality, information quality and user aspects to the net benefit, with an emphasis on user experience design. Finally, we evaluated this model by studying a classroom blog used by 146 college students over the course of 3 academic quarters.

**Keywords:** Web-based learning, Educational software, Web design and development, Learner-centered education, User satisfaction, Critical success factors

## **1. INTRODUCTION**

A decade ago, Prensky (2001) pointed out that college students have become “digital natives” who grew up immersed in the uses and etiquette of computers, digital cameras, cell phones, text messaging, video games, Internet surfing, and the like. As laptops and smart phones have become more affordable and powerful since then, students’ acceptance to new information technologies has only accelerated. They are the early adopters of blogs, wikis, social bookmarking, podcasting, and are frequent users of social network and multimedia sharing web sites like MySpace, Facebook, Twitter, and YouTube (Anderson, 2007; Zhang, 2009). With these Web 2.0 services and applications, students are used to finding vast amounts of information quickly. Students are shifting their role from passive listeners and consumers to active learners and contributors. The students’ digital embrace and the blooming of Web 2.0 technology present immense opportunities to educators who are seeking innovative ways to teach. In this study, we are interested in finding out how educators use classroom blogs to engage and motivate these digital-native students, and what makes classroom blogs successful.

## **2. BLOGS IN EDUCATION**

### **2.1 Overview**

The connection between social software and learning can be supported by the application of constructivism and social learning pedagogy in higher education. Constructivism and social learning theories (Bandura, 1976; Bruner, 1974;

Piaget, 1950; Vygotsky, 1978) state that knowledge is constructed based on personal experiences and hypotheses of the environment which are continuously tested by the learners through social interaction; therefore learning is an active, constructive and social process. In the education environment, students construct their knowledge more effectively through their own experiences (personal) and interaction with others (social), such as hands-on experiments, field studies and group projects, as compared to traditional objectivist methods, such as lectures and use of a textbook. Educational blogs support both personal constructivist and social constructivist learning activities. For example, students create and manage their own blog posts, categories, and pages; at the same time, students share their blog posts, make comments, and collaborate.

Recent studies (Richardson, 2010; Tetard, Patokorpi, & Packalen, 2009; Zhang & Olfman, 2010) showed that using social software such as blogs, wikis and podcasts in the classroom enhances student learning. In particular, classroom blogs benefit students’ learning in many dimensions: blogging allows students to not only review and reinforce what they have learned in class, but also apply such knowledge in complex, real-world settings. Furthermore, blogging encourages students to discover new knowledge outside a textbook and lectures, as well as develop strong and independent reading and writing skills. As students blog and share, the classroom environment becomes more fun, relaxed, and interactive; students become active learners who are more motivated and more engaged in learning activities.

Additionally, using a blog to get jobs, make connections and showcase skills is a new and underused strategy (Kim,

2012). For students who lack work experience, this approach may help them obtain their first internship by demonstrating his/her enthusiasm and dedication for a particular subject or industry. Many career connections are made through social contacts within classroom environments. Blogging allows students to share their career ideas, progress, and goals, and seek ideas and advice from each other. Through blogging, students may get to know each other better, and stay in touch via social networks such as LinkedIn or Facebook even after completing the class.

## **2.2 Use Cases of Classroom Blogs**

Educators may use blogs as a replacement for the standard class Web site, where they publish course materials and other online resources. Some use blogs as a substitute for traditional discussion forums, where they communicate with students and discuss course topics. Most often, blogs are used for students to submit assignments as part of the course learning objectives and grade. Bouldin, Holmes and Fortenberry (2006) reported that pharmaceutical students blogged about course concepts and applied them to the environment outside the classroom. The blog-based assignment contributed to student learning and increased the awareness level of the class overall. Downes (2004) described a virtual space at an elementary school, composed of three sets of weblogs: a classroom Web space for announcements and work of common interests; a public, personal communication space for individual student's work and reflection; and a private personal space reserved for students and teacher interaction.

Blogs may also be used in the classroom environment indirectly. Zhang (2009) developed a social ePortfolio system where students tagged and shared their writing assignments as portfolio pages, and then linked them to relevant external blog posts. Thereafter, students invited their classmates' reactions, formed groups, and collaborated on group portfolios. The results showed significant improvement in the students' perceived value in terms of knowledge discovery and creation, learning effects, and social presence, compared to using traditional learning tools like email or Blackboard. In another recent study by Downes (2010), the researcher developed a Connectivism-based course in which students and instructors work with multiple online services and applications including a Moodle learning management system (for discussions and conversations), a course Wiki (for the course outline and resources), and a RSS aggregator called gRSShopper to collect the feeds from the 170 separate blogs and websites created by participants as a newsletter. The distributed course environment suggested pedagogy of participation rather than retention, through a social network built from individual learning perspectives.

## **2.3 Limitation of Previous Studies**

While many researchers have focused on the benefits of classroom blogs, few have studied or discussed the critical success factors for classroom blogs, though some did talk about limitations and weakness in blog design and development. The study of blogging in an upper-level undergraduate course by Ellison and Wu (2008) revealed a need for more guidance regarding the process of reviewing

and critiquing the work of peers and appreciation for the way in which blogging exposed students to more diverse viewpoints from their peers. Chen & Bonk (2008) studied the use of Weblogs in two classes in China and found a number of problems related to technology inadequacies, peer feedback limitations, time constraints, and a lack of familiarity with the task that require additional attention. They suggested that future studies consider addressing "the customization and personalization of Weblogs for educational purposes as well as the development of instructional strategies related to blogging and the design and implementation of an assessment plan for Weblogs" (Chen & Bonk, 2008).

Du & Wagner (2006) studied the success of weblogs in general. Based on an examination of 126 highly successful weblogs tracked over a period of 3 months. They evaluated the relationship between weblog success (in terms of popularity) and technology use. The researchers categorized weblogs in terms of popularity, rank, and growth. Their analysis indicates that technology characteristics affect the presentation and organization of weblog content, as well as the social interaction between bloggers, and in turn, affect weblog success or popularity improvement. However this model is not applicable to classroom blogs due to the special characteristics of classroom blogs. Classroom blogs are usually used by a small, closed group of students who meet in class once or twice every week. Most classroom blogs will not rank very well in search results, but this is not a reflection of classroom efficacy. Therefore popularity rank and growth are not appropriate measurements for success. Other factors aside from technology, such as guidance, training, and users' technology proficiency, which may be important to the success of classroom blogs, are not considered in their model.

## **3. IS SUCCESS MODEL**

Researchers have studied the success of information systems in many ways, such as by measuring the satisfaction of users (Melone 1990), and the perceived usefulness of specific applications (Davis 1989; Moore and Benbasat 1991). DeLone and McLean (1992, 2003) suggested that researchers should treat IS success as a multi-faceted construct, choose several appropriate success constructs and measures based on the research objectives and the organizational context, and consider possible relationships among these dimensions when constructing a research model. DeLone and McLean's renowned IS Success Model (1992, 2003) suggested that System Quality and Information Quality impact Net Benefit of the information system.

### **3.1 System Quality**

"Systems quality" measures technical success while "information quality" measures semantic success. "System quality, in the Internet environment, measures the desired characteristics of an e-commerce system. Usability, Availability, Reliability, Adaptability, and Response Time (e.g., download time) are examples of qualities that are valued by users of an e-commerce system." (DeLone and McLean, 2003). Blogs are by nature Web-based information

systems; hence, the same System Quality characteristics can apply.

### **3.2 Information Quality**

Wixcom and Watson (2001) used Accuracy, Timeliness, Completeness and Consistency to measure the Information Quality for Data Warehouse systems. Jennex and Olfman (2003) suggested using Richness and Linkage for Knowledge Management systems like blogs. Richness refers to the amount of context surrounding captured knowledge/OM (i.e., sufficiency) as well as its accuracy and timeliness. Linkages reflect the knowledge and topic maps and/or listings of expertise available to the organization. In the case of classroom blogs, linkages refer to the information architecture supporting the connections between the blog posts, comments, external sources, and course materials. The linkages can be managed and accessed in multiple ways, including tag cloud, categories, archive (each calendar date is displayed as a hyperlink to all posts made on that day), and authors (i.e., the author name is displayed as a hyperlink to all his/her posts). We further discuss the importance of linkage to classroom blogs in the “Content Requirements” section.

### **3.3 Net Benefit**

Delone and McLean’s IS Success Model (2003) suggested that, “The choice of where the impacts should be measured will depend on the system(s) being evaluated and their purposes.” And they grouped all the impacts into a single impact or benefit category called “Net Benefit” to measure IS success. Based on this suggestion and the nature of classroom blogs as discussed in the “Blogs in Education” section, we measure the Net Benefit of classroom blogs in terms of four factors: 1) Learning, 2) Motivation, 3) Online Portfolio, and 4) Professional Connection. In 1) Learning we examine to what extent a classroom blog supports deep learning and active learning. Deep learning occurs when students review and create deeper understanding on what they have learned in class, and apply such knowledge in complex, real-world settings. Active learning occurs when students feel motivated and engaged in constantly discovering new knowledge, creating new knowledge, sharing their learning experience and academic growth with classmates. In 2) Motivation we study to what extent using a classroom blog inspires and encourages students to learn more. In 3) Online Portfolio, we investigate to what extent a classroom blog supports students to build a professional online portfolio that demonstrate their knowledge, enthusiasm, and dedication for a particular subject or industry. Finally, in 4) Professional Connection, we examine to what extent a classroom blog encourages students to interact with each other, and make professional connections through such intellectual interactions, both present and future.

In light of DeLone & McLean’s IS Success Model (1992, 2003), Wixcom and Watson’s Data Warehouse Success Model (2001), and Jennex and Olfman’s KMS Success Model (2003), we proposed a five-dimensional research model for classroom blog success (Figure 1), including Design and Implementation Factors, User Factors, System Quality, Information Quality, and Net Benefit.

## **4. A CLASSROOM BLOG SUCCESS MODEL**

Based on the proposed research model shown in Figure 1, we hypothesize that:

### **Group 1: Impact on Net Benefit**

H1a: System Quality will positively influence Net Benefit of classroom blogs.

H1b: Information Quality will positively influence Net Benefit of classroom blogs.

### **Group 2: Impact on System Quality**

H2a: Software Platform will positively influence System Quality of classroom blogs.

H2b: User Experience Design will positively influence System Quality of classroom blogs.

H2c: Training and Support will positively influence System Quality of classroom blogs.

H2d: Technology Proficiency of the users will positively influence System Quality of classroom blogs.

### **Group 3: Impact on Information Quality**

H3a: User Experience Design will positively influence Information Quality of the classroom blogs.

H3b: Content Requirements will positively influence Information Quality of the classroom blogs.

H3c: Reading and Writing skills of the users will positively influence Information Quality of the classroom blogs.

In the follow sections we will further explain each construct in our model.

## **4.1 Design and Implementation Factors for Classroom Blogs**

### **4.1.1 Software Platform: 1. Stand-alone blog vs. Blog as an Integrated Tool in Learning Management Systems**

Seeing the potential benefits of communication, knowledge sharing, and collaboration that social media brings to education, recent design and development in commercial (e.g., WebCT, Blackboard) and open source (e.g., Sakai, Moodle) Learning and Course Management Systems added new tools such as discussion forums, blogs, and wikis to support these activities as well. However, access to these tools in these e-learning systems is usually limited to students, instructors, and teaching assistants within one course. A class blog in this study was designed with open registration: as the student makes his/her blog posts public, they can be viewed and commented on by any registered user (e.g., students and instructors from other courses or universities).

### **2. Do-It-Yourself vs. SaaS**

Educators can choose from a variety of open source blog software such as WordPress or other content management software such as Joomla and Drupal that are not only free to download and use, but also easy and fast to implement and customize. Such downloadable software also provides plenty of plugins and widgets (modules) that can help enhance the media richness in blogs, and support specific learning needs.

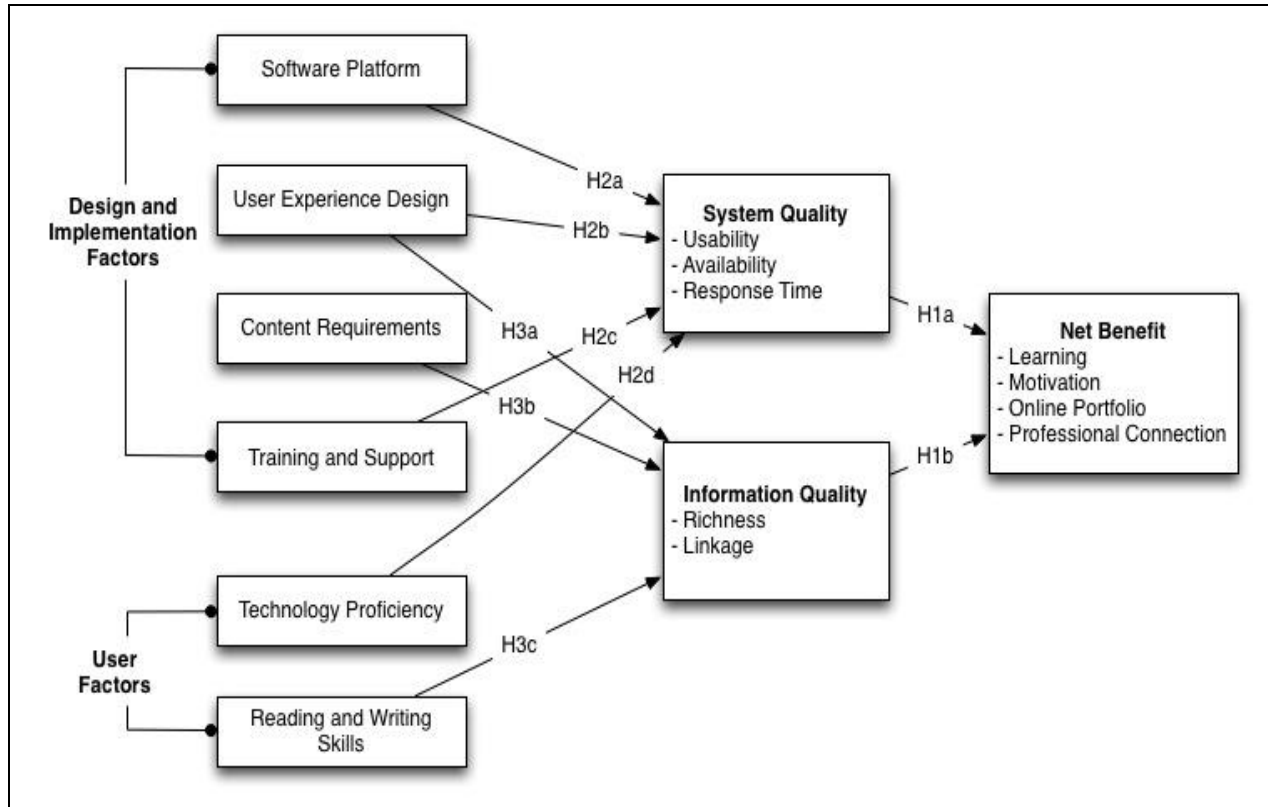


Figure 1. Classroom Blog Success Model

If educators choose to implement blogs on their own, they will need either a web server that is co-located at an Internet Service Provider or a web hosting service provider, and domain name for the blog web site. The benefit of choosing a web hosting service provider is that the web server (e.g., Apache) and database (e.g., MySQL) and programming language (e.g., PHP or Perl) environment is pre-configured and ready to use, they also provide user support, maintenance and backups. In addition, they often provide free one-click blog installation.

Software as a Service (SaaS) is a model of software deployment in which a provider licenses an application to customers for use as a service on demand. SaaS software vendors (such as blogger.com or edublogs.org) host the blog application on their own web servers, back up both data and system configuration, and provide a basic level of user support. These services are often free and can be upgraded for advanced features such as dedicated professional support, massive media space, no advertising on the blogs, premium themes and plugins with a reasonable fee. Such an on-demand SaaS model is best suited for educators who are not very technology savvy, do not have support of their IT department, or simply want to reduce the overhead of creating and managing blogs themselves.

### 3. Networked Individual Student Blogs vs. One Collected Classroom Blog

Dron and Anderson (2007) stated that group blogs function amongst three social views of e-learning: 1) they may support

a *group*, 2) may be *networked* through trackbacks and blogrolls, and 3) may make use of tag clouds to afford a *collective* view. Educators can choose between setting up networked individual student blogs or setting up one collected class blog site. Each approach has its own benefits and limitations. The networked individual blogs approach gives students ownership and democracy. Students can determine and customize their own blog site including theme/skin, plugins, pictures, and pages. Students can use the blog in the future for other courses, educational, or personal purpose. Students can also follow favorite classmates' blog sites. However, because each blog is set up differently, it is difficult for instructors to support, manage, or grade them. In addition, each individual blog has a unique URL, therefore students may have problems finding others' blog sites or sharing their own with others (Ellison and Wu, 2008).

Although compromised on individual customization, the single collected classroom blog approach eliminates several of the problems that are characteristic of the networked individual blogs approach: it is easier for instructors to support and manage a single blog site, and more importantly, it is much easier and intuitive to share information across the class. Every time students go to the classroom blog site to post their own work, they will easily notice updated posts and comments made by others. Students can find related blog posts using a tag cloud, categories, or achieves. Furthermore, the single class blog approach can benefit a larger network of student users than a single class by allowing sharing across different courses or class years. It is also meanwhile possible to see all

blog posts by individual authors, for example in WordPress, by going to /author/{username}, so students still retain the ability to point to their work for that class.

**4.1.2 User Experience Design:** Choosing the right software platform is only the first step. There is still much more design work to do, to get the classroom blog ready to be used by a large number of student users. Many aspects of the user's experience for this system need to be considered, such as creating an intuitive user interface, responsive interaction, and effective information architecture to facilitate student search and browsing behavior. Attention to these details is an example of user-centered design (UCD) practice and is based on the holistic consideration of users' experiences, which is referred to User eXperience (UX) design (Merholz, 2007). Essential elements in UX design are described below in the context of blogs.

#### 1. Visual design

Visual design represents the aesthetics of the front end of any User Interface. The purpose of visual design is to use visual elements like colors, images, typography and symbols following user-centered cognitive approach to create effective visual communication. Many WordPress themes offer professional, visual design at no or low cost, and they are usually highly customizable.

#### 2. Information Architecture

Information Architecture (IA) is the practice of structuring and organizing information in a way that supports usability and findability. Aspects of Information Architecture for blogs are described below:

- **Information:** includes blog posts, comments, images, links, documents, tags, categories, and metadata (e.g., author name, publication date).
- **Structuring and Organization:** The basic building unit in a blog is a single blog post, which is often supplemented by comments, images, tags and categories, and is typically displayed in reverse chronological order with the most recent post at the top of the page. A blog theme is a styled and structured template, normally including a header for the blog title, graphics and possibly navigation links, a content area for posts or page, side bar area for menu, widgets and more navigation links, and a footer for copyright and other useful links.
- **Labeling:** Tags (usually created and used by student authors in a classroom blog) and categories (mostly created by the instructor and used by student authors) are often used to label a blog post, and relate the posts to each other. A tag cloud, a list of linked categories, and an archived calendar are often displayed in the navigation menus to support easy navigation and findability.
- **Finding and Managing:** User's ability to browse and search for the information that they need, findability, is the most critical success factor for Information architecture. Navigation, tag cloud, categories and calendar archive are all tools in blogs to ease the user's burden in finding content.

#### 3. Interaction Design

There are many key factors to understanding Interaction Design and how it can match user expectations and build a enjoyable end user experience. Modern user interface technologies like HTML 5, CSS 3 and JQuery are used to allow more creative expression in design production and to make the user experience richer. Several factors to be considered during interaction design are described below:

- Create intuitive and consistent layout of the interface.
- Provide features and information that are important to the user.
- Define interaction design patterns best suited in the context.
- Design interface behavior (e.g., drag-and-drop, selections, button click, mouse over actions) from a cognitive perspective.

Various WordPress features, plugins and themes can be used to create a great user experience for classroom blogs. We demonstrate the details of UX design for a WordPress classroom blog in "The MIS Class Blog" section.

**4.1.3 Content Requirements:** Students are often allowed to blog just about anything in a classroom blog as long as it is relevant to the course subjects. However, Smith (2004) suggested that reading and writing are closely connected and should be taught together, therefore, "instead of assigning students to go write, we should assign students to go read and then link to what interests them and write about why it does and what it means." Furthermore, Farrell (2003) identifies five major uses for blogs in education. The class blog in this study is used as "4) organization of intensive seminars where students have to provide weekly summaries of the readings"; and "5) requiring students to write their own blog as part of their grade".

Jennex and Olfman (2003) suggested linkage as a measurement for knowledge/information quality in Knowledge Management Systems (KMS), because users always need to retrieve knowledge from its source, and that such needs vary depending on their experience level in the organization. New members often do not have the context of the knowledge, and sometimes the KMS does not store sufficient context. Therefore linkage is critical in helping users to understand and use the stored knowledge. In the case of classroom blogging, students can be seen as new members who join the class without context of the course subject matter initially. The classroom blog thus can be seen as lacking sufficient context, where previous and current students randomly blog about what they have learned. Having students reading and blogging about external sources in course related subjects, such as online articles, journal papers and conference proceedings, can be seen as enabling linkage building, which helps to connect the students to the domain knowledge provided by domain experts.

Based on these past findings, we propose providing structured content requirements to students that specify: 1) qualified external resources, 2) writing expectations, and 3) the connections between the requirements and course assessments (students can earn points towards their course

grade if they follow the requirements). We provide an example of structured content requirements in the “Blog Assignment” section.

**4.1.4 User Training and Support:** Blogs are well known for their user-centered design, which makes it easy to use for even first-time users with minimum instructions or help (Richardson & Swan, 2003). When the blog is built on a well-known open source software platform like WordPress, users can easily find plenty of online discussion forums, blogs, and websites, where they can ask questions or find existing answers to their questions. Students’ technology proficiency may also influence how much training and support are needed, as further discussed in the “Technology Proficiency” section. It may be a good idea for the instructor to survey the students on the first day of class to understand these user factors.

#### **4.2 User Factors for classroom blogs**

**4.2.1 Technology Proficiency:** User’s technology proficiency or technical capabilities refer to the user’s level of technical knowledge and expertise. User’s technical capability has a significant statistical impact on the users’ perception of IS success (Al-adaileh, 2009). In our study, we are interested in whether students’ technology proficiency would impact their perceived system quality, rather than directly impact the net benefit of the classroom blog. For example, a student who had used a blog or similar software before would be able to perform basic tasks such as adding a new post (i.e., usability) with little training or support. The student would also know how long it would take to upload an image of a certain size to the blog site (i.e., response time). A student who did not use a blog or similar software before may find that the system behaves differently than expected, particularly when the student has not been provided with sufficient training or support.

**4.2.2 Reading and Writing Skills:** As discussed in the “Content Requirements” section, reading and writing are closely connected and blogging requires the skills of both (Farrell, 2003; Smith, 2004). Students must carefully evaluate what they read and write, as their words become available to a larger audience, including their peers and everyone on the Internet. From the aspect of language and literacy learning, blogging fosters ownership and creativity; allows students to experiment with language; facilitates expression in a relaxed environment; and provides students with a window into the target culture that their textbooks did not provide (Ducate and Lomickaa, 2008). In our study, we are interested in whether students’ reading and writing skills will influence the quality of their blog posts and comments, as well as their need for structured content requirements.

### **5. RESEARCH DESIGN**

#### **5.1 The Classes**

A total of 146 students from six IS classes participated in this study over the course of three quarters. Students met in class twice per week for one quarter (10 weeks). Through a blend of lectures, demonstrations, and a variety of learning activities, including classroom exercises, assignments, and individual

projects, students studied the various practical and strategic challenges facing the successful design, development, and implementation of information systems and technologies in organizations.

#### **5.2 Blog Assignment**

On the first day of the class, the instructor introduced blogging, demonstrated how to use the classroom blog, and explained the following content requirements and rubrics for the weekly blog assignments:

#### **5.3 Content Requirements**

1. Selection of the article - Each week, students must find an article that is relevant to the course topic(s) from quality sources, including leading academic journals, IT magazines, or online news articles.
2. Summary - Students must then summarize the article in their own words. Direct copying without attribution is considered to be plagiarism, and not allowed.
3. Reflection - As the most important part of the assignment, students must discuss why the article is relevant to the course topic(s), what they learned from the article, any benefits or influence to business and society, and the connection with their previous knowledge or experience.
4. References - At the end of the blog post, students must provide a formatted bibliography and in-text citations for the source of the article selected and other references used in the blog post.
5. Title, Categories, Tags, and Supporting Evidence - Each blog post must be properly titled (must be different from the original article), categorized, and tagged, to make it easy for both human readers and search engines like Google to find the blog post. Supporting evidence such as images, charts, videos and high quality of contents were strongly encouraged.
6. Comments - Each week, students must read at least two classmates’ blog posts, research the topic(s) on their own, and then leave a constructive and helpful comment that either adds new knowledge/information, or asks further question(s).

#### **5.4 Grading**

Students received grades for their blog assignments just as they would other traditional assignments. The instructor explained the following rubrics to the students on the first day of class: The student’s score for each blog assignment was determined by a combination of factors, including the selection of the article (15%), summary (15%), reflection (40%), references (15%), and commenting (15%). In addition, deductions (percentage varied) might be applied in the following: structure (e.g., introduction, body, or conclusion), quality of writing (e.g., flow of logic, spelling and grammar, supporting evidence), submission (making sure that the posts are published, tagged, categorized and enabled for commenting), or presentation.

The instructor regularly (weekly) reviewed the blog posts, posted the grades on Blackboard, as well as their feedback in the format of blog comments. The instructors usually spent 20 to 30 minutes reviewing and grading each blog assignment. With different due dates assigned, the students were also able to regularly present their blog posts to the entire class - usually 2-3 students presented at each class meeting; every student had a chance to present once by the end of the term, given a

class size of 30-50. Students were also graded on quality comments to their classmates' blog posts - each week a student commented on at least two blog posts by different classmates. The same faculty member taught all the courses, and made sure that the blog assignments were carefully integrated into the learning outcomes and course requirements, which helped students to view the blog assignments as an integral part of their course work and commit to quality and the timely completion of work.

### **5.5 MIS Class Blog**

In this study, WordPress was chosen to be the software platform to build the classroom blog (Called "MIS Class Blog"), and GoDaddy.com was chosen to host the web site and the domain name. The decision for the technology and hosting service was made based on three main factors: 1) Technology feasibility: WordPress is the most popular open source blog platform, used by near 20% of Alexa Internet's "top 1 million" websites today (W3Techs, 2013). Often deployed in a LAMP (Linux, Apache, MySQL and PHP) environment, WordPress offers extensive, feature-rich, free or low-cost themes, plug-ins and widgets, and is supported by a wide community of users and developers. GoDaddy.com is among the most popular web hosting companies with affordable prices. It is also the largest ICANN-accredited registrar managing over 40 million domains in 2010. 2) Instructor's skill and experience: The course instructor had experience, skills and knowledge working with both WordPress and GoDaddy.com's web hosting services. 3) Resources: The WordPress software platform is open source therefore cost nothing but the instructor's time to install and customize. The Economy hosting plan at GoDaddy.com offers the LAMP environment, 10GB space, 10 MySQL databases (1GB each) at \$5 per month. These resources were affordable to the instructor even without any institutional support.

Figure 2 shows the classroom blog called "MIS Class Blog". The MIS Class Blog is designed using a WordPress theme called "Edmin" by Themify, offering multiple layout options, threaded comments, social media and Search Engine Optimization (SEO) features. On the home page of the original MIS Class Blog, the posts are displayed in two columns on the right; each displays the post date, title, number of comments, blurb, author's name and categories. The full content of the post as well as its comments can be viewed by clicking the title. The left sidebar consists of 3 sections: 1) Categories, which provides an option to browse posts by topics; 2) Archives, which provides an option to browse posts by date; 3) Tags, which provides the option to browse the most popular topics by the significance of the keywords used to tag the posts (the bigger the font size of the keyword in the cloud, the more posts in that topic). In addition, a search bar is provided on top of the page, allowing users to find posts by keywords. An About page, Login link, and an RSS feed link for the posts and comments are also displayed on the top of the page. The About page contains a brief introduction to the blog site, and all the student authors' names (students have the options of using either their real names or fictitious names to post). Each name links to only posts made by the student, with

a dedicated, user and SEO-friendly URL. The sidebar, search box, About page, Login link and RSS link are also displayed in each individual post page as well.

All posts on the MIS Class Blog are viewable by the public. However, to prevent spamming by machine bots, posting and commenting are restricted to registered users only. The Sabre WordPress plugin is used to validate email address submitted via the registration form and allows the instructor to approve or block registration requests. Student users are granted the "author" role, so they can publish and manage their own blog posts without the blog administrator's (i.e., instructor's) approval, they can also comment on others' blog posts.

## **6. DATA ANALYSIS AND RESULTS**

### **6.1 System Usages and Traffic**

Over the course of three quarters, 146 students from six IS classes contributed 1,375 blog posts, 2,211 comments, 1,506 tags, and 17 categories on the MIS Class Blog. Google Analytics was used to track site traffic for the classroom blog (Figure 3). As the amount of content on the classroom blog kept growing, the site reputation and overall Internet traffic grew consistently over time too. Since the majority of the site visitors are students, low traffic was recorded during the Christmas and New Year break. Over three quarters, there were 12,959 unique visitors, and 49,768 page views, which yielded an average of 2.65 pages per visit. Average visit duration was 3 minutes 39 seconds.

The numbers above include visitors worldwide. To make sure that the statistics more accurately represent the students who participated in the study, a map overlay was used to narrow down the geographic information of the visitors to the local level (Figure 4). The map overlay result showed a lower number of visitors (7,681), a higher average page views per visit (4.44) and a higher average time on site (7 minutes 52 seconds).

### **6.2 Data Collection and Analysis**

Student participants completed a questionnaire at the end of the quarter. The survey contained five-point Likert scale questions and open-ended questions. The questionnaire was adapted from previous studies in IS Success and e-Learning Evaluation (Wixcom and Watson, 2001; Zhang X., 2009). A total of 128 completed survey questionnaires were collected, resulting in a response rate of 87%.

**6.2.1 Reliability:** We tested our measurement model by examining the internal consistency of the constructs under study. Table 1 lists the measures and their internal consistency reliabilities. All reliability measures were above the recommended level of .70, thus indicating adequate internal consistency (Nunnally, 1978).

**6.2.2 Correlation:** We performed correlation analysis on the data set to test our hypotheses. Table 2 shows the correlation and hypothesis testing results.

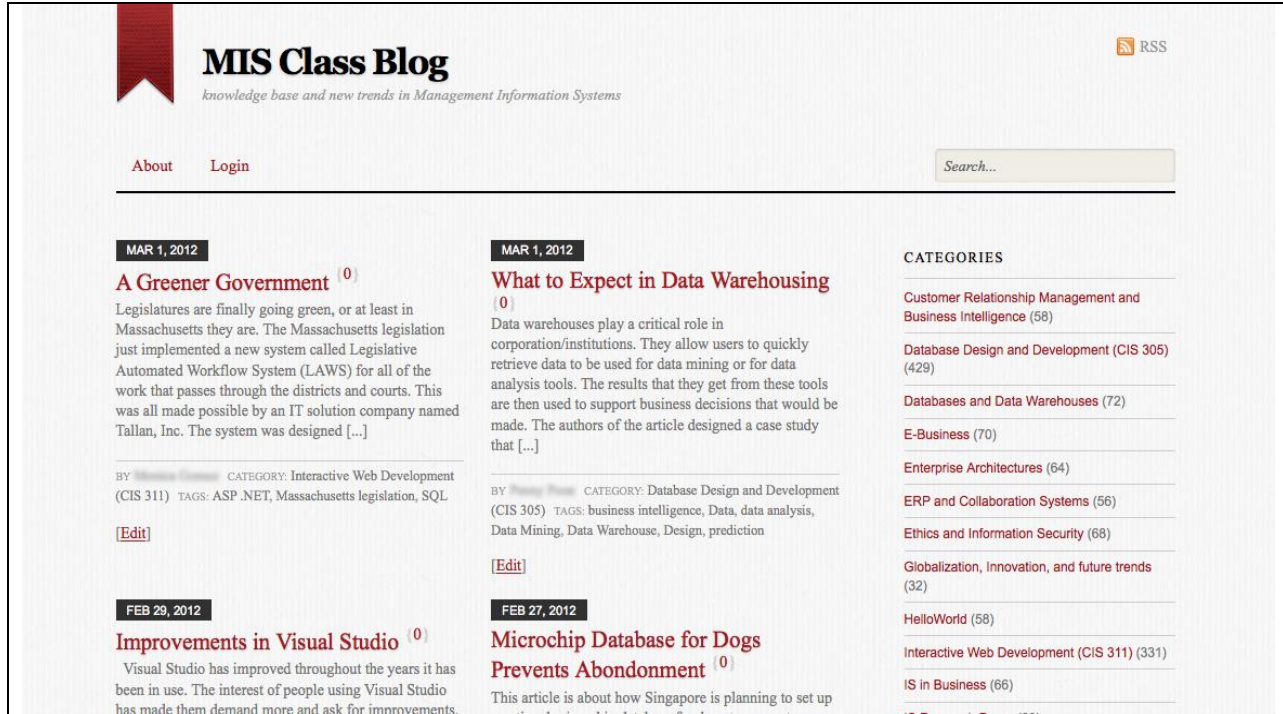


Figure 2. MIS Class Blog

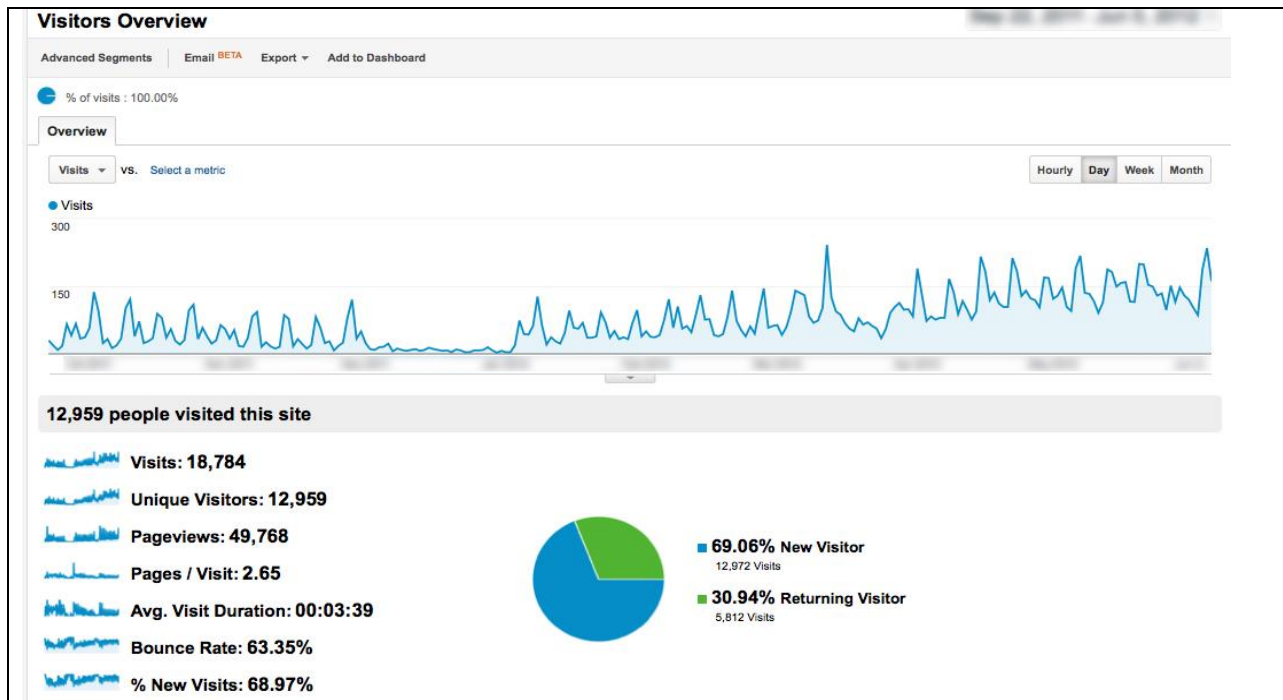


Figure 3. Site Traffic by Google Analytics



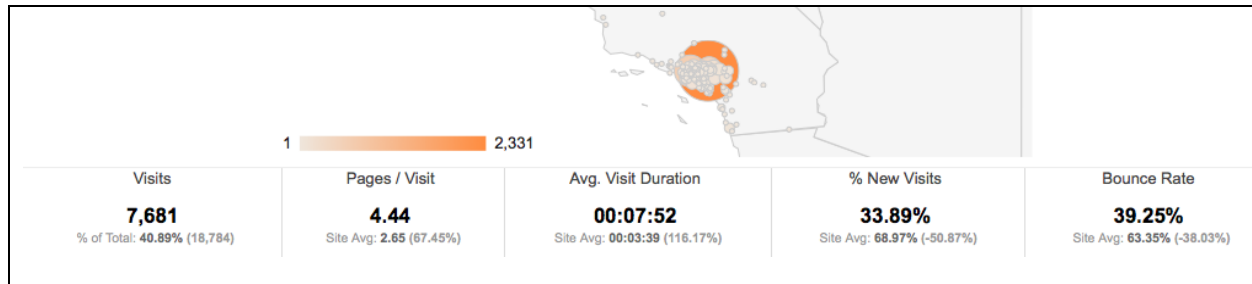


Figure 4. Local Site Traffic by Google Analytics

Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of items
Information Quality (IQ)	0.721	0.722	2
System Quality (SQ)	0.713	0.714	3
Net Benefit (NB)	0.725	0.737	4

Table 1: Reliability of the Constructs

Study Assumptions	Pearson Correlation Coefficient (r)	Verified Result on Hypothesis
<b>Impact on Net Benefit (NB)</b>		
H1a: System Quality (SQ) will positively influence Net Benefit (NB).	0.454**	Yes
H1b: Information Quality (IQ) will positively influence Net Benefit (NB).	0.683**	Yes
<b>Impact on System Quality (SQ)</b>		
H2a: Software Platform (DIF_SP) will positively influence System Quality (SQ).	0.573**	Yes
H2b: User Experience Design (DIF_UXD) will positively influence System Quality (SQ).	0.636**	Yes
H2c: Training and Support (DIF_TS) will positively influence System Quality (SQ).	0.263**	Yes
H2d: Technical Proficiency of the users (UF_TP) will positively influence System Quality (SQ).	0.312**	Yes
<b>Impact on Information Quality (IQ)</b>		
H3a: User Experience Design (DIF_UXD) will positively influence Information Quality (IQ).	0.430**	Yes
H3b: Content Requirements (DIF_CR) will positively influence Information Quality (IQ).	0.747**	Yes
H3c: Reading and Writing skills (UF_RW) of the users will positively influence Information Quality (IQ).	.178*	Partly Yes
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). df=126 (n=128) Critical Value for Pearson's Correlation Coefficient=1.6570 @ 0.05 level, 2.3563 @ 0.01 level.		

Table 2: Pearson Correlation Coefficients for n=128

**6.2.3 Multiple Regression:** Linear regression estimates the coefficients of the linear equation, involving one or more independent variables that best predict the value of the dependent variable. In this study, we used linear regression to predict users' perceived Net Benefit of the classroom blog (dependent variable) from System Quality and Information Quality (predictors). We also attempted to predict System Quality and Information Quality from the design, implementation and user factors stated in the research model. The results are displayed in Table 3.

In predicting Net Benefit from System Quality and Information Quality, the large value (0.732) of R, the multiple correlation coefficient, indicates a strong relationship between the model and the dependent variable. R Square, the coefficient of determination, shows that over 53.5% of the

variance in perceived Net Benefit of the classroom blog can be predicted from the variables System Quality and Information Quality. Furthermore, we observed through analysis of variance (i.e., ANOVA), the difference between the regression sum of squares and the residual sum of squares indicates that about 55% of the variation in perceived value is explained by the model. This result coordinates with the result of the aforementioned R Square. The significance value of the F statistic is much less than 0.05, which indicates that the variation explained by the model is not due to chance, and that the independent variables reliably predict the dependent variable. Finally, the Coefficient table shows that the regression equation can be presented as:

Perceived Net Benefit = 2.626 + 0.412\* System Quality + 0.973\*Information Quality. The regression equation implies

that a change in System Quality of one unit will increase perceived Net Benefit by .412 units, and change in Information Quality of one unit will increase perceived Net Benefit by .973 units. Information Quality has a larger coefficient (0.973) as well as a larger absolute standardized coefficient (0.587) compared to Information Quality (0.412 and 0.327). So we can conclude that in the case of the classroom blog, Information Quality actually contributes more to the model. Both System Quality and Information Quality yield statistically significant test results ( $p < 0.001$ ), indicating that both significantly contribute to the model, which is consistent with Delone and McLean's model.

Similarly, in predicting System Quality and Information Quality from the design, implementation and user factors, large values of R (0.738 and 0.774 respectively) are also observed, which indicates a strong relationship between the model and the dependent variables. More specifically, Software Platform and User Experience Design are strong predictors of System Quality due to the large value of B (0.676 and 1.311 respectively), while Training Support or

Technology Proficiency have a less significant impact on the prediction. On the other hand, Information Quality can be well predicted from User Experience Design and Content Requirements (0.332 and 1.272 respectively) but less significantly from Reading or Writing skills of the users (0.112).

**6.2.4 Descriptive Statistics:** All measurements used 5-Likert scale survey items with the following format: 1=Strongly disagree, 2=Disagree, 3=Neither agree nor disagree, 4=Agree, 5=Strongly agree. Table 4 shows descriptive statistics. The means are noticeably high for User Experience Design (3.86), Content Requirements (3.90), System Availability (4.30) and Response Time (4.15), and Information Richness (4.05) and Linkage (3.85). The high means are consistent with the correlation significance. Most measurements for perceived Net Benefit are also high (Learning 3.83, Motivation 3.97 and Portfolio 3.88), which shows that the students perceived using the classroom blog as beneficial.

Dependent Variable	Predictors	R	R Square	Constant	B	Sig.
Net Benefit		.732	.535	2.626		.000
	System Quality				.412	.000
	Information Quality				.973	.000
System Quality		.738	.545	4.804		.000
	Software Platform				.676	.001
	UX Design				1.311	.000
	Training Support				-.154	.285
	Technology Proficiency				.111	.477
Information Quality		.774	.600	1.247		.000
	UX Design				.332	.003
	Content Requirements				1.272	.000
	Reading Writing				.112	.125

**Table 3: Multiple Regression**

## 7. DISCUSSIONS AND IMPLICATIONS

The results of our study indicate that classroom blogs benefit the learning experience of students and may be further optimized through careful improvement of system design and use of information.

From the design perspective, we found that WordPress is a mature and reliable blog platform, yet flexible and adaptable to meet each classroom's unique needs. Its open source nature, plentiful plugins and themes enable further design on user interface, information architecture, and search engine optimization, and help achieve a great user experience. In our case study, the instructor found WordPress easy to implement, manage and customize, and the students found it easy to use (average 3.77 by 128 students) with minimum training and support. Our survey results showed that choosing WordPress as the blog platform and creating a good user experience design are significant to improving the system quality of the classroom blog, while training and support has low significance.

UX design is also significant to improving the information quality. Information architecture within the scope of UX design may have contributed to the significant correlation

found. Allowing students to tag and categorize their own blog posts and provide the tag cloud, categories, calendar archive and other navigation links on the blog site (e.g. student name linked to their posts, most recent posts/comments, most popular comments) may ease finding of information that is useful to students.

From an implementation perspective, we found that providing content requirements is the most critical success factor. The instructor provided the students with clear and detailed content requirements that specified how to select articles, where some of the popular external resources are, how to construct blog post, comments, and citations. The instructor posted the content requirements on the course web site so students could review them anytime anywhere. Our survey results showed that 80% (103 out of 128 students) agreed or strongly agreed that the content requirements have provided useful guidance.

The majority of student participants in our study were IS majors and had already taken a few prerequisites in computer basics and programming, which helped prepare them with proficient knowledge and skills (average 3.84 by 128 students) to quickly embrace blog technology, with minimum training and instructions. The instructor introduced the blog to the

students at a one-hour workshop on the first day of class. Students mastered the ability to register, edit profile, and add a new “Hello World” post with styled text, photos (some with

videos) and links in class after only 30-minute introduction useful to students.

Measurement	Survey Item	N	Mean	Std. Dev.
<b>Design and Implementation Factors (DIF)</b>				
Software Platform (DIF_SP)	WordPress was a good choice as the software platform for the classroom blog. (Students were introduced to various blog platforms and designs during the workshop on the first day of class.)	128	3.76	.830
User Experience Design (DIF_UXD)	The user experience design (visual, interaction, and information architecture) of the classroom blog is high quality.	128	3.86	.830
Content Requirements (DIF_CR)	The content requirements provided useful guidance.	128	3.90	.802
User Training and Support (DIF_TR)	The training and support provided was sufficient.	128	3.62	1.004
<b>User Factors (UF)</b>				
Technology Proficiency (UF_TP)	I have proficient knowledge and skills in computer technology.	128	3.84	.882
Reading and Writing Skills (UF_RW)	I have proficient reading and writing skills.	128	3.76	1.209
<b>System Quality (SQ)</b>				
Usability	The classroom blog was easy to use.	128	3.77	.874
Availability	The classroom blog was always available.	128	4.30	.779
Response Time	The classroom blog responded to my requests quickly.	128	4.15	.833
<b>Information Quality (IQ)</b>				
Richness	The classroom blog provided rich information.	128	4.05	.881
Linkage	The information in the classroom blog was well connected to course materials and external sources.	128	3.85	.824
<b>Net Benefit (NB)</b>				
Learning	The classroom blog has enhanced my learning significantly.	128	3.83	.744
Motivation	The classroom blog has increased my motivation to learn.	128	3.97	.860
Online Portfolio	The classroom blog has improved my online portfolio.	128	3.88	.763
Professional Connection	The classroom blog has helped me make professional connections with my classmates.	128	3.68	.988

**Table 4 Descriptive Statistics**

Our case study demonstrates a classroom blog implemented in four IS classrooms. The nature of the IS field is multi-disciplinary covering a wide range of topics of how technologies can be applied to benefit business. As the Internet continues to grow exponentially, innovative technologies and modern business strategies are also evolving and becoming available to the public with lightening speed. Setting up classroom blogs to motivate discovering and sharing such knowledge outside textbook and lectures can be tremendously beneficial to learning, as agreed by the students in the study. Even though the subjects in our study (i.e., IS majors) may not represent general college students, our finding still contributes to an understanding of general classroom blog strategies, including providing training and support that suits the technology proficiency of the student users.

Our study used survey questionnaire as the main evaluation method to test the hypothesis and research model. Survey questionnaires provided benefits such as objective and standardized responses that were easy to collect from a large number of students, quantified and analyzed results. However, survey questionnaires also tend to have limitations, such as lack of flexibility to the response format, or personal contact. A questionnaire asking for probing sensitive issues or attitudes such as perceived learning effects or motivations might be more affected than factual information. Therefore we suggest that techniques alternative to survey questionnaires, such as student based testing, focus group interviews, and data analysis of blog posts and comments, grades and instructor feedback, should be considered to further examine the learning and motivation components of the model’s net benefits in future studies. Frequent spaces for comments should also be

considered in future questionnaire design, to help overcome the disadvantage of structured instruments.

## 8. CONCLUSION

Classroom blogs can optimize their benefits if well planned, designed, and implemented. The results of our study suggest that choosing the right software platform, considering system usability, specifying content requirements, and providing adequate training and support are critical success factors to achieve high System Quality and Information Quality, which are significantly correlated to, and can be used to predict the perceived Net Benefit of the classroom blog. In practice, this means that classroom blogs must be user-friendly and contain quality information in order to get students engaged in active learning. Specifically, being user-friendly means being easy to use by an individual student (e.g., logging in and posting content), as well as easy to share among all students (e.g., browsing, searching, and commenting to other's posts). To ensure the quality of information posted on the blog, specific content requirements and reward systems (e.g., grading, feedback, in-class presentation and discussion) must be explained to students on the first day of class and implemented consistently throughout the academic term. When these details in place, a classroom blog can be a valuable pedagogical tool for improving the teacher-student feedback loop that increases learning and overall student satisfaction.

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