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Creating a content management system to support K-12 teachers implementing a web enhanced classroom

Marc Thomas Drescher

CREATING A CONTENT MANAGEMENT SYSTEM TO SUPPORT K-12 TEACHERS IMPLEMENTING A WEB ENHANCED CLASSROOM

A Project

Presented to the

Faculty of

California State University,

San Bernardino

In Partial Fulfillment

of the Requirements for the Degree

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in

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ABSTRACT

Increasing teacher communication outside the classroom will elevate parent involvement, student test scores, attendance, and more consistently completed homework. The way in which teachers communicate with students and their parents has not changed over the past twenty-five years despite drastic changes in newly developed technologies. Many teachers do not possess the skills necessary or do not have access to the resources needed to effectively use technology for communication. This project identifies ways to increase this communication using the World Wide Web and the Software As A Service (SAAS) business model. Using the instructional design process, online communication tools are identified and implemented into a course management system to support K-12 teachers implementing a web-enhanced classroom. Giving teachers the ability to create and maintain an effective web-enhanced classroom has several pragmatic and pedagogical benefits. Web enhanced classrooms extend the realm of possibilities outside the classroom to increase communication and enrich instruction.

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DEDICATION

The completion of this project was made possible by the love, sacrifices, and support made by my family. For this, I dedicate this project to my wife Lauri, son Spencer, and daughter Hannah Mae.

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CHAPTER ONE

BACKGROUND

Introduction

Internet use has quickly become a commonly accepted form of communication. Its use is now embedded into our everyday lives. At work, email is as common as the phone. At home, the internet has become a common way of shopping for goods and services. More and more, people are turning to the internet for banking and bill paying. People are even turning to the internet for entertainment.

From the beginning, education has been an early adopter of internet use and more specifically, the World Wide Web. A vast majority of the initial information on the World Wide Web was provided by educators in the form of research. Schools became quickly wired to receive high-speed connectivity to the internet. Classroom computers, libraries and labs became connected in a relatively short period of time. Students now look first to the World Wide Web when conducting and gathering research. Some teachers are finding innovative ways of incorporating the World Wide Web into the classroom.

One such use is creating a classroom website to enhance a traditional classroom setting. Recognizing the

pragmatic and pedagogical benefits of having a classroom website, early adopters learned to code Hypertext Markup Language (HTML) to format classroom information and instructional materials for the World Wide Web. Once created, these teachers learned to use File Transfer Protocol (FTP) to copy these files onto specialized servers running various web server applications. These servers were typically part of a school districts' instructional technology infrastructure or located at a web hosting company. Since this proved to be a time consuming, and labor intensive process requiring specialized knowledge, widespread use among teachers was not attained.

As the web evolved, commercially available HTML editors simplified the process of creating a classroom website. Using a "What You See Is What You Get" (WYSIWYG) HTML editor eliminated the need to learn specialized syntax. This allowed more teachers to embrace the concept of enhancing their classroom with a website. While HTML editors simplified the process, they still require specialized knowledge of software and web design.

Course Management Systems (CMS) simplify the process of creating a classroom website further and have gained

widespread use at colleges and universities in recent years. A CMS integrates a suite of teaching technologies into a powerful set of tools that make it easy for teachers to use technology in instruction (Morgan, 2003). Using a CMS significantly reduces the time and skill required of traditional methods. A teacher with basic computer and internet browsing skills can post communications and instructional materials using a CMS. This gives students and their parents anytime access to the classroom.

Purpose of the Project

Using instructional design methodology, this project identified the features of an effective classroom website and incorporated them into the design of a CMS for K-12 teachers. The purpose of this CMS is to deliver online information to students and parents while meeting the needs of K-12 teachers.

K-12 teachers lack the application selection of commercially available CMS solutions as no product has reached critical mass in this arena. Available CMS specifically targeted to this market is limited. Today's course management systems were created to provide online classes as their primary use, not to support K-12

classrooms. Because of this, their features, such as synchronous communication, are geared for online classes. Thus, they require the necessary hardware and bandwidth that will allow extensive use from students who will spend most of their classroom time connected to the course management system.

Significance of the Project

The significance of this project is its practical application for K-12 teachers. This project took enterprise level CMS tools used in higher education, features frequently used on instructional websites, and adapted them into an integrated CMS for K-12 teachers. The project further identified and integrated features unique to K-12 classrooms. This project followed an instructional design methodology through several iterations to create a product that may be successfully implemented into a classroom. It is hoped this project will promote the use of classroom websites and find widespread adoption. The learning modules included in this application serve as a starting point for other instructional designers to develop and improve. While the project has ended, the application remains available for individual teachers to use free at http://www.classkey.com.

Limitations

During the development of the project, a number of limitations were noted. These limitations are presented in the following section.

While this project took over three years to complete, there was not ample time to complete a thorough evaluation process. A more extensive confirmative evaluation needs to take place to determine the revision of materials.

The project was developed using Active Server Pages 3.0, a Microsoft scripting language. Since the completion of this project, Microsoft has released ASP.NET. This new generation of ASP is a compiled language that runs on the Microsoft .Net framework. While ASP 3.0, now referred to as Classic ASP, is currently supported, its use is declining and its development has ceased.

Another limitation is the hosting environment of the project. The project is housed on a shared web server with a commercial web host. This limits control over the environment surrounding the project. For example, a major feature of the project is a password protected control panel utilized by teachers to create content. This area of the application uses session variables to control state and worked well on Microsoft 2000 Server running IIS 5.0.

However, when the web host upgraded the server housing the project to Windows 2003 Server running IIS 6.0, session variables now run in an application pool with all other applications running. When the application pool is recycled, current logged in users are kicked out of the application.

Definition of Terms

The following terms are defined as they apply to the project.

Active Server Pages (ASP) - A specification for a dynamically created Web page with a .ASP extension that utilizes ActiveX scripting.

Domain Name Server (DNS) - An Internet service that translates domain names into IP addresses.

Web host - A Web host is in the business of providing server space, Web services and file maintenance for Web sites controlled by individuals or companies that do not have their own Web servers.

Relational Database Management System (RDBMS) - A type of database management system (DBMS) that stores data in the form of related tables.

Hypertext Markup Language (HTML) - The authoring language used to create documents on the World Wide Web.

File Transfer Protocol (FTP) - The protocol for exchanging files over the Internet.

Web Server - A computer that delivers web pages.

Uniform Resource Locator (URL) - The global address of documents and other resources on the World Wide Web.

Stored Procedures - An operation that is stored with the database server.

Structured Query Language (SQL) - A standardized query language for requesting information from a database.

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

The internet is increasingly finding its way into instruction. Schools have a vast array of emerging online services to select from. These online services offer teachers ways of delivering instruction and completing tasks online. A review of Course Management Systems (CMS), expected outcomes, the instructional design process and web design guidelines will be presented.

Online Learning

The idea of using computer-based content to enhance classroom practices evolved with the internet. Today's systems are readily deployable using websites over networks, including the internet, without the need of physically distributing software. The common element of these systems is access to the internet. Using internet access, CMS offer features for instructing online learning.

Internet Access

The growth of the internet has spread into many aspects of our daily routine. It is being used for work,

entertainment and education. Today's CMS rely on the internet as the mode of delivery. If teachers wish to use such a system they must readily have access to the internet to maintain and update their course materials. Students must be able to access the course materials online from school or other areas. In order for parents to participate, they must also have online access from home, work or other areas.

The National Center for Education Statistics started tracking the number of schools connected to the internet in 1994. Their first survey showed less than 35% of schools had access to the internet. By 2000 this number grew to 98% (Cattagni, 2001). This means virtually every public K-12 school now has access to the internet. Another report showed since 2000, 99% of teachers have access to the internet directly from their classroom or a designated area within the school. The report also stated that 77% of the teachers surveyed participated in some form of professional development to use the internet (Smerdon, 2000). It is likely this number is significantly higher today as internet access continues to grow. Having convenient access to the internet is a vital element needed for teachers to use a CMS.

Today's student will grow up using computers and accessing the Internet. In the fall of 2000 the National Center for Education Statistics reported the ratio of students to instructional computers with internet access in public schools was 7 to 1 (Cattagni, 2001). A July 2002 survey by the Pew Internet & American Life Project shows that 78% of children between the ages of 12 and 17 use the internet (Levin, 2002). With the passing of the No Child Left Behind Act (NCLB) and Elementary and Secondary Education Act (ESEA), this number will soon reach 100%. One of the programs within the ESEA, known as Enhancing Education Through Technology (Ed Tech), has the primary goal of improving student academic performance through the use of technology in school and assisting students in becoming technologically literate by the time they finish eighth grade (Loschert, 2003). In addition to school access to the internet, many students have access from home, public libraries, or from relatives.

While there is little research showing the number of parents with school age children that have internet access, a recent study showed two-thirds of the American population is now online (Fallows, 2004). Parents that do not have direct access from home may have access from

friends, relatives, public libraries or work. Although finding research on computer experience among parents of school aged children is difficult, the significant number of online users shows many parents do have the needed access to view classroom websites. Also, students with the necessary skills to access a classroom website could assist their parents.

Course Management Systems

Course management systems (CMS) are useful tools that allow an instructor to make various types of course materials readily accessible to students via the internet using a website as the mode of delivery. They are created to handle the design, delivery and management of classes online (Firdyiwek, 1999). Their primary goal is to make the task of creating a website transparent to the user. CMS tools are typically organized around a class or subject area.

Internet based Course Management Systems began to appear in the mid-nineties. Although the name Course Management System seems to be used most often, a number of names are found in research including:

- Content Learning Management Systems (CLMS)
- Course Management Software Packages (CMSP)

- Instructional Management System (IMS)
- Learning Management Systems (LMS)
- Managed Learning Environment (MLE)
- e-Courseware
- e-Learning

Course Management Systems grew from projects started at Colleges and Universities as a result of the lack of tools available on the market during this time. Murray Goldberg along with his colleagues developed WebCT while instructing at the University of British Columbia. BlackBoard evolved from Cornell University, Prometheus has its roots from George Washington University, and Course Tools has its start from the University of Michigan (Morgan, 2003).

In spite of the dot com bubble and recent consolidations, there are over fifty CMS available (Course-Management Systems, 2005). The Western Cooperative for Educational Telecommunications' EduTools web site provides a listing of the most widely used CMS along with reviews and comparisons. The list includes both commercially available and open source versions. Blackboard is currently the most frequently used CMS in the United States. Blackboard's recent acquisition of

WebCT has given it over 80% market share in higher education (O'Hara, 2005). Several open source projects have emerged as an alternative to the high cost of commercial CMS. Moodle and Sakai are two examples of currently available open source options.

Features

While each CMS differs in design, presentation and the technology used to build, most systems offer similar tools to deliver content from a web site. Their tools allow instructors to organize information, communicate, assess student performance, record grades, and manage course materials. Common features used to deliver content include:

- Announcements
- Assignments
- Course Information
- Course Documents
- Digital Drop Boxes
- Grade Books
- Synchronous Chat
- Asynchronous Discussion Boards
- Security Based Login

- Surveys
- Tests & Quizzes

Most also allow some level of customization to the presentation of the delivered web site. Some CMS also provide Software Development Kits (SDK) that allows programmers to build additional modules allowing for increased functionality. CMS are also beginning to branch out in other areas. Blackboard currently offers solutions for incorporating portal features, electronic portfolios and online fee payments.

Types of Online Learning

Today's use of CMS is primarily in colleges and universities. A 2002 Gartner Research survey reported that 95% of colleges and universities are using content management systems to deliver course materials (Weinstein, 2002). The adoption level of CMS at colleges and universities has grown significantly over the past five years. A 2004 study shows the percentage of classes using CMS has grown from 18% in 2000 to 47% in 2004 (Course-Management Systems, 2005). This increase is due to new found uses of these systems. CMS are being used to deliver purely online courses, hybrid courses and enhancements to traditional courses.

Internet based CMS were initially created to facilitate the teaching of online classes. Online courses require no physical attendance at a campus. They offer the key advantages of convenience and flexibility. The primary use is found most often in higher education and corporate training.

Although online learning has not lived up to early expectations, their popularity and use has grown substantially over the past several years. Early predictions promised a revolution in how teaching is conducted. Zemsky (2004) believes online courses were initially hyped to the point that it created expectations that couldn't be met. Instead of a revolution, online learning is happening more slowly and is evolving over time.

Hybrid or blended models of online learning recently evolved from pure online offerings at colleges and universities. A convergence of the traditional classroom and distance education, hybrid courses provide a mix of classroom and distributed learning environments. Research does not define the exact percentage of traditional classroom versus the online component that makes up a hybrid course. The traditional face-to-face meetings

provide the social aspects and allow instructors to maintain a classroom structure. The online component allows students to access course content based on individual learning objectives.

Colleges and universities are embracing hybrid classes as a way of increasing enrollment and reducing the cost of traditional courses. The University Of Central Florida, for example, has used hybrids to relieve a critical shortage of classroom space (Young, 2002). Increased enrollment is achieved by meeting student demand for flexibility.

This is a natural extension for colleges and universities already utilizing a CMS for online courses. They are also able to utilize their CMS investments by offering hybrid courses in addition to their online courses using a single software package. Since the face-to-face interaction of hybrid courses is present, many of the tools offered by full featured CMS are not needed.

Dr. Klaus Schmidt (2002) defines adding online activities with traditional classroom instruction as a web-enhanced classroom. Adding a web component to a traditional classroom has become the most popular way to

use internet teaching and learning tools since 2001 (Wheeler, 2001).

Web-enhanced classrooms allow efficiency of student administration and an enjoyable, flexible learning environment that embraces the diversity of student learning styles (Khan, 2000). The online component reinforces, enhances and extends the realm of a traditional classroom.

The adoption of web enhanced classrooms has followed the way of online and hybrid courses from colleges and universities as an additional use of their deployed CMS. Abrams (2005) estimates K-12 to be behind the higher education space on the e-learning curve by five to seven years. He also notes the penetration of CMS in K-12 to be between five and ten percent, while higher education has seventy to eighty percent penetration. Most K-12 districts have not invested in CMS because of high costs and the need of permanent development teams to administer the fairly advanced nature of this software and hardware. Typical CMS products that only a few years ago cost a few thousand dollars will cost in the six figures annually for many institutions (Young, 2002). They are designed using robust hardware to allow for extensive use from students

who will spend all of their classroom time connected. In addition, the full featured tools offered in CMS are designed for online courses and may not be the best fit for enhancing a traditional K-12 classroom. Because of the depth of features and the numerous tools available, ongoing training and support are required.

Early technology adopters in K-12 have needed to learn ways of deploying web enhanced classrooms on their own. As technologies such as CMS mature, school districts will need to provide specialized software applications with training, hardware and support. While the software used to publish information on the World Wide Web has become easier to use in recent years, teachers with basic computer skills will require extensive training and ongoing support. Teachers learning and using disparate tools are unable to learn and support each other. In addition, few teachers have advanced knowledge of usability and accessibility standards required to build a web enhanced classroom that is user-friendly and compliant with Section 508 of the American Disabilities Act. The time involved in creating and maintaining such a site is also extensive. Districts need to provide and support web servers where the web-enhanced classrooms will be stored.

Typically, these servers need to be maintained by a systems administrator. Because of the cost, time restraints and training issues, few schools have opted for this solution.

Zemsky (2004) believes one of the impediments keeping online learning from moving into every facet of education is the lack of a standardized format or software tool for creating online course enhancements. CMS have evolved to meet the needs of its earliest adopters, administrators, faculty, and adult learners in higher education. The K-12 environment has a different set of stakeholders made up of principals, teachers, school-aged learners and parents. Currently, no technology has reached critical mass to meet the needs of these stakeholders. Abram (2005) notes the K-12 space includes over 17,000 institutions, and has the potential to be a larger market than higher education.

Expected Outcomes of Web Enhanced Classrooms in K-12 Education

The idea of giving students access to course materials outside the classroom is appealing to many teachers. Teachers are finding many benefits of enhancing their traditional classroom with a web based component. Many teachers are enhancing their classrooms with specific

goals and often find unexpected benefits. While the initial goals and expectations found in research vary greatly, most fall under two categories and are not mutually exclusive (Wingard, 2004). These categories include pragmatic goals and pedagogical goals.

Pragmatic

Many teachers are initially motivated by the potential pragmatic benefits web-enhanced classrooms provide. A well developed web-enhanced classroom allows a teacher to spend more time interacting with students and applying higher level thinking skills rather on administrative activities.

There are many ways teachers can save classroom time by using a web-enhanced classroom. Instead of printing and distributing course handouts, teachers may post this information on their web site. Teachers may update and revise this information in one location quickly and efficiently. Assignments, announcements and readings can also be made available, again saving time from having to distribute. Because this information may be expanded, updated, or corrected quickly and distributed immediately, course information is more current and correct than it would be without the website (Wingard, 2004). When a

student is absent, they may access this information from home. This eliminates or reduces the time needed for teachers to handle these clerical tasks during class time.

Making course materials available forces teachers to keep their instructional materials organized. Wingard (2004) notes teachers report a noticeable improvement in organizing as a result of preparing their course information for the web. Wingard (2004) also reported the process of organizing their materials automatically encouraged reconsideration of course goals, teaching strategies, and outcome expectations and consequently resulted in enhanced early planning. Having the ability to make course information available online may not change the content; it does expand the amount of information available to students. It also expands the type of information teachers may make available. Teachers may increase the amount of information provided to students and give students access to resources that go beyond what may be incorporated into a traditional classroom during school hours. Advanced graphical models, complex color illustrations, computer aided simulations, audio and motion video information may all be intergraded into a web-enhanced classroom.

Students and their parents may be better informed by accessing classroom announcements, assignments and course materials at any time. A web-enhanced classroom also has the potential of increasing teacher communication with students and their parents. Questions and discussions may easily occur utilizing a web-enhanced classroom. Teachers may inform students and parents of the standards being followed in the classroom. Administrators may conveniently access to ensure proper standards are being met.

Pedagogical

In his multi-institutional study, Wingard (2004) found a majority of teachers interested in web-enhanced classrooms for pragmatic reasons, but many reported changing goals over time toward an increase awareness of instructional benefits. As teachers became comfortable using the web to enhance classrooms, they discovered ways of using for instructional purposes. Many of the pragmatic uses of web-enhanced classrooms also emerge as pedagogical benefits.

Saving classroom time from administrative tasks allow teachers to focus more on instruction during classroom hours. The potential for an increase in communication outside the classroom allows for continuous learning.

Making available course information online reduces the need to take extensive notes and allows the students to be engaged in lectures. Teachers may present computer enhanced materials from their website in the form of PowerPoint, graphical models, complex color illustrations, computer aided simulations, audio and motion video to further engage students. Making available additional materials online allows a student to further explore a subject and increases opportunity for understanding. Making course materials available online allows individualized instruction making learning student-centered. Teachers may deliver materials to allow self-paced learning and provide additional practice materials. Students have the opportunity to take more responsibility for learning fundamentals independently online leaving further engagement during classroom lessons.

Wheeler (2001) found students with access to both traditional lectures and an online environment fair better academically than students instructed entirely in the classroom. Web-enhanced classrooms incorporates the best of both worlds; efficiency of student administration and an enjoyable, flexible learning environment that embraces the diversity of student learning styles (Khan, 2000).

Schmidt (2002) notes while the traditional classroom instruction should not be considered in competition to a web-enhanced classroom, learning can take place outside the traditional classroom if students have access to subject matter online and study the material at their own pace.

Instructional Design and Web Design Guidelines

The instructional design (ID) process is a systematic strategy to develop education and training programs using learning and instructional theory (Reiser, 2002). Simplified, the system is made up of interrelated steps using learning theory to accomplish the desired goal of learning. Behaviorist, cognitivist, and more recently, constructivist learning theories are applied in the instructional design process. The components of the system are the learners, the instructor, instructional materials, and the learning environment (Reiser, 2002). Using a systematic approach enables instructional designers to better conceptualize this complex process to ensure the quality of instruction and is commonly used in business, government and education. The establishment of key steps

has led to the creation of several models describing how to utilize the ID process in various situations.

Instructional Design

The key steps comprising the ID process are Analysis, Design, Development, Implementation, and Evaluation (ADDIE). Collectively, these elements form an integrated system. ADDIE is a sequence of iterative instructional design processes, where the results of the formative evaluation of each phase may lead the instructional designer back to any previous phase (Ryder, 2006). The end product of one step is the starting product of the next. It is likely the instructional designer will have to repeat several steps based on the outcomes. Early research shows the designing of instruction following the prescribed steps. Gustafson (2002) notes the ADDIE activities typically are not completed in a linear, step-by-step sequence.

Several models have been created using the ADDIE components to describe how to practice the ID process. While each model is significantly unique, they all share the common systematic approach steps of ADDIE. The following ID models appear often in the reviewed literature:

- Kemp Model
- The Dick & Carey Model
- Gerlach and Ely Design Model
- Hannafin Peck Design Model
- Knirk and Gustafson Design Model
- Jerrold/Kemp Design Model

Reiser & Dempsey classify the use of instructional design models by the type of instruction they are designed to produce. Their categories include instruction that is likely to be delivered in a classroom by an instructor, instructional products such as computer-based modules designed for wide distribution, and large-scale instructional systems such as an entire distance learning course or degree program.

Rapid Prototyping

Technology is expanding the definition of a classroom. The proliferation of computers and the internet in education has created the need for an ID model suited for the creation of electronic, online instruction. Learners now have access to instructional opportunities anytime anywhere allowing instructional designers to develop student-centered, guided learning (Gustafson, 1997). An emerging ID model filling this need is rapid

prototyping design. Gustafson defines rapid prototyping design as a generalizible process now commonly used in the software application development field to create new products and interfaces. Rapid prototyping is a widely accepted process for creating application programs in computer science (Reiser & Dempsey, 2002). Given the similarities between software design and instructional design, rapid prototyping has become an accepted model for creating online instruction. Gustafson & Branch (1997) correctly predicted rapid prototyping to become a widely used instruction model. Today, the use of rapid prototyping is commonly found in research on the creation of online instruction.

Rapid prototyping design uses a process of quickly developing an initial prototype based on an identified goal. The prototype evolves as a series of systematic try and revise cycles are completed until an acceptable version is created. Depending on the situation, this process may continue on after implementation through enhancements and refinements. Rapid prototyping uses the ADDIE components and shares its iterative nature and has several advantages.

Rapid prototyping typically requires less time than

traditional ID models. Less time is spent on goal specifications, detailed analysis and design specifications. Instead, brainstorming, building, testing and revising become the alternatives to traditional ID. In the continuously changing environment of technology, instructional designers must quickly develop and implement instructional materials or run the risk of implementing an obsolete product.

The try and revise nature of rapid prototyping also gives users greater input into the design. While there are many advantages to rapid prototyping, the reviewed literature states it is a development process only to be used in certain circumstances. This model works particularly well in situations where traditional ID may take too long and cost too much (Tripp & Bichelmeyer, 1990).

Web Design Guidelines

Instructional designers commonly use the web for a means of deploying instruction hoping their product will gain widespread adoption and use. While the web offers several opportunities, instructional designers need to follow important criteria to ensure quality instruction takes place. Offutt (2002) lists reliability, usability,

security, availability, scalability, maintainability and time-to-market as the critical factors followed by instructional designers. The reviewed literature focuses on one such factor that must be applied during the development process, usability.

The usability of web based instruction can either facilitate or impede instruction. Before starting your development process, Lopuck (1996) suggests identifying your audience and message, determine the setting, and create an experience. If usability is successfully applied, the technology will be transparent to the user allowing them to focus on instruction. The goal of the instructional designer is to make the technology as transparent as possible. Teachers, students, and other users should not need to constantly be aware of the technology they are using and should not need to spend excessive time learning to use the technology. Cuban (2001) believes for a tool to gain widespread use, it must be simple to use, easy to learn, provide multiple uses, is reliable, and does not require substantial time and energy.

According to Nielsen (2000), the definition of usability is to help humans overcome technology and make

it easy, efficient, and pleasant for them to use. He considers usability as critical to the success of any web site (Nielsen, 2000). Usability expert Dorothy Kushner believes usability is the combination of fitness for purpose, ease of use, and ease of learning that makes a product effective (Fichter, 2001).

Guidelines are being established to help assist the instructional designer with creating web learning experiences. Usability guidelines deal with information, organization, navigation, visual presentation, layout, and overall experience. Ivory and Megraw (2005) created a Conceptual Model of Web Interfaces to break down the various elements that affect its usability. The model presents a hierarchy with text elements, link elements and graphic elements called the element level as the foundation. The formatting of the foundation elements comprises the rest of the element level. Page formatting and page performance make up the page level. The final level, called site level, addresses the overall site performance, consistency, breadth, and depth of pages within sites. Based on this model an instructional designer may apply established usability guidelines to the various elements of a web site.

Element level guidelines suggest using intuitive and familiar elements. Instructional designers should leverage what users already know (Fichter, 2001). When used appropriately, the use of metaphors can be an effective approach. Another approach stresses form following function. Established guidelines for form following function include:

- Less is more: how much functionality do your users really need?
- Consistency: what functions should users always be able to access?
- Real world mapping: can functions work as they do elsewhere?
- Transparency: don't interfere with content
- Anticipation: context-sensitive functions

Jones and Okey (1995) suggest the following strategies to element level usability:

- Navigation: allow for flexible navigation but browsing should not be uncontrolled
- Changes in state: use animation or visual effects as cues to show changes
- Coaching: examples or guided searches provide guidance for using program

- Searchability: keep granularity small to facilitate searching for specific info
- Tool availability: grey out unneeded ones
- Media controls: similar controls for all media

Page level guidelines include readability, layout, style and performance. Nielsen (2000) suggests as a rule of thumb, 80% of a page should be content and 20% left for navigation. Much of the reviewed literature suggests users scan pages quickly looking for words or phrases matching their goals. Nielson (2000) points out that reading from computer screens is about 25% slower than reading from paper. As a result, he suggests keeping your text short. Breaking content into blocks, using headings and bulleted lists are strategies often used. Page layout is another topic found often in the reviewed literature. Research shows users do not like to scroll long pages. Nielson (2000) recommends creating pages less than two screen lengths. Page style should also be considered by the instructional designer. Nielsen (2000) suggests using page color with a high contrast to the text color used. The performance of a page relates to the download time it takes to appear on a users screen. The reviewed research suggests a page should be anywhere from 40kb to 60kb

(Nielson, 2000). This insures a page will load between ten to fifteen seconds on a 56k modem. With large spread use of broadband, it is likely this guideline will increase.

Site level guidelines focus on audience and using continuity to ensure site integration. Instructional designers should implement a site targeted to their lowest end users. This includes taking into account browser versions, browser vendors, connection speeds, monitor size, monitor resolution and system requirements. Pages with a common look and feel provide the user with a consistent experience. Inconsistent design forces user to relearn the interface each time they visit another section of the site. External cascading style sheets should be used to improve site layout consistency (Nielsen, 2000). Common guidelines found in reviewed literature include:

- Visual momentum: maintaining context across several screens helps integration
- Way finding: provide a map of content
- Information access: provides ways to search or index content
- Media bias: text is seen as more credible than video

Many of the guidelines reviewed in the literature are heuristic in nature and are evolving as the web continues to grow.

Summary

Content management systems (CMS) are readily deployable web sites over the internet. Internet connectivity is the key component for access. While internet access has not reached 100% for all stakeholders, critical mass has been reached and users may gain access from secondary sources if needed. CMS provide a suite of teaching technologies to handle the design, delivery and management of online learning. There are dozens of commercial and open source CMS available on the market today. Blackboard is the largest with over 80% market share. Moodle and Sakai are two of the more popular open source projects.

Most CMS offer tools to deploy a pure online course. Common features allow instructors to organize information, communicate, assess student performance, record grades, and manage course materials. CMS tools allow instructors to post announcements, assignments, course documents, grade books, synchronous chat, discussion boards, security

based login, surveys, and tests. Many also allow some level of customization.

Pure online classes, hybrid, and web enhanced classes are the three types of learning deployed by CMS. Purely online classes require no physical attendance at a campus. This type of learning is used primarily at colleges and universities. Hybrid classes evolved from colleges and universities already utilizing a CMS for purely online classes. They provide a mix of classroom and distributed learning environments. Web enhanced classrooms are traditional classrooms with an online component. Currently, this has become the most popular way to use internet teaching and learning tools. Colleges and universities are again leading the way in this learning method. This is in part due to the fact many already have a CMS to utilize. K-12 instructors are beginning to use web enhanced classrooms but do not have the benefit of having a CMS to utilize. In many cases they must find ways of creating web sites to enhance their classrooms. Because of cost and focus on higher education, most K-12 schools are not implementing CMS.

The benefits of implementing a web-enhanced classroom for K-12 teachers fall into two categories; pragmatic and

pedagogical. Saving time, communicating with students and their parents, more efficiently managing course materials and increasing student access to information are the primary benefits of deploying a web-enhanced classroom for pragmatic purposes. Many of the pragmatic reasons for implementing a web-enhanced classroom crossover and become pedagogical benefits. Engaging students to enriched materials, ability to further explore subjects, potential for student-centered instruction, and self-paced individualized instruction a just a few of the outcomes K-12 instructors are finding.

Instructional designers employ an instructional design (ID) process for developing instruction. The components of the ID process include; Analysis, Design, Development, Implementation, and Evaluation. This process is commonly known as ADDIE. This is a systematic approach used by instructional designers to simplify the creation of instruction. Several models have been developed using ADDIE as their core.

Rapid prototyping is one such model based on the ADDIE elements. It is commonly used in software development and is commonly adopted in web development. This model quickly establishes a prototype and has a

series of try and revise cycles. Depending on the situation, this process may continue through the life of the product in the form of enhancements and refinements.

Instructional designers deploying instruction on the web must focus on usability during the development process. Through the evolution of the web several guidelines have been established to help instructional designers build easy to use and intuitive web sites. Usability experts have emerged publishing guidelines to further assist the instructional designers. Many of the guidelines are heuristic in nature, but are becoming generally accepted.

CHAPTER THREE

PROJECT DESIGN PROCESSES

Introduction

A systems approach was used during the project design process. The instructional design methodology rapid prototyping was selected based on its efficiency of the process. Traditional instructional design methodologies focus on the effectiveness of the product but pay a high price on efficiency. Romiszowski (1981) recognizes this inefficiency and pointed out the cost of instructional design must be justified. Rapid prototyping has been used successfully as a design methodology in software engineering over the past several years. Tripp and Bichelmeyer, (1990) believe the similarities between software design and instructional design make this a viable model for computer-based instruction. Rapid prototyping produces a statement of needs and objectives, research and development are then conducted as parallel processes to create prototypes, and are tested (Tripp & Bichelmeyer, 1990). While rapid prototyping differs from traditional instructional design models, aspects of ADDIE may be seen.

Analysis

During this phase of the instructional design process, contexts, and content analysis were conducted.

Context Analysis

The project was made available to K-12 teachers in the United States. During this designers March, 2004 practicum at Yucca Mesa Elementary observations were made. Teachers needed to have basic computer skills and a familiarity with web browsing. A computer with Internet access and a current version of a web browser was needed to use the application. Having internet access from home will afford teachers added flexibility.

Most teachers do not have the technology skills required to create a web-enhanced classroom on their own. Few have advanced knowledge of usability and accessibility standards required to build an effective web-enhanced classroom. Still, others who may have the skills lack access to required software or server space. Often, schools do not offer their teachers access to a web server to store class websites. Schools providing limited web server space and required software often do not have sufficient support to maintain such a service. The time needed to build an effective website from scratch is also

a critical factor that leads to the low number of teachers utilizing the web as a communication and instruction tool.

Parents and students had the ability to access a web-enhanced classroom from any computer with Internet access and a web browser. The information provided on the web enhanced classroom was stored on a hosted server with no impact on districts resources. Students had the opportunity to access from school if availability from home was not available. Parents accessed the information from home, work, relative or public library.

Content Analysis

After an initial review of the common features available on most CMS and research from various teachers' websites, this designer chose to include five modules as a starting point. These modules allowed teachers to readily make available announcements, assignments, book lists, links and syllabus online. Announcements and assignments help teachers communicate upcoming activities and homework. Book lists allow teachers to make available recommended and required readings. Links allow teachers a single point of reference for other online resources. Making available a single instance of a class syllabus

allowed the teacher to easily update any needed changes to a course.

Research findings of the most frequently used CMS tools led to the inclusion of modules for communication, course materials, and lesson plans. A communication module allowed teachers asynchronous messaging with students and their parents. This also allowed students to submit homework electronically. Converting course materials and lesson plans to a web format may be a time consuming task. For this reason, modules allowing for the uploading of documents in their current electronic format were selected. The features serve to meet the pragmatic and pedagogical needs of a K-12 teacher.

Design

Based on the results of the analysis, the design phase focused on information architecture, and site design.

Information Architecture

A user-centered approach was used to design the information architecture of the CMS. An index card was created for each statement of need and sorted based on user. Users were determined to be teacher, student or parent. Student and parents needs were grouped together.

Based on the two groupings, flowcharts were created and content was defined.

Site Design

Several visual organizational principles were used designing the CMS that is the subject of this development which was called ClassKey. The page layout of ClassKey has a consistent look and feel throughout the entire site. A template and cascading style sheet was used to ensure consistency and separates content from design.

ClassKey's site template defined the overall layout and graphical elements. Changes made to the template are reflected throughout the site maintaining this consistency. A common icon set was used to metaphorically represent several of the sites features. The ClassKey logo appears on the top left corner of each page. The header is a graphical representation of an inverted file folder. This is consistent with the theme of the site's content. The footer is a small background gif image that tiles the width of the page. This is used to separate site information such as copyright from the content of the site. The template also defines the height and width of each page (see figure 1). A percent width definition of 100% is used for the header and footer. This will adjust

and fill the user's browser window regardless of the size and resolution of the monitor being used. As Nielson (2000) suggests, the content width of 600 pixels is used. This takes into account a 15 inch monitor and a screen resolution of 640 by 480. These dimensions also consider the amount of space taken up by the browser window. This ensures no page will require horizontal scrolling. The primary colors used in the template were selected to reflect a classroom theme. A white background with black text defines the content area of the site to ensure adequate contrast for readability.

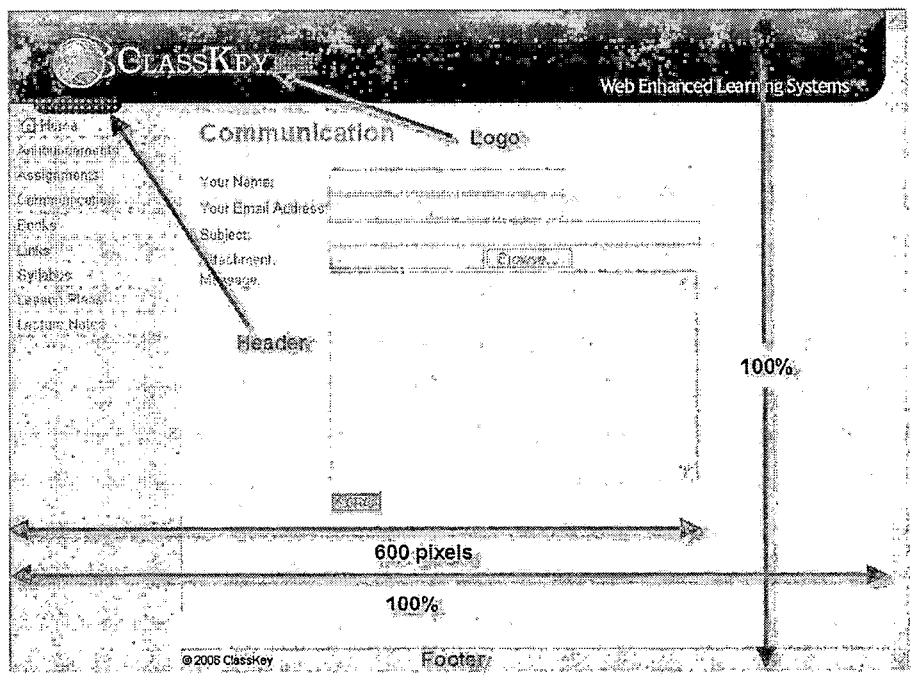


Figure 1. Page Template

An external cascading style sheet (CSS) is used to separate the content elements from the design. Any changes to the cascading style sheet are reflected throughout the site maintaining consistency. The primary font used is Arial. Geneva, Helvetica and Sans-Serif are defined as secondary fonts. These fonts take into account various operating systems that may be accessing the site. Definitions for headings and table cell background are used for contrast between titles and content. This designer intentionally avoided using italicized, underlined and color definitions. Italicized text is difficult to read on monitors. The use of underlining and coloring text generally signifies a hypertext link. This may confuse users when used on normal text. Instead, bold and larger font size definitions are used for contrast between textual elements. Various cell background colors are also defined to allow grouping and the use of proximity of related content.

Site content is presented in a direct and concise manner. Nielsen (2000) points out that reading from a computer screen is 25 percent slower than reading from paper. The screen readability problem is predicted to be

solved in the next five years when monitor resolution reaches 300 dpi.

Content is left aligned. An early practice of web design and often used by new designers is to center the text within your interface. This makes the text difficult to read. Your eye naturally finds a starting point based on the beginning of the previous line. When you center align text, this natural starting point does not exist and your eye has to make adjustments.

ClassKey used several organizational structures to help users navigate the site. The home page uses audience specific navigation to guide targeted users (registered members, potential members, parents and students). A navigation bar is used across the top of the page. This navigation will also appear within the content of the home page (see figure 2). Additional information appears within the content to allow users to identify their associated group.

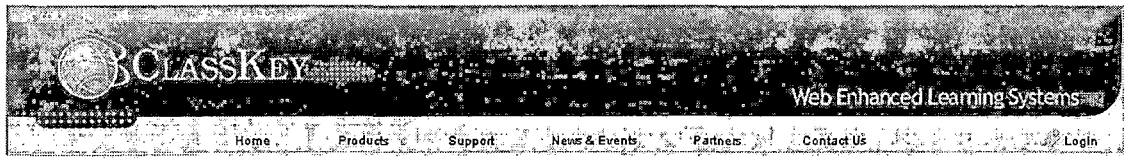


Figure 2. Navigation Menu

Registered members login to the site to create and maintain their web-enhanced classroom. A database organizational structure was used to define the various features of this area of the site. A task oriented navigational structure was used on main page (control panel) to help the user find these features. Navigation to return to the main page is provided.

Potential members are given options to learn more about the site and to register. A topical navigation structure is used on the left side of the page. If a potential member decides to register, a topical navigation menu is used to help guide the user through the process.

Once a parent or student reaches the desired school page, an alphabetical navigation bar listing each teachers name appears on the page. Selecting a teacher's name brings the user to their web-enhanced classroom. The home page of the web enhanced classroom uses topical navigation. Each topic has several elements enabled by the teacher. These elements appear in an alphabetical navigation bar on the left hand side of the page.

Development

The application may be found at Uniform Resource Locator (URL) http://www.classkey.com. It is stored at a

commercial web hosting company. Static HTML pages, dynamic active server pages (ASP) pages, cascading style sheets (CSS), images and files uploaded by users are housed on a Windows 2003 Server running Internet Information Services (IIS) 6.0. Content created using the application, and authentication information is stored on a Microsoft SQL 2000 server using a relational database.

The application uses standard html with Microsoft Active Server Pages (ASP) and JavaScript (JS) as the scripting languages. The application connects to the SQL (Structured Query Language) database using an ODBC (Open Data Base Connectivity) connection. A cascading style sheet (CSS) defines textual elements.

The application was developed using various web developer tools including; Macromedia Dreamweaver, Microsoft SQL Enterprise Manager and Macromedia Fireworks. The Dreamweaver web authoring tool is a widely adopted professional development tool and was used for the creation of all web pages. Microsoft SQL Enterprise Manager was used to create the database and stored procedures. Macromedia Fireworks was used for graphic creation and optimization. Object oriented programming

(OOP) methods were used to ensure modularity and plasticity (Tripp & Bichelmeyer, 1990).

To develop a web-enhanced classroom, teachers login to the home page of ClassKey. Once authenticated, teachers have access to a control panel (see Figure 3) allowing them to set contact information and manage their password. The control panel provides access to technical support via e-mail, reference guides, frequently asked questions and the ability to preview their web enhanced classroom. An interactive demo allows users to quickly learn how to use the application. A link on the control panel provides access to an editor allowing the creation of free flow text for the home page. An optional image of teachers' choice may be added to the home page from the control panel.

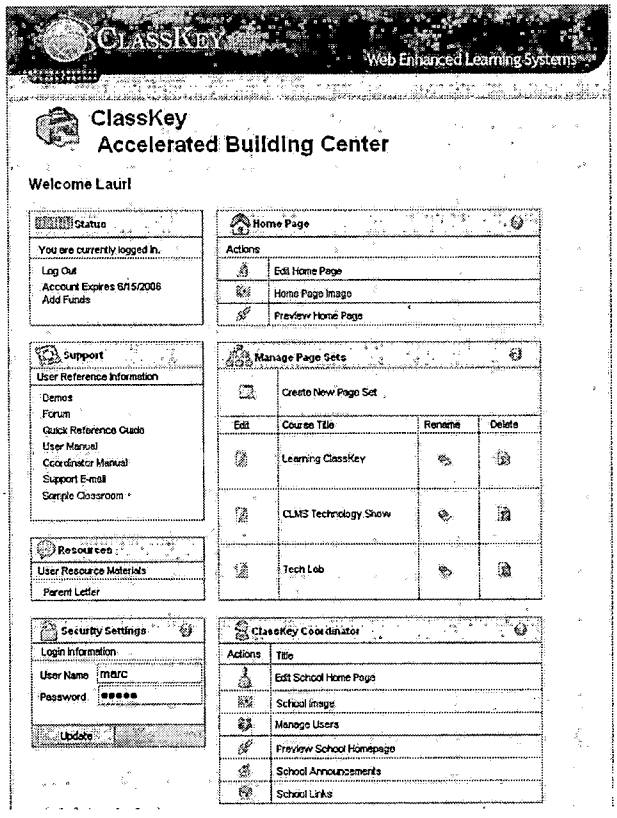


Figure 3. Teacher Control Panel

Teachers have the ability to create unlimited page sets from the control panel. The page set name is uniquely defined by the teacher and may be updated or deleted at any time. Each page set has the option to enable a series of predefined modules based on the teachers needs (see Figure 4).

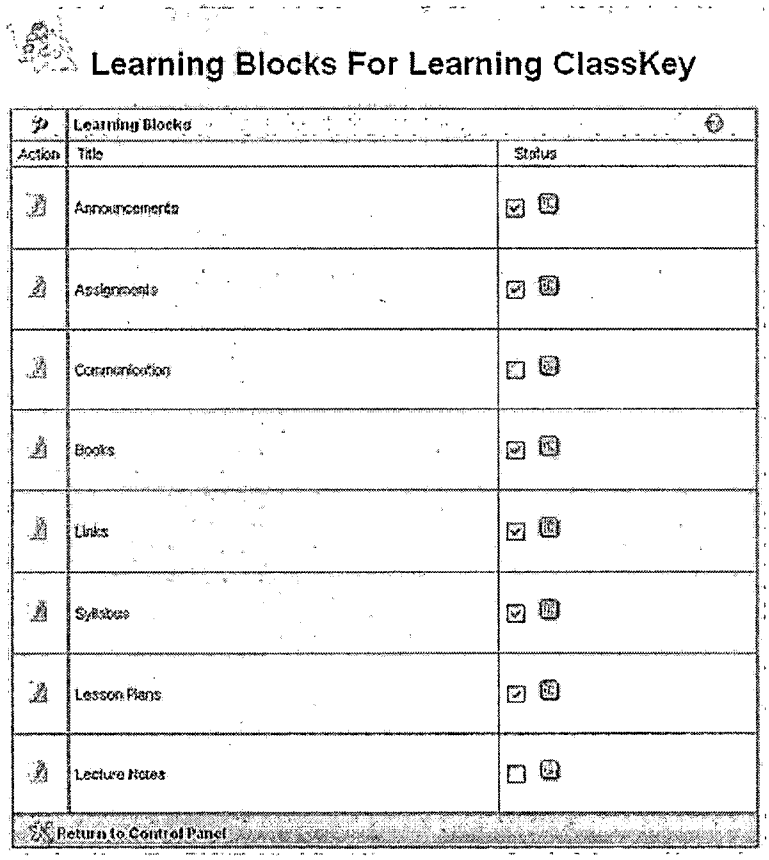


Figure 4. Available Learning Blocks

Modules are available for assignments, announcements, book lists, communication, lesson plans, links and syllabus (see Figure 5).

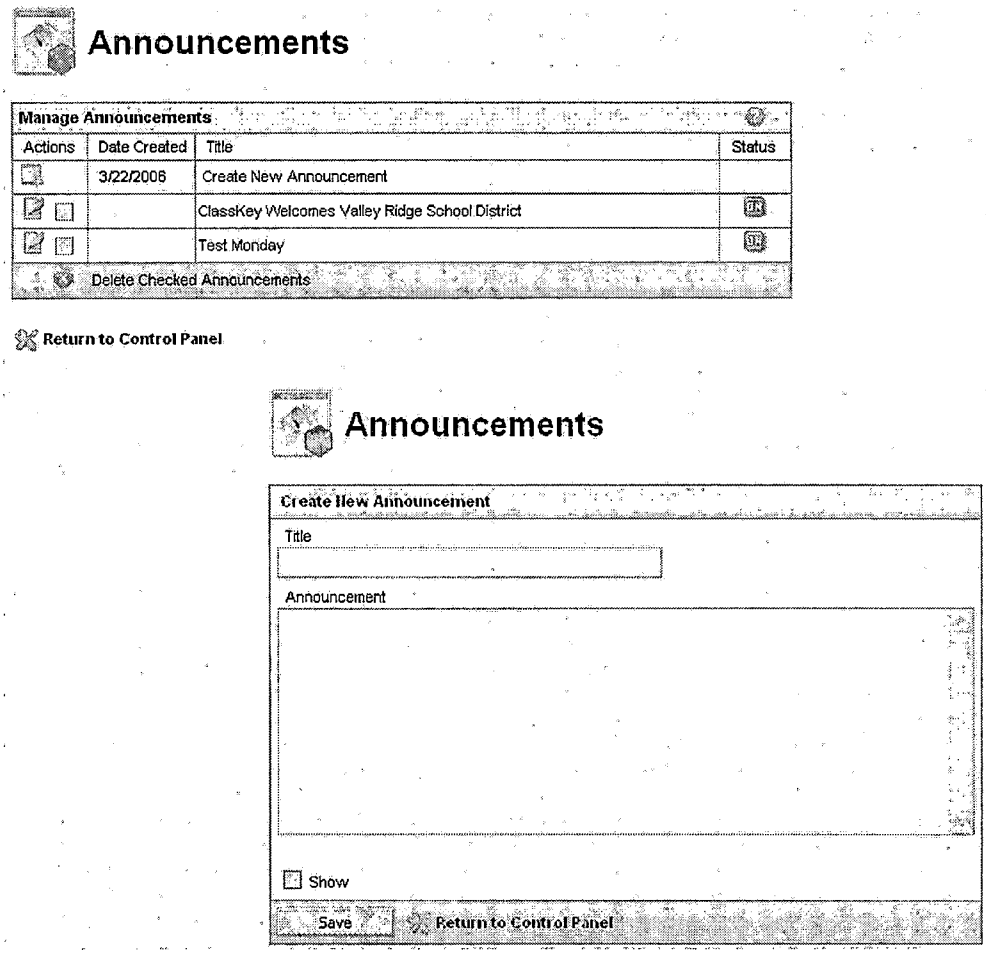


Figure 5. Learning Block Modules

Announcements are created using a form with three fields. The fields define a title, body and a check box to enable the announcement to appear on the web enhanced classroom. An unlimited number of announcements may be created for each page set. Each announcement may be updated or deleted. Announcements appear on the web enhanced classroom in descending order.

Assignments are created using a form with four fields. The fields define a title, due date, body and a check box to enable the assignment to appear on the web enhanced classroom. An unlimited number of announcements may be created for each page set. Each assignment may be updated or deleted. Assignments appear on the web enhanced classroom based on the due date assigned by teacher.

Book lists are created using a form with four fields. The fields define a book title, author, optional body information and a check box to enable the book to appear on the web enhanced classroom. An unlimited number of books may be created for each page set. Each book may be updated or deleted. Books appear on the web enhanced classroom alphabetically by title.

Links are created using a form with four fields. The fields define a link title, web address, optional summary information and a check box to enable the link to appear on the web enhanced classroom. An unlimited number of links may be created for each page set. Each link may be updated or deleted. Links will appear on the web enhanced classroom alphabetically by title.

Teachers may maintain one syllabus per page set. A web based editor allows teachers to create or paste free

flow text to build and manage a syllabus. The editor has familiar tools allowing basic and advanced formatting. The basic formatting tools allow for text styles, alignment, and color. Advanced tools allow for hyperlink creation and the ability to directly edit the HTML created.

Teachers access messages from the communication building block. Teachers may distinguish between read and unread messages. A message may be saved or deleted. Attachments in the form of homework may be accessed from this area of the site. Teachers will have the ability to sort and manage documents submitted.

Students and parents have access to read, download and send information to the teacher from a Uniform Resource Locator (URL) provided by the teacher (see Figure 6).

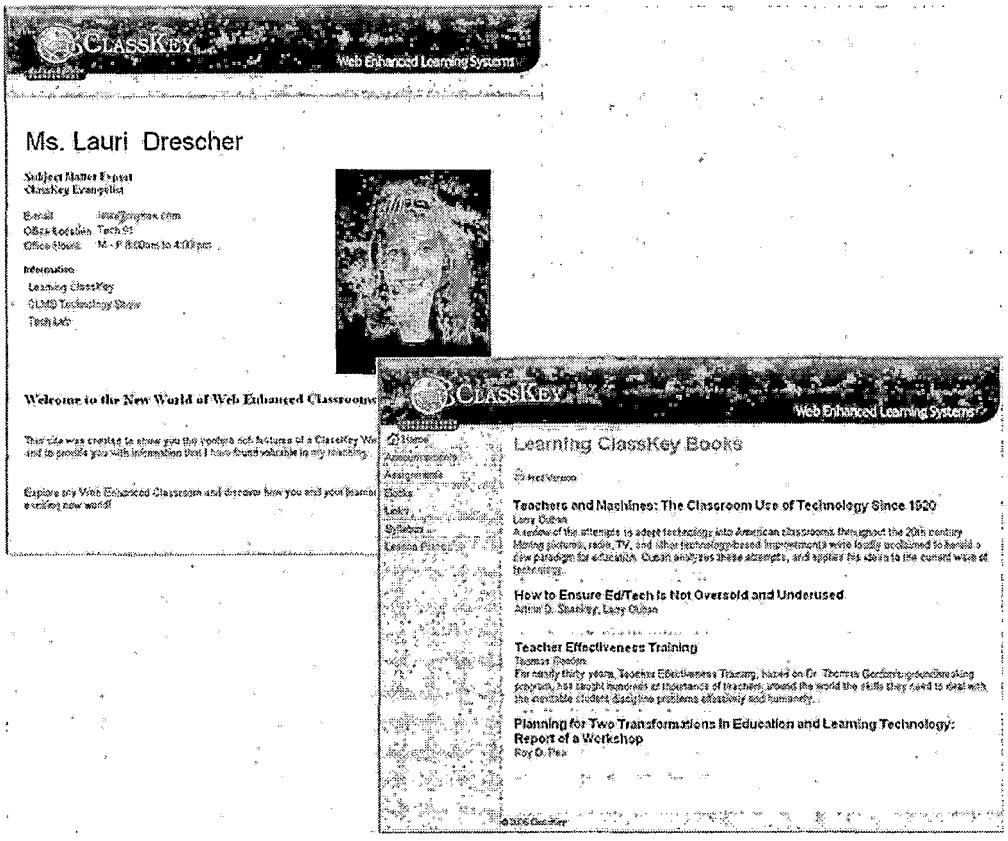


Figure 6. User View of Web-Enhanced Classroom

A global domain name server (DNS) entry provides a unique web address for each school allowing the user direct access. The communication module was created using a form with four fields. The fields define from name, optional return e-mail address, subject and body. Users do not need an e-mail address to send a message. Students and parents are also able to submit documents using the communication module. A browser based upload is used for this feature.

Implementation and Evaluation

Implementation and evaluation have been an ongoing process since March, 2004. The first iteration took place during practicum at Yucca Mesa Elementary. Since then, several iterations have taken place as users submit requests and report bugs.

During practicum, this designer presented the concept of using a web-enhanced classroom to twenty K-8 teachers at Yucca Mesa Elementary. This group represents the target audience that is most likely to use ClassKey web enhanced classrooms. The technology skills of the teachers ranged from beginning to proficient. All of the teachers had computers in their classroom and homes with Internet access. The teachers also had prior experience browsing the internet and using email.

An email message was sent to each of the teachers asking them to register for a web enhanced classroom at http://www.classkey.com/classkey/register_step.asp. Once registered, the teachers were asked to create a web enhanced classroom using the information provided on the website. At the end of the practicum, the teachers were asked to visit

http://www.zoomerang.com/survey.zgi?p=WEB2KXFWTBV7 and complete a formative survey of materials (Appendix A).

The purpose of the evaluation was to survey the usability, content, design and overall usefulness of the CMS. Teachers were given the opportunity to provide additional feedback where appropriate. The evaluation was completely anonymous to help provide unbiased feedback.

The timing of the evaluation occurred at one of the busiest times of the year for teachers and my response was limited to fifty percent. However, the feedback received was beneficial (see Appendix B).

Although limited, the feedback received showed building a ClassKey web-enhanced classroom was simple. All respondents were able to build a site in less than 45 minutes. One area where respondents had difficulty was enabling a module to appear on their site. The submit icon used did not appear to be intuitive. Also, adequate documentation was not available. To aid users, the submit icon was replaced with a green on button and red off button to signify the current state of each module (see Figure 7). A user manual and quick reference guide made available for users to download (see Appendix A).

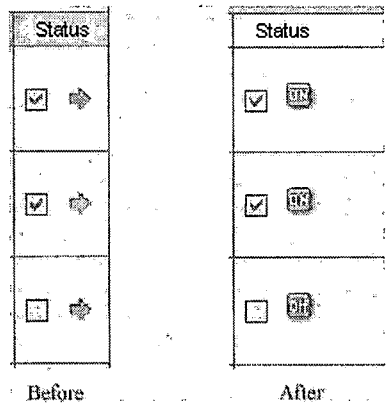


Figure 7. Revised Buttons

The communication feature was found to be the most useful by all respondents. Adding the ability to submit homework was suggested. This was accomplished by adding an attachment feature to the communication module (see Figure 8).

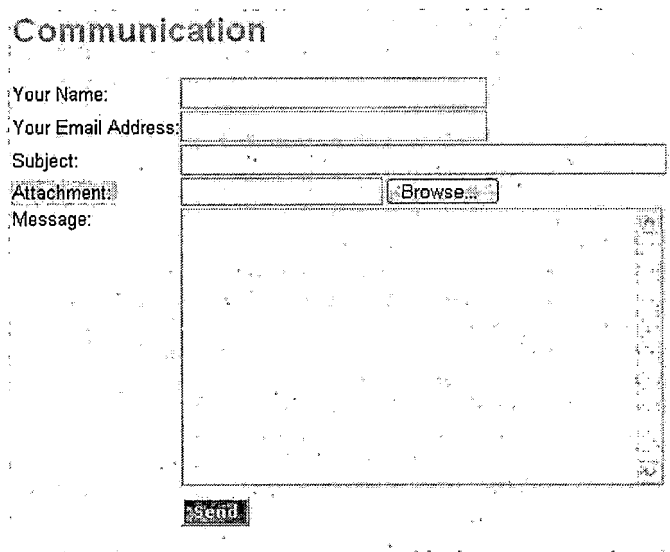


Figure 8. Submit Homework

This gives the single module added functionality and did not add the complexity of building another module.

Adding the ability to post grades was suggested by all respondents. Because of security issues, adding this functionality goes beyond the scope of creating a simple CMS. This would also increase the complexity of using a simple CMS and could reduce its intended use. In addition, many schools have enterprise relationship planning systems to record and store grades. For these schools, this would be an unnecessary redundancy.

Navigation was found to be easy to follow. Respondents particularly found the three step registration form easy to use. One respondent did have difficulty in receiving the confirmation email message that is automatically generated upon completion of the registration form. The respondent did receive the message; however the Internet Service Provider sent the message to their spam folder. Additional documentation may be needed to warn users. This may be a potential problem because of the proliferation of spam and internet service providers' (ISP) continuous attempt to limit unsolicited messages. An alternative way of validating new users registering for the site may be needed.

All respondents felt the overall appearance of ClassKey was professional and its use of a consistent design added to the sites usability. The consistent use of an icon set helped limit the learning curve for each of the sites building blocks. One respondent mentioned that adding additional features was easy after learning how to create the first.

The organization sequence of content was found to help guide respondents through the process of creating a site. Respondents agreed that the information was presented in an orderly flow that enabled them to easily add content. One respondent did have difficulty when using the browsers back button. This is a known issue with online applications that are passing database strings from page to page and there are various solutions that may be implemented. JavaScript could be used to launch the application in a browser widow with the standard toolbar disabled. This will force the user to use navigation provided within the site.

Visiting the completed web-enhanced classrooms found some unexpected uses of the various features of the site. One unexpected outcome came from a user who seemed to have a proficient computer skill level. This user created their

own navigation on the home page using the provided text editor that allowed users to go directly to various features of their site. This user also created links to their district site directly on the home page.

Since this designer's practicum, ClassKey has been made available online to any K-12 teacher in the United States. Presentations have been made during various instructional technology classes at California State University San Bernardino (CSUSB) offering the use of ClassKey. This designer has exhibited the use of ClassKey at the California League of Middle Schools (CLMS) technology conference in Monterey, California and the Computer-Using Educators (CUE) conference in Palm Springs, California. Continuous feedback is collected, recorded, and evaluated using an online tracking database (see Appendix A). Using this type of formative evaluation of materials has resulted in several revisions.

With the completion of a formative evaluation of materials, a summative evaluation of materials to determine the effectiveness is planned for the future. If ClassKey is able to sustain users, a confirmative evaluation may be conducted to determine if materials need to be revised.

CHAPTER FOUR

CONCLUSIONS

Introduction

The success of a Course Management System (CMS) is in its ability to deliver teacher created pragmatic and pedagogical outcomes. The measurement of success is the level of transparency created between the technology and its intended use. Transparency is attained by carefully following an instructional design methodology throughout the live of the project.

This project employed a user-centered approach to drive the design process. Careful analysis, design, development, evaluation and implementation were important factors leading to the goal of the project. Needs were identified, established design guidelines followed, features developed, and each iteration evaluated into the implementation of a current version of the product. Measurements of success were examined to extract conclusions and recommendations.

Conclusions

Creating a usable CMS through the instructional design process was a rewarding experience. Maintaining

objectivity to a project lasting nearly three years proved to be a challenge. An instructional designer must be reminded to focus on the user-centered design process despite the closeness of their creation. If an instructional designer loses site of this focus, the chances of success are diminished.

The evaluation and implementation proved to be a challenge for this designer. Having access to a sufficient user base willing to use the project and provide feedback was difficult. Getting a group of teachers together to witness how they use the project, proved difficult. Fortunately, speaking at various California State University San Bernardino (CSUSB) instructional technology classes, posting on several instructional technology message boards and exhibiting at technology conferences did lead to the recruitment of a small beta testing sample. The feedback received by this small sample group and the research conducted, did lead to several iterations of the prototype. It is the hope of this designer, more teachers will be willing to use the current release of the product and eventually conduct a confirmative evaluation leading to new features.

Recommendations

Rapid prototyping proved to be effective instructional design model in the creation of a web based CMS. Creating a prototype early in the instructional design process is a necessity as web development methods quickly change and evolve. Without the use of this model, it would be possible to have an obsolete product at the end of the process. Having the ability to try and revise is invaluable in the development of web based applications. This is also beneficial for the life of the application. The nature of a web application never being completely finished is conducive to the iterative nature of rapid prototyping. This process may continue throughout the life of the product resulting in several versions.

The importance of effective design is seen when attempting to create a product that's use is transparent to the instruction it is intended to deliver. Thanks to widely available WYSIWYG HTML editors, anyone with moderate computer skills can create a web interface. However, to create an effective web interface, established guidelines must be followed. While many of these guidelines are heuristic in nature, they follow a user-centered approach. Instructional designers must first

identify their audience and then build a web interface based on established guidelines to create the desired user experience.

Summary

In order to attain the goal of creating an effective Course Management System (CMS), an instructional designer must follow an instructional design process. Users and their needs must be identified through careful analysis. The primary intended users of this project are K-12 teachers. Research conducted found CMS are widely used in higher education but have not yet found wide acceptance in K-12 schools. Through analysis, their needs were identified to be both pragmatic and pedagogical. Based on these needs, several features were integrated into the project. Design of the project followed widely accepted guidelines and elements incorporated were user-centered. Several development tools and technologies were utilized in the development of the project. Their selection was based on industry standards and acceptance. Several iterations of the prototype were completed based on user-centered evaluations. These try and revise cycles will continue throughout the life of this project.

APPENDIX A

CD OF PROJECT

APPENDIX B

SURVEY

ClassKey Web Enhanced Classrooms

1

ClassKey worked with no technical issues:

Strongly Disagree	Disagree	No Opinion/ Neutral	Agree	Strongly Agree
1	2	3	4	5

2

Interface is intuitive and simple to use:

Strongly Disagree	Disagree	No Opinion/ Neutral	Agree	Strongly Agree
1	2	3	4	5

3

Application is easy to learn:

Strongly Disagree	Disagree	No Opinion/ Neutral	Agree	Strongly Agree
1	2	3	4	5

4

Graphics help guide user:

Strongly Disagree	Disagree	No Opinion/ Neutra	Agree	Strongly Agree
1	2	3	4	5

5

Easy to enter/exit at any point of program:

Strongly Disagree	Disagree	No Opinion/ Neutral	Agree	Strongly Agree
1	2	3	4	5

6

Offers help functions in appropriate locations:

Strongly Disagree	Disagree	No Opinion/ Neutral	Agree	Strongly Agree
1	2	3	4	5

7

Pages loaded fast:

Strongly Disagree	Disagree	No Opinion/ Neutral	Agree	Strongly Agree
1	2	3	4	5

8

You found the following Learning Blocks useful:

	1 Strongly Disagree	2 Disagree	3 No Opinion/ Neutral	4 Agree	5 Strongly Agree
Assignments	1	2	3	4	5
Announcements	1	2	3	4	5
Communication	1	2	3	4	5
Links	1	2	3	4	5
Syllabus	1	2	3	4	5

9

What additional Learning Blocks should be added?

10

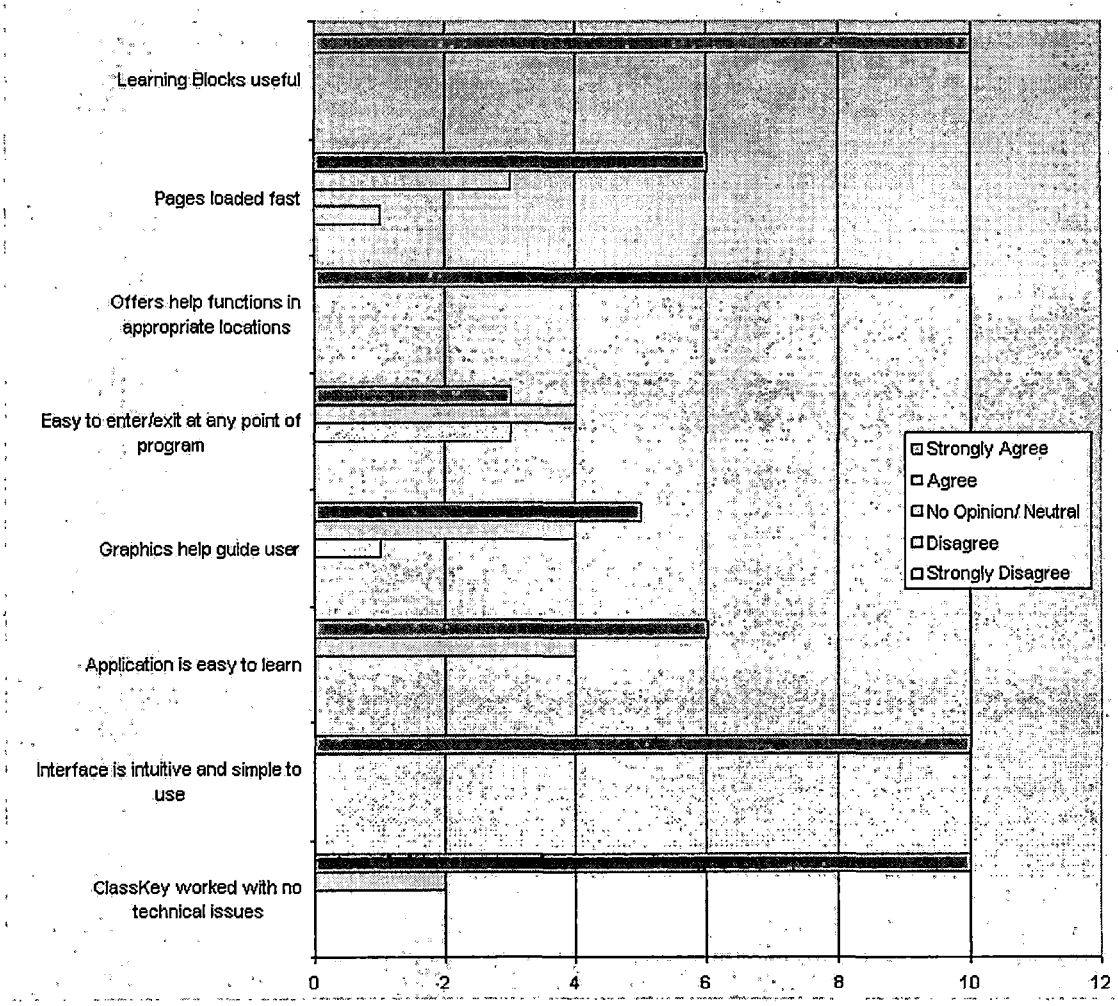
ClassKey is a useful tool that I could utilize in my classroom?

YES NO

APPENDIX C

SURVEY RESULTS

Figure 2: Results of Survey Given To Teachers



APPENDIX D

REFREENCE GUIDE

ClassKey

Web Enhanced Classrooms

Quick Start Building Guide

Getting Started

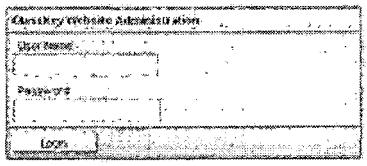
Accessing ClassKey

http://www.classkey.com
http://www.classkey.com/classkey/admin

Admin Login

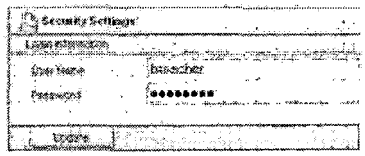
http://classkey.com/classkey/admin/

Login



Updating Login Information

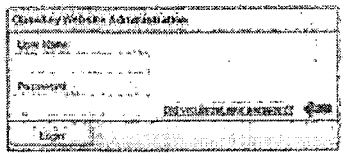
After logging in, scroll down to "Security Settings" from Control Panel. Make changes to login information and select "Update". Your new settings will take effect the next time you login.



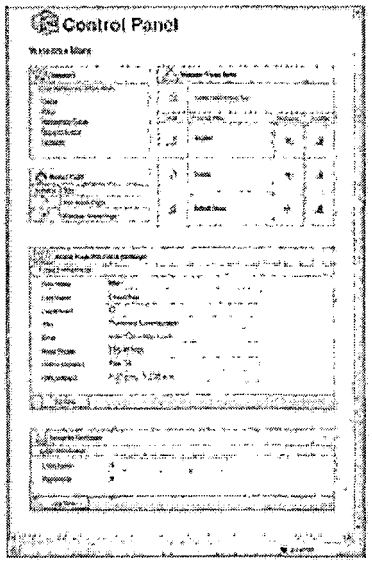
Resetting Login Information

If you forget your login information, visit http://classkey.com/classkey/admin/ and select "Did you forget your password?". New login information will automatically be sent you via email.

Login



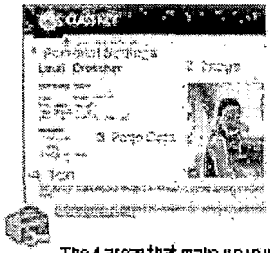
Control Panel



From the Control Panel you can:

- Get support.
- Add content and image to your home page.
- Preview your site.
- Create and manage Page Sets.
- Manage your security settings.

Creating Your Home Page



The 4 areas that make up your home page are created in the Control Panel.

1. Personal Settings The information you enter in the "Home Page Personal Settings" of Control Panel will appear on your home page.

2. Image You may upload one image of your choice to the home page.

3. Page Sets Each Page Set you create will appear as a link on the home page.

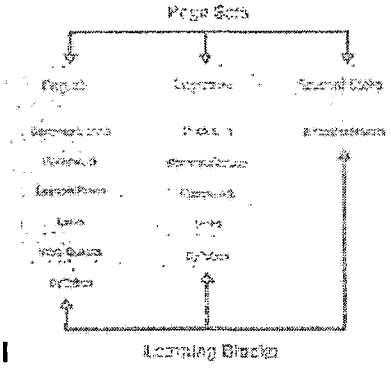
4. Text Using the homepage text editor, you can enter free flow text on your home page.

*You can preview your site at any time by selecting the "Preview Home Page" link on Control Panel.

Creating Content

Page Sets

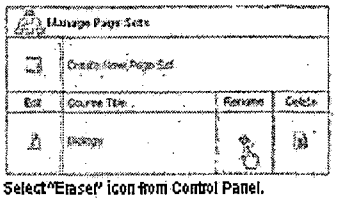
- A Page Set is made up of a series of Learning Blocks (announcements, homework, webquests, etc.) that you enable.
- The name of each Page Set is defined by you and can be changed or deleted at any time.
- You may create as many Page Sets as you need.
- Each Page Set you create will appear as a link on your home page and will direct students/parents to the Learning Blocks that you enable.



Creating a Page Set

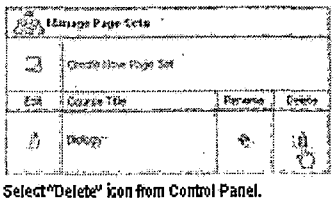
Select "Create New Page Set" from Control Panel.
Give your new Page Set a name and select "Save".

Editing Page Set Name



Select "Eraser" icon from Control Panel.
Edit the Page Set name and select "Update".

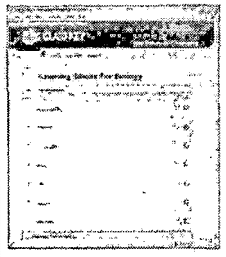
Deleting a Page Set



Select "Delete" icon from Control Panel.

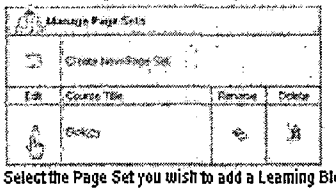
* Warning: Learning Blocks associated with the selected Page Set will also be deleted.

Learning Blocks



- Learning Blocks are associated with a Page Set that you create.
- Students/ parents will only have access to the Learning Blocks you enable.
- You have the ability to enable/ disable an entire Learning Block or individual parts.

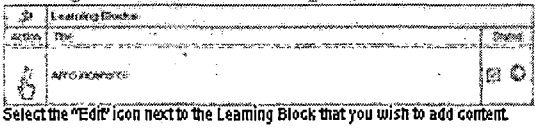
Enabling a Learning Block



Select the Page Set you wish to add a Learning Block.

Chose the Learning Block you wish to enable by selecting the check box and clicking the arrow. Once enabled, students/ parents have access to view.

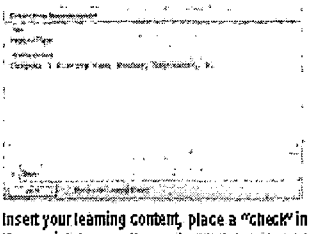
Adding Content to Learning Blocks



Select the "Edit" icon next to the Learning Block that you wish to add content.

From the Manage Learning Block Center, select "Create New".

*Note: From the Manage Learning Block Center, you can view the publish status or delete any unneeded content.



Insert your learning content, place a "check" in the "Show" field and "Save".
If you wish to save the content but do not want students/ parents to view, leave the "Show" check box blank.

APPENDIX E

FEEDBACK DATABASE

issue_id	issue_name	issue_desc	date_submitted	date_resolved	date_modified
78	Change redirect on classnew.asp		7/29/2004		7/29/2004
79	change back link on thankyouhomepage.asp		7/29/2004	7/29/2004	7/29/2004
80	Add "Are you sure" to delete on instructor.asp		7/29/2004	7/29/2004	7/29/2004
81	Build new template		7/29/2004	7/29/2004	7/29/2004
82	Reference Guide		7/29/2004	7/29/2004	7/29/2004
83	Reference Manual		7/29/2004	7/29/2004	7/29/2004
84	Terms of Service Agreement		7/29/2004	7/29/2004	7/29/2004
85	StyleSheet	Need new style sheet. Add mouse over effect for side navigation.	7/29/2004	7/29/2004	7/29/2004
86	Homepage	Create content for home page. Still need to figure out proper navigation and page content.	7/29/2004	9/19/2004	9/19/2004
87	Add log out feature.		7/29/2004	7/29/2004	7/29/2004
88	Encrypt where needed.	May want to wait until app is complete.	7/29/2004		10/10/2004
89	Payment Page.	Integrate into PayPal or other payment system.	7/29/2004		10/10/2004
90	Coordinator ability to add users and modify school home page.	Nee ability to upload image. Need to layout the School Page.	7/29/2004	8/15/2004	8/15/2004
91	Integrate Forum	Need to fix some images.	7/29/2004	10/3/2004	10/3/2004
92	Teacher image upload in control page.		7/29/2004	7/29/2004	7/29/2004
93	Text Editor on Syllabus Page.		7/29/2004	9/19/2004	9/19/2004
94	Text Editor on Homepage		7/29/2004		7/29/2004
95	Add New Learning Blocks.	Figure out how to use. Add two new Learning Blocks. 1. WebQuest: Needs Pages For: Title Introduction Task Process Resources Evaluation Conclusion 2. My Portfolio: Needs Pages for: Intorduction Resume Teaching Philosphy Lesson Plans Student Assessment Comments	7/29/2004	10/10/2004	10/10/2004
96	HomeworkDrop Box	Add ability for students to submit documents.	7/29/2004	9/29/2004	9/29/2004
97	Add Did you forget your password feature? to login page.		7/29/2004	7/29/2004	7/29/2004
98	Add Remember Me feature to login.		7/29/2004	7/29/2004	7/29/2004
99	Thankyou log out page w/links.		7/29/2004	9/19/2004	9/19/2004

issue_id	issue_name	issue_desc	date_submitted	date_resolved	date_modified
100	School Home Page Story Board	I was thinking about having the home page of the school look similar to http://www.classkey.com/classkey/storyboard.pdf Do you think I should create tables just for school announcements, about us and links? Or should I tie them into the tables already created for teachers? I am thinking new tables then could always add new features for school home page latter on. What do you think? Also the school pics. Should they be mixed in with teacher pics or separate?	8/8/2004	9/19/2004	9/19/2004
101	Secured Pages	Make sure each admin page is password protected.	8/8/2004	3/27/2005	3/27/2005
102	Create Admin Manual	Need to decide to make new manual or add to end of usermanual.	8/8/2004	9/19/2004	9/19/2004
103	Manual PDF	Make PDF of user manual with links from toc and link from support box in admin area.	8/8/2004	3/27/2005	3/27/2005
104	Make First and Last Name Required on Hompage Edit		8/8/2004	3/27/2005	3/27/2005
105	Fix "Back" on thankyouhomepage.asp	Link takes you back to control panel. Should take you back to previous page.	8/8/2004	9/19/2004	9/19/2004
106	Thank you home pages	need thank you home pages for homepageimageschool.asp homepageimageschooldetail.asp homepageimageschoolmanage.asp Group ❑ Check to see where redirect is pointing	8/11/2004		3/27/2005
107	Home Page Edit		8/11/2004	3/27/2005	3/27/2005
108	Home Page Edit Schools		8/11/2004	3/27/2005	3/27/2005
109	Stuck Again	After creating a syllabus you then have option to edit the syllabus. When you select to edit, page is not pulling idsyllabus. It is showing the first record in the database. I can't tell what is going on because of the ENCRYPTED_CYPHERTEXT. Please fix	8/16/2004	9/19/2004	9/19/2004
110	Delete not working on School Announcements.		8/17/2004	9/19/2004	9/19/2004
111	Delete not working on School Links.		8/17/2004	9/19/2004	9/19/2004
112	Create a contact page	/contact.asp	9/2/2004	3/27/2005	3/27/2005
113	Create FAQ Page	/faq.asp	9/2/2004	3/27/2005	3/27/2005
114	Create About Us Page	/aboutus.asp	9/2/2004	3/27/2005	3/27/2005
115	thankyoulinksschool.asp	Back buttons do not work.	9/6/2004	10/1/2004	10/1/2004
116	Remove undo redo form editor help file.	Undo: This is a keyboard only command that will undo the last few actions. Ctrl+Z Redo: This is a keyboard only command that will redo the last few actions that have been undone Ctrl+Y	9/6/2004	9/19/2004	9/19/2004
117	School Info	http://www.classkey.com/classkey/schoolinfo.asp	9/6/2004	3/27/2005	3/27/2005
118	School home page edit add	Edit and add pages for school home page	9/6/2004	3/27/2005	3/27/2005
119	Thank you page on delete image is getting an error.	http://www.classkey.com/classkey/admin/thankyouuploadschoolimage.asp Microsoft VBScript runtime error '800a000d' Type mismatch: 'Request_eQuerystring' /classkey/admin/thankyouuploadschoolimage.asp, line 91	9/11/2004	10/1/2004	10/1/2004
120	Lesson Plan Learning Block	Create New Learning Block.	9/18/2004	9/19/2004	9/19/2004
121	Create Several Blank Learning Blocks		9/18/2004	9/19/2004	9/19/2004
122	Help Files	Link help files in admin.	9/18/2004	9/23/2004	9/23/2004
123	Create Lesson Plan Building Block		9/19/2004	9/19/2004	9/19/2004
124	Create Lecture Note Learning Block		9/19/2004	9/19/2004	9/19/2004
125	Date - Have current date populate date field in Lesson Plan / Lecture Note Building Blocks		9/19/2004	9/19/2004	9/19/2004

issue_id	issue_name	issue_desc	date_submitted	date_resolved	date_modified
126	Updatetitle.asp Has wrong Thank you page.		9/23/2004	9/23/2004	9/23/2004
127	Check and Add Form Validation		9/23/2004	10/10/2004	10/10/2004
128	Show / Hide /school.asp	Show / Hide: Announcements Links On both body and left navigation	9/29/2004		10/3/2004
129	get rid of tools.asp	Have Page Set go directly to teacher learning blocks. Right now there is a middle page (tools.asp). Need a conditional statement that sends page set link to firs page that has "show" set to 1	10/4/2004	12/20/2004	12/20/2004
130	Create New Page Set	Create New Page Set doesn't seem to work. I can make it work but I don't know if your working on it.	10/18/2004	3/27/2005	3/27/2005
131	Error when there are no page sets on instructor.asp	ADODB.Field error '800a0bcd' Either BOF or EOF is True, or the current record has been deleted. Requested operation requires a current record. /classkey/admin/instructor.asp, line 279	12/17/2004	3/27/2005	3/27/2005
132	homepage validation error	Contact information "First Name" gets popup error message if empty.	12/17/2004	3/27/2005	3/27/2005
133	http://www.classkey.com/classkey/announcements.asp	Announcement content and date are not displaying.	12/20/2004		3/27/2005
134	Announcements - Admin	After creating announcement and returning to add additional announcements the id appears on page. After each new announcement, the id keeps duplicating.	1/3/2005		3/27/2005
135	Announcements - Student View	Announcement title does not link to announcement.	1/3/2005		3/27/2005
136	Assignments	Display in order of date.	1/4/2005	3/27/2005	3/27/2005
137	E-mail Notification	An email is sent when someone submits a message using communication learning block.	3/27/2005		3/27/2005
138	Stats	Create a simple stats page for individual teacher and one for school. Number of hits. Show a graph if possible.	3/27/2005		3/27/2005
139	Syllabus	Give option to upload a syllabus or use editor.	3/27/2005		3/27/2005

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