Interactive and New Communication Technologies

A Proposal for a Communication Technology Project

To Be Titled

ISDICTIONARY – AN ONLINE DICTIONARY OF
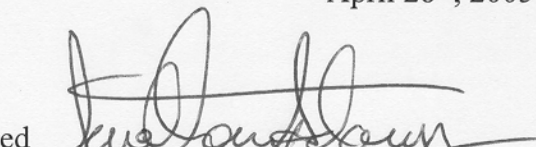
INSTRUCTIONAL SYSTEMS DESIGN TERMINOLOGY
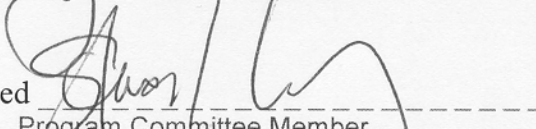
By

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To be Submitted in Partial Fulfillment for the Degree of

MASTERS OF SCIENCE IN MASS COMMUNICATION
WITH AN EMPHASIS IN INTERACTIVE COMMUNICATION

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Overview

Executive Summary

This project involved the creation of a web-based dictionary of Instructional Systems Design (ISD) terminology, which provides visitors with an easy-to-access reference to the specific terminology used in their everyday ISD-related activities. Users are able to search words and become familiar (through definitions, descriptions, explanations, and exemplifications) with the language of the field. Content managers are able to create and store words and definitions, the core content offered by a dictionary.

This tool has two defined sections: the <u>Main Area</u> for *users* and the <u>Content Management Area</u> for *members*. The main area allows for the search and retrieval of words through a "Word Search" box, and provides associated meanings and links to related websites. The content management area provides tools for the storage of potential new words, discussion of possible definitions, approval of those definitions, development of a semantic network (i.e., related words), and the addition of related links.

The Main Area, apart from the Word Search box, also provides users with content such as Top Searches, Featured Website, Featured Author, Educational News (news feed provided by a third party), and Book of the Month. Contact information is provided in the About Us and the Contact Us sections. Additionally, the Main Area offers services such as Search in a Box (HTML code for users to place a search box on their own websites) and tools such as Suggest a Word, Suggest a Link, and Registration (to become a contributor and be able to create, edit, and discuss words).

The technology behind this website will be provided by ColdFusion Markup Language (CFML) in combination with JavaScript and Cascade Style Sheets (CSS). This

will allow for the creation of dynamic content that will be populated through database connectivity provided by a CF server. The back end of this website will be a series of relational Access databases that will contain all the dynamic content that is displayed at different times: words, forums, users, and alerts.

Background

The body of knowledge on which sciences rely may be composed of paradigms, laws, theories, concepts, ideas, and a number of constructs that give each science a specific domain or area of influence. Many times that area overlaps between sciences, as concepts and ideas can also overlap, or be shared, between sciences.

One of the things that specific sciences have is their specific vocabulary, their *jargon*, which again, can be shared by more than one science. Specific terminology gives a science a kind of identity, a personality, operationalized through a set of semantic components that may express a unique meaning and may carry a unique connotation in that field.

As sciences advance in the development of their body of knowledge, it is not unusual that their specific terminology is explained and described in the form of dictionaries. Examples of this are the "Dictionary of Biology" (Martin & Hine Eds., 2004) or the "Dictionary of Physics" (Isaacs Ed., 2003), both published by Oxford University Press. Furthermore, a number of dictionaries normally exist for the same field, so that different dictionaries can complement each other, none of them claiming to be the only source of reference.

According to the Association of Educational Communication and Technology (AECT) Definition and Terminology Committee (2004), conceptions of educational technology have been evolving as long as the field has, and they continue to evolve. As more and more terms are created and elaborated in both the technical and educational aspects, it is important to understand educational technology related terminology if it is to be fully understood by all persons involved.

Problem Statement

Since I started my studies in Instructional Systems, I was constantly exposed to new terminology that needed to be understood perfectly for me to be able to grasp concepts and ideas, and to engage in constructive discussions. However, I could never find a "Dictionary of ISD terms" that would have helped me, a newcomer to the field, acquire that corpus of terms and expressions faster and easier.

Occasionally, I would come across a few web sites that provided a brief collection of the most commonly used terms related to educational technology, such as Kilby's (1994) glossary in the Web-Based Training Information Center (WBTIC). Other times, I would locate a glossary or "key concepts" list that would accompany some articles or books with an ISD focus, like the one provided in *Instructional Design Competencies: The Standards* (Richey, Fields, & Foxon, 2003) on pages 180 through 185. More often than not, these resources would provide only a list of terms, and would fail to reflect the context in which those terms could be used and understood. Also, the online resources would not allow for people to construct the more in-depth understanding of specific terms through continuous discussion with other individuals.

This gap in existing resources was the initial motivation to start collecting the new terms and words that I would come across in my readings, creating my own private glossary. Eventually, and using the knowledge and skills acquired in my Interactive Communications program, I conceptualized a project that would consist in streamlining the process of collecting terms and creating definitions for them using new communications technologies. This technology integration step would provide for a front-end interface and a back-end database structure, so that the content created could be put online for shared access and it could be developed through regular collaboration among different content developers, thus allowing the collection to be expanded and enriched with multiple contributions.

Project Description

Scope

The ISDictionary Project is an online resource whose main purpose is to provide easy access to definitions of and useful links about ISD-related terminology. This resource is intended as a tool for professionals and students in the field of instructional systems, as well as professionals from related fields such as computer science, graphic design, distance education, and technology management, among others, who have to work in interdisciplinary instructional design projects and, thus, need to be familiar with the terminology that is specific to the field.

Apart from the creation of the technology that allows for the different functions of the dictionary, the ISDictionary project has an additional scope (which will be focused on after the technology has been sufficiently tested and developed) that deals with the

human environment in which this project will grow. This additional scope is the development of an online learning community that provides students and practitioners in the field the learning environment that encourages critical reflection and understanding of terms through social interaction with other participants. In a learning community, the participants' backgrounds vary, and each person's strengths are utilized to encourage learning among and between participants (Barab & Duffy, 2000). The importance of a "community" where ideas are discussed and understandings are enriched is critical to the design of effective practice fields (Scardamalia & Bereiter, 1993). This community would be "housed" in and fostered by the content management and community support tools (e.g., discussion forums) the ISDictionary website offers.

Goals and Objectives

The main goal of the ISDictionary project is to offer an interactive environment where a group of professionals and practitioners in the field of instructional Systems Design can work collaboratively to develop appropriate content for the dictionary (namely, words and definitions).

The specific objectives are:

- To develop a database-driven application that would allow for the storage, search, and retrieval of dictionary words and meanings.

- To create a virtual community of volunteer scholars and practitioners who contribute content to the database.

- To populate the database with pertinent, valuable, and rich content.

- To offer access to database content, via the World Wide Web, to individuals working in instructional design-related projects.

Funding and Revenue

The first two years of this project have been covered by a small grant the creator of the website received from the College of Education at Florida State university. This grant will cover administrative costs as detailed below:

- Domain names registration: $ 48.50 (a year)
- Cold Fusion hosting: $ 310.00 (a year)

                 Total $ 358.50   (Annual Operating Cost)

Since hosting of a CF-based website is more expensive than other technologies (e.g., ASP, PHP, etc.), alternative ways of covering operating costs are currently under study and testing. One such revenue-generating alternative is advertising, with banners and text placed on different pages offering products and services that are related to the target audience (students and professionals). The revenue will be per click, per lead, or per sale of those products and services, and will be managed by online advertising companies. A second type of revenue may come from commissions, e.g., sale of books and plane tickets, and will be managed directly by the merchants. Eventually, as the site grows in content and critical mass, sale of advertising space could be directly offered to universities and professional associations, so that they place their banners and ads on the ISDictionary website. A third, possible source of revenue is a technology development grant from a professional association or from an educational organization.

As mentioned above, operational costs are covered for the first two years of the project. The alternative sources just described will be tested during that period, and statistical data will be collected to identify which of those approaches yield the most return in terms of generated revenue.

Target Audience

This website has been developed to meet the needs of a target audience that can be divided intro three clearly defined groups: ISD students, ISD professionals, and non-ISD professionals. The first group is composed of college-level students starting in ISD programs who are faced with a number of new terms and concepts as part of their classes. The demographic composition of this group includes diverse racial/ethnic origin, equal percentages of males and females, ages between 20 and 30 years old, and undergraduate/graduate level college experience (National Center for Education Statistics, 2005). A sampling of expected skills using Richey, Fields, & Foxon's (2001) *Instructional Design Competencies: The Standards* indicates that this group has intermediate computer literacy skills, familiarity with the World Wide Web, experience in locating and using Internet resources, and a basic understanding of general education and training concepts.

The second group is formed by professionals and practitioners in the field of ISD who may need to update their knowledge or understanding of new terms (e.g., acronyms, models, etc.) incorporated to the field since they graduated from their ISD programs. Demographics for this group includes diverse race/ethnicity, balanced ratio of males to females, ages between 30 and 60 years old, graduate and post-doc college level experience (National Center for Education Statistics, 2005). The average member of this group has intermediate to advance computer literacy skills, familiarity and experience with the use of online resources (web-based and intranet-based), and intermediate to advanced understanding of training and development concepts (Longitudinal Employer-

Household Dynamics, U.S. Census Bureau, 2005; Bureau of Labor Statistics, U.S.

Department of Labor, 2005).

The third group that conforms the target audience consists in non-ISD professionals

such as graphic artists, programmers, network administrators, and multimedia developers

who may be involved in instructional design projects and may be unfamiliar with the

specific terminology or "jargon" used in those projects. The demographic information for

this group indicates a diverse racial/ethnic makeup, an approximate 5:1 ration of males to

females, ages between 20 and 50 years old, and vocational education or professional

certification background (Longitudinal Employer-Household Dynamics, U.S. Census

Bureau, 2005). This group is predicted to have advanced computer literacy skills,

expertise in the use of online resources and references, and limited understanding of

general training concepts (Bureau of Labor Statistics, U.S. Department of Labor, 2005).

Technology Assessment

System Requirements

The ISDictionary website only uses client-based scripting (HTML, JavaScript,

and CSS) and server-side scripting (CFML). No plug-in is necessary to use this website.

Minimum and recommended system specifications for users and contributors who access

the ISDictionary project are as follows:

IBM-Compatible systems
- ❖ Intel, Celeron, or AMD processor
- ❖ Minimum 64 MB of RAM, recommended 128 MB
- ❖ Minimum 800 MHz processor speed, recommended 1.8 GHz
- ❖ MS Windows 9x, NT, ME, 2000, or XP
- ❖ Internet Explorer 5.5 or higher

❖ Netscape 4.85 or higher

❖ Mozilla 1.x or higher

Macintosh systems

❖ Power Mac, G3, or higher

❖ Minimum 64 MB of RAM, recommended 128 MB

❖ Minimum 450 MHz processor speed, recommended 1 GHz

❖ Macintosh OS/8 operating system or higher

❖ Internet Explorer 5.5 or higher

❖ Netscape 4.85 or higher

❖ Mozilla 1.x or higher

Internet Connection

❖ minimum 56K modem, recommended cable modem

Hosting Requirements

The ISDictionary project is a website built on ColdFusion technology which displays database-driven, dynamic content. The web hosting services should meet the following specifications:

❖ ColdFusion Server 6.1 or higher

❖ 200 MB hard disk storage

❖ 50 POP3 email accounts

❖ 20 FTP users

❖ 20 GB monthly transfer

❖ Access database support

❖ Unlimited ODBC DSN's

❖ Usage tracking and reporting

Product Design

Title Summary

The ISDictionary website is an online dictionary of terms related to the field of Instructional Systems Design. Visitors can search terminology specific to their field and get definitions, related words, and related links for each dictionary entry. The Content Management area, available only to registered members who volunteer their time to create content, features a word administration panel, discussion boards for each word, and an internal communications system to keep community members in close contact.

Genre

This web-based application has been developed under the genre of Electronic Performance Support System (EPSS). According to Gery (1989), an EPSS is "…an integrated electronic environment … structured to provide immediate, individualized on-line access to … information." Raybould (1990) states that an EPSS improves employee performance by providing "…on-the-job access to integrated information." In accordance to the operational definition of SPSS, the ISDictionary website provides information and additional resources to users who in turn can use this information to improve the way they conduct business.

Metaphor

The general layout and functionality of the ISDictionary website uses the metaphor of a paper-based dictionary (although with the advantages of online media). In line with this metaphor, an initial screen prompts the user for a word entry to search in the dictionary. The search button bears the label "Look it Up!" instead of the customary "Go" or "Submit" alternatives. If the entry is found in the dictionary, the results page

displays information similar to the one included in a paper-based dictionary: the entry is identified by category (noun, verb, adjective, or adverb) and number (singular or plural); a pronunciation is provided for acronyms or problematic words (e.g., foreign terms); a definition is displayed including identification, description, explanation and/or exemplification of the entry; finally, a set of related words (i.e., a semantic network) is offered for the user to explore that semantic field further.

Structure

The content of the ISDictionary project is structured in a modular fashion, by which each section caters to a specific information need. The different modules, or sections, that conform the structure of the website are described below.

- Dictionary: this is the main page, which contains the search box and the Look it Up! button. Additional areas (such as Professional Associations and Journals) are planned for future development, and this page would be the initial portal for those additional services or areas.

- Results: this is the page that returns the results of the search. The results can show definitions, related words, and related links for a given term, or they can show a "word not found" message with a suggestion form, which the visitor can use to suggest that word for future inclusion in the dictionary.

- About us: this area explains what the ISDictionary project is, who is involved, and how visitors can volunteer to work in the project.

- Terms of service: a disclaimer regarding the quality and availability of content in the dictionary.

- Search in a box: this section contains instructions (with HTML code included) for visitors to place a search box on their own websites.

- Suggest a Word: this page has a form that visitors can use to suggest a word to be included in the dictionary.

- Login: this page has the login form that members can use to access the Content Management area. It also has a Username Recovery and a Password Recovery tool, for members who have misplaced their access information. Finally, a link on this page opens up a registration form, where visitors can apply to become volunteers and work in the ISDictionary Project.

- Add a Word: members only. This part of the Content Management area allows users to create words in the dictionary.

- Edit a Word: members only. This part of the Content Management area allows editors to edit the words they own (i.e., for which they are responsible) in the dictionary.

Interactivity

This application is designed to facilitate both interactivity between the user and the system, and interaction among users themselves. User-system interactivity relies on a number of requests the user can make by selecting choices in the form of links, buttons, and pull-down menus. Links are the most common type of "trigger" because they are fast to load and easy to edit. Examples of links are the View, Discuss, and Edit options in the word editing area. Buttons are the second type of device that allows for interactivity, and they require either the setting up of a FORM tag in HTML, or the creation of customized graphics. Examples of buttons are the Submit, Edit, and Save buttons in the word editing area; examples of icons are the Reply to Message and View Poster icons in the forum

area. Finally, pull-down menus offer the user a number of preset options that will feed certain information into the system. Examples of pull-down menus are the Category and Number options in the word editing area.

User-user interaction is facilitated by a number of tools available in the members' area. These tools allow for interaction among project members and they help build a sense of community: each word has a discussion board where members are able to exchange views on how to best define a certain word in different contexts; forums are also available for members to discuss the issues associated with each role (e.g., the "editors' lounge"); an internal message/alert system allows for easy communication among members, telling them when a word has been assigned to them or when a response has been posted in a discussion board; the same message system can be used to communicate with the system administrators to request ownership of a word, to request publication of a word, or to ask for technical support; finally, all messages in the discussion forum contain a link to a Poster Profile popup window that displays the poster's background, affiliation, and professional interests. Thus, posters can be viewed not as a cryptic username, but as a real person, member of the learning community.

Creative Content

In order to create a critical mass of users and repeat visitors, this website will rely on content quality and the uniqueness of the service offered: an online dictionary that targets the niche of instructional designers and their need for definitions in their field. The contents of the website are dynamic, so that information in the different sections on the main screen changes regularly. This information includes featured authors, featured websites, polls and surveys, most searched words, and educational news feed (provided

by a third party). As for the service, other websites will be able to use the Search-in-a-box, i.e., a box placed on their web pages to search directly on the ISDictionary database, with the results page bringing the visitor to our website. This will achieve the dual purpose of capturing new visitors and promote the dictionary on other ISD-related websites. Table 1 below compares the creative content offered by the ISDictionary website with other, similar media:

Name	Search option	Results page	Top Searches	Suggest a word	Suggest a link	Discussion board	Search-in-a-box	Educ. news
Merriam-Webster	✓	✓						
Answers.com	✓	✓	✓				✓	
Wikipedia		✓						
Webopedia	✓	✓	✓	✓	✓			
ERIC		✓						
D.Clark HRD		✓						
ISDictionary	✓	✓	✓	✓	✓	✓	✓	✓

Table 1: comparison between the ISDictionary creative content and content offered by other initiatives.

Look and Feel

As described in the "Target Audience" section, prospective users of the ISDictionary website are young and middle aged adults experienced in the use of computer systems and knowledgeable about what appealing an unappealing interfaces look like. The graphic design aspect of the website includes nice and soothing colors and color schemes, in combination with an organized, neat layout that contributes to the usability of the interface. Shapes combine right angles and smooth curves to create a pleasing visual effect. Drop shadows have been used in tables to create a sense of depth. This depth is accentuated by the use of an emboss effect in buttons, which adds a slight 3D effect to the overall look and feel. Friendly faces were used in strategic places (where a message is conveyed to the user) to add to a pleasant user experience (Perez, 2001).
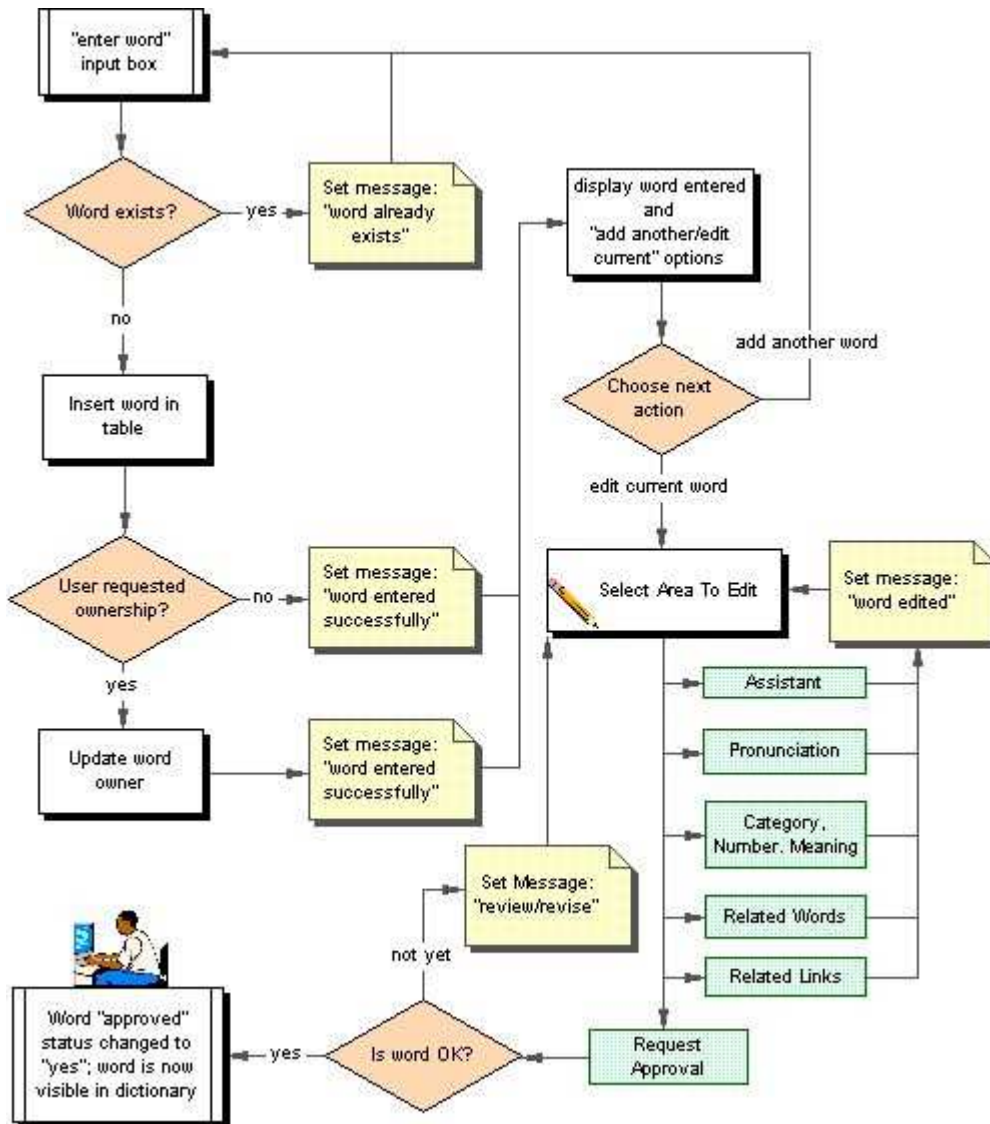
Functional Specifications

Flowchart

Figure 1 shows the process by which a word is entered, defined, and approved in the dictionary.

Figure 1: the process to add, edit, and approve a word in the dictionary.

Storyboards

Search Page

Project: _ISDictionary_ _   Date: __Fall 2004_   Section: _Word Search_

Description:
- This is a draft of the main area where users would look up a word.
1. text entry box
2. query submit button
3. placeholders for image of person/friendly face
4. placeholder for book cover
5. placeholders for prospective sections

Go to: results.cfm	Filenames: index.cfm
After: clicking on "look it up" button	
Menu 1 - - - -	**Notes:** other areas, like "conferences", "recommended books", etc. are for future development, as an expansion of the "dictionary" role.
2 - - - -	
3 - - - -	
4 - - - -	

Results Page

Project: _ISDictionary___   Date: __Fall 2004___   Section: _Search Results_

Description:
- This is a draft of the interface where results would be displayed.
1. matching word from "word" table
2. pronunciation from "pronounce" field in "pronunciation" table
3. word type from "type" field in "type" table
4. meaning from "meaning" field in "meaning" table
5. placeholder for related words from "relatedwords" table
6. placeholder for links from "links" table

Go to: index.cfm	Filenames: results.cfm
After: clicking on "new search" button	
Menu 1- isdictionary	Notes:
2 - new search	
3 TBD	
4 TBD	

Create Word Page

Project: _ISDictionary_	Date: _Fall 2004_	Section: _Create Word_
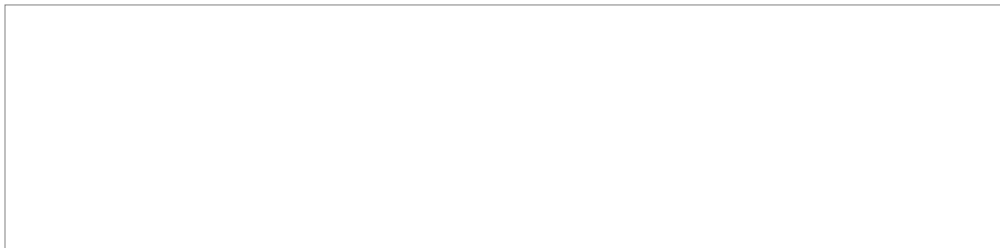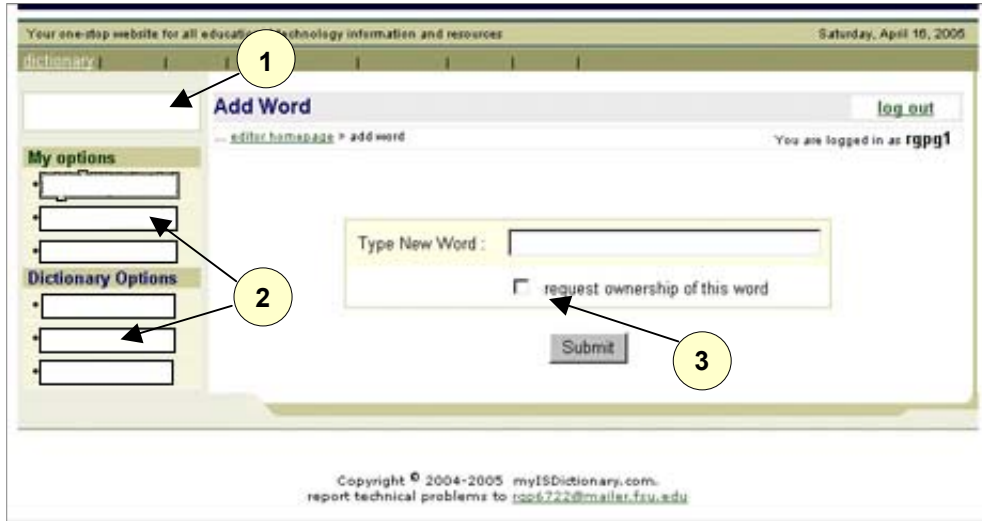
Go to: addWordFormAction.cfm	Filenames: addWordForm.cfm
After: clicking on "Submit" button	
Menu 1- return to main page	**Notes:** the same page is used for different roles, but with the "ad", "ed", and "co" prefixes for administrator, editor, and contributor.
2 TBD	
3 TBD	
4 TBD	

Edit Word Page

Project: _ISDictionary_ _ Date: __Fall 2004___ Section: _Edit Word_
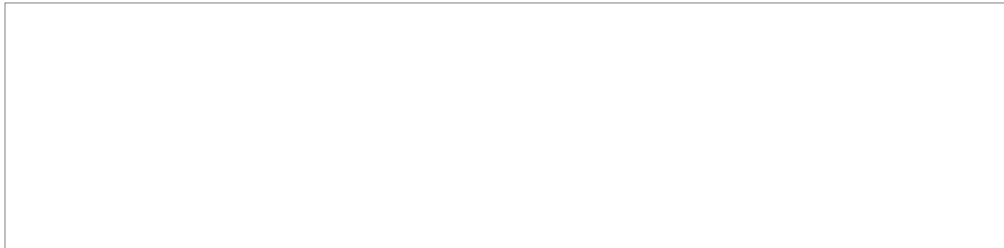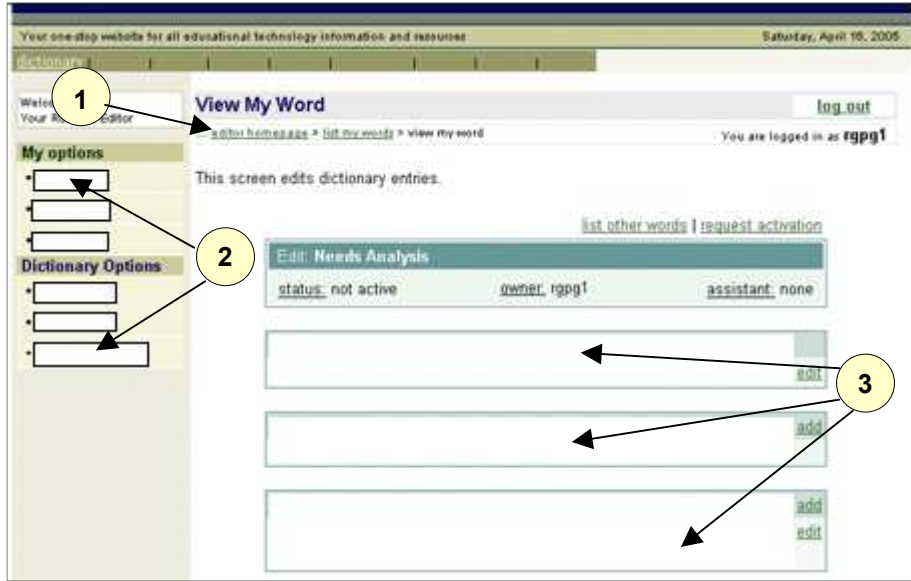
Go to: editWordFormAction.cfm	Filenames: viewWordForm.cfm
After: clicking on "edit" button	
Menu 1- return to main page	**Notes:** this page lists a word that is ready to be edited; different edit "includes" can be used to select what area to edit.
2 - return to list page	
3 TBD	
4 TBD	

List Words Page

Project:_ISDictionary __   Date: __Fall 2004___   Section: _List Word_

Your one-stop website for all educational technology information and resources   Saturday, April 16, 2005

dictionary

My Words   log out

homepage > list my words   You are logged in as **rgpg1**

My Options

This screen lists the entries in the dictionary that you own.

Displaying words 1 to 12 of 12

Dictionary Options

word	modified	asstn.	links	posts	active			
development	09-Apr-05	rgpg2			no	View	Discuss	Edit
formative evaluation	never	rgpg2			no	View	Discuss	Edit
Hawthorne effect	never	rgpg2			no	View	Discuss	Edit
motivation	never	none			no	View	Discuss	Edit
need...al	never	none			no	View	Discuss	Edit
N...alysis	09-Apr-05	none			no	View	Discuss	Edit
pilot	never	none			no	View	Discuss	Edit
rapid prototype	never	none			no	View	Discuss	Edit
Task Analysis	never	none			no	View	Discuss	Edit
test 2	never	none			no	View	Discuss	Edit
WBI	never	none			no	View	Discuss	Edit
WBT	never	none			no	View	Discuss	Edit

Words per page: 15 ▾ set ▢

1

Go to: viewWordForm.cfm	Filenames: listMyWords.cfm
After: clicking on "edit" button	
Menu 1- return to main page	**Notes:** this page lists all the words a user owns; quick links to "View", "Discuss", or "Edit" are provided.
2 view word	
3 discuss word	
4 edit word	

Database Integration

Given the fact that storage, search and retrieval of information is the main function of this website, database connectivity and integration has been at the core of the design and development process. The main database that contains all dictionary entries has been created in MS Access and it has been normalized to Boyce-Codd (BCNF). The normalization process followed these steps:

- First Normal Form

  o Multivalued fields were moved to another table.

  o Repeating values were moved to another (lookup) table.

  o Each field is atomic (as small as possible).

  o Each table has a key.

- Second Normal Form

  o All fields are related to the primary key.

  o Nonkey fields not related to the primary key were moved to another table.

- Third Normal Form

  o All fields are mutually independent

  o Fields that describe a nonkey field have been moved to another table.

- Boyce-Codd Normal Form (BCNF)

  o No interdependence between nonkey fields.

Normalized tables included in this relational database are as follows:

Table Name: **words_tb**

Field Name	Data type	Description	Key
IDW	Autonumber	Unique ID for word entry	**PK** (composite key)
word	Text – 80 chr	Unique word entry	**PK** (composite key)
pronunciation	Text – 50 chr	How word is pronounced	
dateCreated	Date/time		
dateLastModified	Date/time		
timesViewed	Number		
approvedFK	Text – 3 chr	Whether word is approved for display	**FK** to approved_tb.approved
ownerUserIDFK	Text - 20	Owner of the word	**FK** to owners_tb.ownerUserID
assistantUserIDFK	Text - 20	Assistant to owner	**FK** to assistants_tb.assistantUserID

Table Name: **relatedWords_tb**

Field Name	Data type	Description	Key
IDRW	Autonumber	Unique ID for related word	**PK**
RelatedWordName	Text – 80 chr	Related word	
RelatedWordURL	Text – 255 chr	URL for related word	

Table Name: **Words_RelWordsLinking_tb**

Field Name	Data type	Description	Key
IDWFK	Number	ID number for word	**PK -** FK to words_tb.IDW
IDRWFK	Number	ID number for related word	**PK -** FK to relatedWords_tb.IDRW

Table Name: **meanings_tb**

Field Name	Data type	Description	Key
IDM	Autonumber	Unique ID for meaning	**PK**
wordFK	Text – 80 chr	Word entry	FK to words_tb.word
IDCFK	Number	Category ID	**FK** to categories_tb.IDC
IDNFK	Number	Number ID	**FK** to number_tb.IDN
shortMeaning	Memo	Word meaning	
extMeaning	Memo	Extended word meaning	

Table Name: **categories_tb**

Field Name	Data type	Description	Key
IDC	Autonumber	Unique ID for category	**PK**
category	Text – 20 chr	Unique category	

Table Name: **number_tb**

Field Name	Data type	Description	Key
IDN	Autonumber	Unique ID for number	**PK**
number	Text – 8 chr	Unique number	

Table Name: **links_tb**

Field Name	Data type	Description	Key
IDL	Autonumber	Unique ID for link	**PK**
IDWFK	Number	Word entry	**FK** to words_tb.IDW
linkName	Text – 80 chr	Name / title of link	
linkDesc	Text – 255 chr	Description of link	
linkURL	Text – 255 chr		
statusFK	Text – 7 chr	Status of link	**FK** to linkStatus_tb.status

Table Name: **linkStatus_tb**

Field Name	Data type	Description	Key
IDLS	Autonumber	Unique ID for link status	
status	Text – 7 chr	Unique status of link	**PK**

Table Name: **approve_tb**

Field Name	Data type	Description	Key
IDAP	Autonumber	Unique ID for approved	
approved	Text – 3 chr	Unique approved status	**PK**

Table Name: **owners_tb**

Field Name	Data type	Description	Key
IDO	Autonumber	Unique ID for owner	
ownerUserID	Text – 20 chr	Unique owner username	**PK**
ownerFirstName	Text – 50 chr	Owner first name	
ownerLastName	Text – 50 chr	Owner last name	
userActive	Text – 3 chr	Whether user is active or not	

Table Name: **assistants_tb**

Field Name	Data type	Description	Key
IDA	Autonumber	Unique ID for assistant	
assistantUserID	Text – 20 chr	Unique assistant username	**PK**
assistantFirstName	Text – 50 chr	Assistant first name	
assistantLastName	Text – 50 chr	Assistant last name	
userActive	Text – 3 chr	Whether user is active or not	

Figure 2 below shows the relationships between the different tables in this database. This is the rationale for these relationships:

Figure 2: Relationships among tables in the "dicWords_db" database.
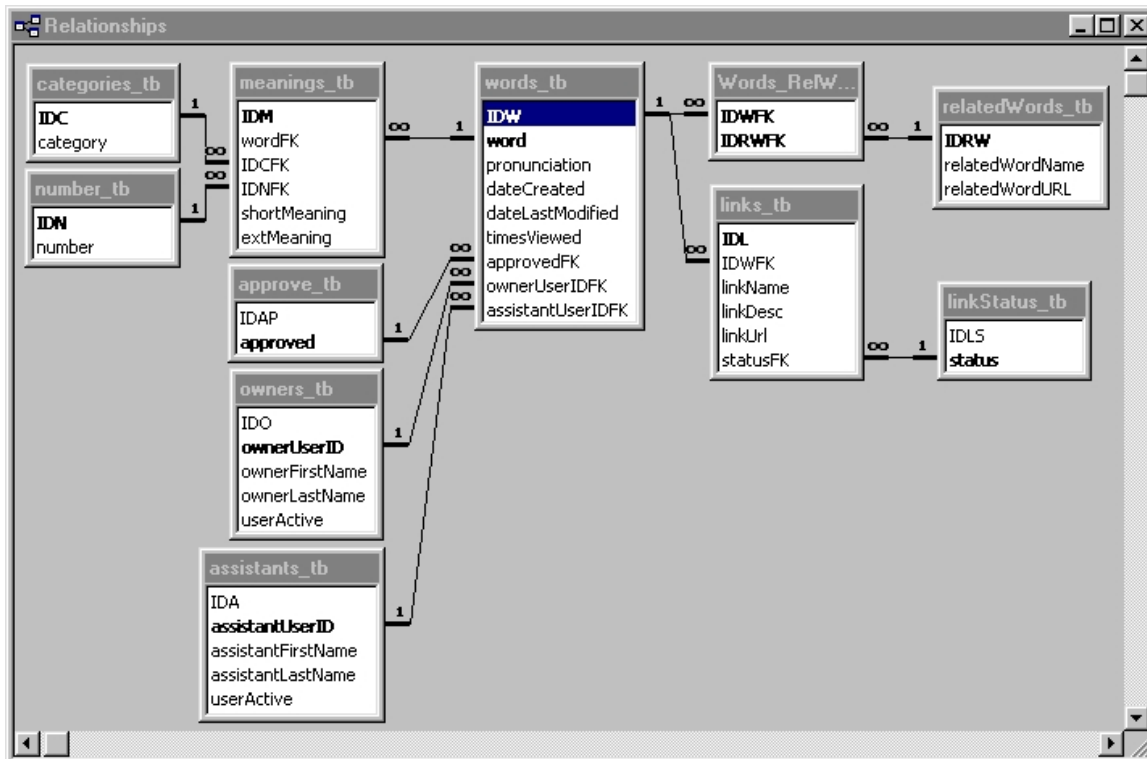
- **words_tb** one-to-many to **meanings_tb**: one word can have several meanings, but each meaning can belong to only one word.

- **categories_tb** one-to-many to **meanings_tb**: each category can apply to several meanings, but each meaning can have only one category.

- **number_tb** one-to-many to **meanings_tb**: each number can apply to several meanings, but each meaning can have only one number.

- **words_tb** many-to-many **relatedWords_tb**: one main entry can be related to several words, and each of these words can be related to several main entries. Notice that a linking table has been created to accommodate for this type of relationship.

- **words_tb** one-to-many to **links_tb**: this relationship is enforced based on a business (not a logical) rule. A decision has been made that each word can have several links, but each link can serve to only one word.

- **linkStatus_tb** one-to-many to **links_tb**: each link can have only one status, but each status can apply to several links.

- **approve_tb** one-to-many to **words_tb**: each approve status can apply to several words, but each word can only have one approve status.

- **owners_tb** one-to-many to **words_tb**: each owner can have several words, but each word can have only one owner.

- **assistants_tb** one-to-many to **words_tb**: each assistant can have several words, but each word can have only one assistant.

Color Scheme

A split complementary color scheme was chosen for this website in order to provide contrast between different components, but not the extreme kind of contrast a complementary color scheme would have yielded. A split complementary scheme consists in a base color, in combination with colors that are close in hue to the complement of that base color (December, 2004). The base color chosen for this website was green, and the two analogous colors were blue and beige. Additionally, the blue color was further processed with an analogous color scheme, by which colors that are close in hue value are combined. This added for some extra contrast in this color group. Table 2 shows the three color schemes, the hexadecimal value for each color, and the most common settings in and functions for which each color was used.

Color	Hex value	Function / Setting
	#336633	Table borders, text links
	#669999	Table header background, title text
	#DAE7E1	Table subheaders background, button background
	#EE77F0	Table row background, alternating row colors, button background

Table 2a: Green color scheme

Color	Hex value	Function / Setting
	#000033	Table borders, table header background, title text
	#6699CC	Table header background
	#999999	Table subheader background, subtitle text
	#EDEBEB	Table row background, alternating row colors, button background
	#F8F8F8	Table row background, alternating row colors, button background

Table 2b: Blue-Grey color scheme
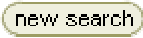
Color	Hex value	Function / Setting
	#999966	Table borders, text links
	#CCCC99	Table header background, title text, button borders
	#EEEEE0	Table subheaders background, button background
	#F5F5DC	Table row background, alternating row colors
	#FFFFE6	Table row background, alternating row colors
	#FFFFF0	Table row background, alternating row colors, button background
	#F4F4EC	Table row background, alternating row colors

Table 2c: Beige color scheme

Buttons and Images

Graphics and images have been used selectively on this website. There were two main reasons used to justify the use of an image: a) to add to the appeal and attractiveness of a page, or b) to save space by using an icon (which represents an idea) instead of a full text version of that idea. The rationale behind these decisions is to avoid overloading a page with icons, images, graphics, etc., that would add to download and processing time. Table 3 below shows the graphics included on this website, together with its function and the color scheme used (when applicable).

Image	Function
	Motivational role. A friendly face greets the user in a nice, welcoming posture.
	Communicative role. A word has not been found, but the "host" invites the user to submit/suggest the word for future inclusion in the dictionary.
	Communicative role. A set of positive smileys is available when a user posts a message in the discussion board.
	Communicative role. A set of negative smileys is available when a user posts a message in the discussion board.
new search	Navigation. Sends the user to the Search page.
edit	Interaction. Allows the user to perform an edit action
	Interaction. Lets the user to perform an edit action in the discussion board.
	Interaction. Lets the user respond to a message in the discussion board.
	Interaction. Lets the user view a poster profile in the discussion board.

Table 3: buttons and images used in the ISDictionary pages

Fonts

The different sections of the website use two standard font faces: Arial and Times New Roman. The reason for this choice is that the main purpose of the website is to offer standard, readable text, not to achieve any special effect, contrast, or impact with fonts. Thus, the two font faces that are standard and available on most systems were chosen. Table 4 below shows the different sizes used.

Font	Size	Use	Sample
Arial	4	Page title, table headers.	Sample text here.
Arial	3	Short texts, definitions, help areas.	Sample text here.
Arial	2	Clarifications, caveats, tips and recommendations that were not supposed to detract from the main text.	Sample text here.
Times New Roman	3	Body copy, extended text.	Sample text here.

Table 4: font faces and sizes used.

Dialogue Boxes

The different forms on the website use a JavaScript validation routine to ensure data integrity. Scripts are in place to check that data has been entered when required, that data is of the expected type (numeric or alphanumeric), and that data has the correct structure. Figure 3a below shows a dialogue box that alerts the user that the "First Name" field has been left empty, while Figure 3b shows a dialogue box that tells the user the "Password" and the "Password Verification" fields do not match.

Figure 3a: missing information alert.

Figure 3b: data mismatch alert.

System Messages

There are three levels of system message the user can receive. A Level 1 message (Figure 4a) informs the user of the status of a request, for example, that a discussion forum has no threads (normal event). A Level 2 message (Figure 4b) reports when an action has not been completed, for instance, when a word cannot be updated because it is already active. A Level 3 message (Figure 4c) sends a warning when a security policy has been violated, for instance, when a user is trying to edit a word owned by another user.

Figure 4a: system message Level 1

There are currently no discussion topics for the word 'Pareto Chart'. To start a discussion, use the "create new topic" option above.

Figure 4b: system message Level 2

The word you are trying to edit is already active. Please contact the system administrator to request deactivation.

Figure 4c: system message Level 3

⚠ Warning: you are trying to edit a word you do not own. Please restrict your navigation to the links provided by the system.

Review of Related Media

One of the first steps in this ISDictionary Project was to research the different formats in which collections of words can be arranged (e.g., lists of terms, glossaries, and dictionaries) and determine what the difference is between them, i.e., what makes a

glossary a glossary, and a dictionary a dictionary. According to Martínez de Sousa (1995), a glossary contains a smaller number of terms, specific to a field, and is normally attached to a main document. Thus, a glossary may be part of a book, an instructional module, or a chapter. A dictionary, instead, covers a wider area, is not restricted to be accompanying a main document, and it includes a higher number of terms. Also, a dictionary generally contains language-specific information, e.g., whether a word is a noun or a verb, or how a word is pronounced.

However, the same author says that, beyond the prescribed notion of what a dictionary and what a glossary is, in practice, publishing houses and authors frequently exercise their rights to merge features, categories, and functionality. Thus, a document entitled *Dictionary of Statistical terms*, which would technically be a field-specific dictionary, can also serve the purpose of a glossary and be attached as an appendix of a main document. In those cases, flexibility is exercised to determine what functionality that document will have, and to choose a name that both the author and the publisher are comfortable with. What is important, De Sousa claims, is the utility of that work, not its name.

Modeling online glossaries

With this theoretical framework in mind, the next step in this project was to look for examples of online glossaries, to model on what had been already done, to contrast that with editorial principles of what the components of a glossary would be, mentioned in the previous section. A systematic process was used to search the Web for ISD-related glossaries, archiving examples, creating a list of visited sites, and evaluating and

analyzing content and format. Among those examples of online glossaries, two of them are cited in the sections below as representative of De Sousa's operational definitions.

The first example is Don Clark's (1995) Online Learning Glossary (http://www.nwlink.com/~donclark/hrd/glossary.html). This is a personal page created by Donald Clark to cover different aspects of training and development. Curiously enough, the author refers to this glossary as "Learning Dictionary" on a different part of his website, which exemplifies De Sousa's position regarding the flexibility of naming conventions. This collection of terms met the description for a glossary, in that it was part of an online Training Manual (the main document). Also, the words were restricted to a field (HRD), and the number of terms defined, although numerous, were still lower than the thousands that is common to find in a dictionary. This glossary presented a linear fashion, with words listed alphabetically in long pages. No search mechanism was in place. No feedback system was provided for users to send their opinions about the quality and structure of the definitions. However, given that this website is the results of an individual effort, with no support or sponsorship from a large organization, the result is more than satisfactory given the little resources the author had to create this glossary.

One of the ideas to take from the site is the way most words are defined, which consists in a clear identification of that word (e.g., "a model for…" or "an approach that…") at the beginning of the definition. Another idea is the alphabetical arrangement of the content which, although not a novel approach at all, it could be used in combination with the searchable database for users who may not be sure about the spelling of the word they are looking for, or who may want to print out a large number of words.

A second example is the glossary in the Web-Based Training Information Center (WBTIC) (http://www.wbtic.com/primer_glossary.aspx). This website is also an example of an individual effort and it was created by Tim Kilby, who is presented (on the website) as the creator of the terms *Web-based Training* (WBT) and *Web-based Performance Support System* (WBPSS). The author explains that his website is not affiliated with or sponsored by any institution, and that there are no products or services sold on the website. Rather, the website is an online resource where the author shares views, materials, and information on computer-based training.

This website has a professional-looking interface, with pleasing colors and an organized layout. The graphics have been professionally designed and processed specifically for this site. The interface features a host (presumably the author of the website) in different postures (e.g., teaching, talking, etc.) with professional quality pictures. The navigation is clear and simple, and the different sections include a tutorial on what WBT is, a sample of new trends in the field (e.g., Learning Objects), and a simple form to contact the site owner. The glossary proper is a subsection of the WBT tutorial and, as such, it meets De Sousa's definition of a glossary, i.e., a collection of terms that accompanies a main document.

Ideas to take from this website include the use of a friendly face as part of the interface; the use of a nice, well-thought out color scheme; and the attention paid to good quality graphics. Additionally, sites like this one are inspirational for someone who is pursuing a project like the ISDictionary, since it shows how much can be accomplished with minimum or no institutional support.

Modeling online dictionaries

A process similar to that followed for glossaries was carried out to research what the components of an online dictionary were, what functionality they offered, and what technology was used. Since most online dictionaries are commercial enterprises, with availability of financial and human resources, and the intervention of full time employees that are experts in their specific tasks (programming, graphic design, and linguistics), most examples in this category were rated as very good or excellent. Only two examples will be described for the sake of space.

The first example is Merriam-Webster's online dictionary (http://www.m-w.com). This dictionary combines a slick, fast search engine with CGI technology, backed up by a huge collection of words resulting from decades of research by linguists and language professionals. Words are not listed alphabetically, but they were displayed after a search performed by the user. If the term is not found, the system offers an alternative spelling (based on a built-in dictionary) to check whether the user is using the right spelling. If a word is found, other, similar words are also offered as alternative options, building a semantic network for the user. Additionally, the dictionary features an "audio" link, so that users can click on a button to hear their word pronounced.

Merriam-Webster's online dictionary has all the characteristics and features de Sousa claims dictionaries should have (number of terms, not domain specific, not document specific, and language-related features). Additionally, the website includes a search option for a Thesaurus, a collection of more comprehensive information on the same concepts and ideas included in the main dictionary. The Merriam-Webster's dictionary also has a paid option, where more words are available; a Downloads section,

where different linguistic tools can be downloaded from free; and a number of advertising items, where other products from the same company are described and offered for sale.

Ideas to get from this dictionary include the option of offering "extended" meanings in the form of a thesaurus, so that users can search for more comprehensive information instead of a brief definition. The ISDictionary, thus, could have a "read more" link next to each word, were more extensive, essay-like information could be provided for those concepts that are too large to be covered in a simple definition (e.g., "education" or "learning"). The Merriam-Webster's website also featured a Word of the Day section and a Word Games section. These two features could be easily implemented in the ISDictionary, properly adapted to suit current goals and objectives. For instance, a Trivia Game could be developed, so that practitioners get to participate in a quiz-like activity that covers important names in the field (e.g., who developed what concept), or important ideas in the field (e.g., what "ZPD" is).

The second example is the thesaurus section in the Education Resources Information Center (ERIC) at http://www.eric.ed.gov. The metaphor of this resource is similar to a library index card, with words "catalogued" and "classified" and brief definitions provided. The definitions are accompanied by a Related Terms entry, which lists words from the same semantic area. The interface was nice and professional, with intense use of drop shadows and rounded borders to create a 3D effect. Ideas to implement from this website are the use of drop shadows and rounded borders, as well as the Related Terms feature.

Production Schedule

Task	Duration	Started	Ended	Comments
Analysis				
Audience analysis	8 hs.	08-30-04	09-02-04	
Project planning	15 hs.	09-01-04	09-15-04	
Content analysis	40 hs.	09-20-04	10-20-04	Conceptualizing right kind of content for the opening and results page
Related Media Review	25 hs	10-28-04	11-12-04	
Database conceptualization	85 hs.	10-20-04	03-02-05	This process had to be redone when the DB was changed from flat file to relational
Dictionary entry analysis	60 hs.	10-28-04	11-20-04	Analysis of dictionary entries to determine what the structure of a good definition is
Design				
Word suggestion process	8 hs.	01-23-05	01-25-05	How to process a word suggestion
Word creation process	22 hs.	02-12-05	02-25-05	How to process the creation of a new word
Word modification process	60 hs.	02-26-05	03-16-05	How to modify an existing word
Website design and navigation	12 hs.	12-20-04	01-05-05	Sections, links, menus
Website content draft	20 hs.	12-08-04	01-26-05	Content and information for each section
Website functionalities	28 hs.	01-08-05	01-25-05	Application form, login, persistent scopes, listing/sorting capabilities.
Development				
Create databases	55 hs.	03-02-05	03-20-05	
Create forms	30 hs.	02-15-05	02-21-05	
Create CFML scripts	95 hs.	10-20-04	03-22-05	
Create graphics	12 hs.	10-20-04	02-01-05	
Adapt/modify forum	240 hs.	10-04-04	02-10-05	
Additional Content	60 hs.	10-21-04	11-20-04	Includes newsfeed on opening page and related websites.
Navigation schemes	10 hs.	01-06-05	02-12-05	Structure and internal links.

Formative Evaluation

At the time of creating this report a number of volunteer editors are working in the creation and definition of words for the dictionary. Another group of volunteers, working as editor assistants, are adding related words and links to those same words. One-on-one sessions and a usability survey were the methods used to gather feedback from these volunteers during the formative evaluation process.

One-on-one Sessions

This technique was used to analyze specific areas of the website and specific processes executed by volunteer editors and assistants. The researcher met with six volunteers and sat with them as they worked through some of the screens. The screens analyzed were List Words, Add a Word, List My Words in the Content Management area. Additionally, the general look and feel of the main page was discussed. The researcher took comprehensive notes of the comments and impressions of the users as they went through the different screens. Questions were generic in nature since the goal was to capture the user's initial impressions about the interface. Average duration of the one-on-one sessions was 20 minutes. An analysis of the comments provided by these users led to a number of changes, which are discussed below:

- Added options: a discussion of the information presented on the main screen led to the suggestions that words in the "Top 5 Searches" box were turned into hyperlinks, which was implemented. Also, "Alt text" labels were added to some icons.

- Improved process: a few users felt intimidated by the "all inclusive design of the "Edit Word" screen, where all parts of a word, e.g., meaning,

pronunciation, etc., had to be modified at the same time. The designed was

then changed to a "modular" one, where component parts can be selected to

be modified individually.

- Added functions: some users felt a need to check how the information they

  were submitting would display. To this effect, a "preview" button was added

  to the "Edit Meaning" screen, so that users could see what the text would look

  like. Additionally, a "check URL" button was added to the "Edit Related

  Link" screen and a "check word" button was added to the "Edit Related

  Word" screen, so that users could verify that both links and related words

  were functional before submitting them.

Usability Survey

This technique was used to systematically gather data on the user experience with

the website's interface and functionality. At this point only one survey has been

implemented; this survey focuses on the application form, i.e., the process prospective

members go through to apply to be editors or assistants. As the implementation process

advances and the pool of members is larger, other usability surveys will target other

processes, e.g., the complete process to add and define words in the dictionary, or the

process to find and add pertinent links to each word.

A copy of the usability survey used can be found in Appendix I at the end of this

report. This survey included items (both original and modified) from the Website

Analysis and MeasureMent Inventory (WAMMI) developed at the University College

Cork (Human Factors Research Group, 1996). The survey covered six areas with a total

of 16 questions. A five-item Likert scale was used to rank each question from *Strongly*

Disagree to *Strongly Agree*. The usability survey had very specific questions, as the goal was to gather information on specific aspects of our system. Data was gathered from graduate students and professors in the Instructional Systems program at the College of Education, Florida State University, who had previously expressed their interest in joining the project. These users completed the online application form and then filled out the usability survey. Respondents were two females and three males, with ages ranging from 28 to 52 years old. Four rated themselves as *very confident* in the use of computers and one rated herself as *confident*. Average time to complete the online application form was 4:25 minutes. Average time to complete the usability survey was 12 minutes. Data gathered with the usability survey is displayed in Table 5 below.

Scale: 1- Strongly Disagree; 2- Disagree; 3- Neutral; 4- Agree; 5- Strongly Agree

Question	Respondents					Average
	1st	2nd	3rd	4th	5th	
Overall Reactions						
1. The website loaded quickly.	5	5	5	5	4	4.8
2. The interface of this system is pleasant.	5	3	5	4	5	4.4
3. Size of input textboxes was adequate.	5	4	5	5	5	4.8
Screen Layout						
4. Screen layout was well organized.	5	2	5	5	5	4.4
5. Fonts on the screen were easy to read.	5	4	3	4	4	4
6. Amount of information on the screen was adequate.	5	5	5	5	5	5
Ease of Use						
7. Learning to use the system was easy.	5	4	5	5	5	4.8
8. Steps to complete a task followed a logical sequence.	4	4	5	5	5	4.6
9. The number of steps per task was adequate.	5	4	5	5	5	4.8
Program Capabilities						
10. Response time for each operation was fast enough.	5	5	5	5	5	5
11. Ability to correct mistakes was adequate.	5	4	5	4	4	4.4
12. System failures did not occur.	5	5	2	5	5	4.4
Online Help						
13. Terminology used in the help sections was clear.	5	5	3	5	5	4.6
14. Warning messages were helpful to identify the problem.	4	3	3	4	4	3.6
15. Feedback on the completion of sequence of steps was clear.	5	5	3	5	5	4.6
General Impression						
16. I felt comfortable using this system.	5	4	5	5	5	4.8

Table 5: data from five respondents to usability survey.

Based on the feedback received in the usability survey, a few changes were implemented, which are discussed below:

- Interface appeal: to address feedback from question two a drop-shadow effect was added to some cells/tables to provide a sense of depth between different areas in the interface.

- Screen organization: to address the organization of information covered by question four, the layout of the application form was changed from three rows to two rows, providing for better information organization.

- Readability: responses to question five indicated potential readability issues, so fonts were increased from size 2 to size 3. Also, CSS was used to eliminate the underline of links in the left navigation menu so that links would be more readable.

- Correcting mistakes: to address the concerns expressed in responses to question eleven, the form was redesign so that, if a piece of information has to be changed, the rest of the information entered stays in place, instead of the whole form being emptied. Also, in order to address question fourteen, explanatory messages in red color were added next to the areas that needed corrections.

- System errors: a computer freeze-up occurred with only one of the respondents. Since it was later reported to us that that computer had had problems in the past, and no other user had a problem with the application form, no steps were taken beyond a re-examination of the CFML and JavaScript code to rule out possible syntax errors.

Project Review

At this stage in the development process, I can truly say that this project took much longer than I initially expected, but it was all worth it. When someone sets out to build an online dictionary, the first reaction may be to minimize the involvement of such an undertaking and to think that project will only involve the development of a database and the creation of a search page. However, when one starts to look at similar projects, and starts noticing all the little features, all the necessary functions, and all the desirable services an online dictionary should have, the task presents itself as overwhelming.

Additionally, it seemed to be that the more I worked on this project and the more features I added, the more features and functionalities presented themselves as desirable additions. For example, a link to an email next to a word is a good way of providing feedback about a given word. But then, wouldn't a message board be better? And then, what if the message board (where people just leave messages in a linear fashion) were upgraded to a discussion board (where people can respond to individual messages)? But then, there should be a way of identifying who the poster is (a Poster Profile function), and posters may want to edit their messages, but security has to be built so that a poster can only edit his or her own messages only. At some point, however, you need to stop thinking of additional features, then call your product a "Version 1" and release it. That is the point at which the project is right now, and that will be the departing point for versions 2, 3, and beyond of this content management tool.

As far as the technical knowledge and skills necessary to build this application, the amount of learning and hands-on experience I got from this project are priceless. In order to be able to tackle the different design and development phases I had to go far and

beyond the basics of database development and connectivity. On the database side, I had to get fresh knowledge on the theories behind relational databases, the why's and how to's of good database design, and the issues associated with it. This included the learning of very specific terminology (e.g., "tuple") and the understanding of specialized features (e.g., like database joins, embedded queries, and database optimization techniques). On the connectivity side, I had to develop a deeper understanding of ColdFusion Markup Language (CFML) and the different tools it offers for the creation of dynamic content. In the process of developing the website I had to research the use of custom tags, verity collections, and Java Classes integration. Although these technologies were not finally implemented given their complexity, they are still being considered for future versions of the dictionary.

Finally, the implementation of this project, which presents itself as a future, ongoing large scale development, made me adopt a number of best practices that resulted in a more efficient design and development process:

- Security: there are a number of ways in which variables and values can be passed from one page to another. One common practice is to pass variables in a URL, where the values being passed are visible to the users. When that is done, then security checks must be in place for those users who, experimenting with the system, may change values manually in the URL to see where those new settings take them. In order to avoid leaving security holes open, every single undesired combination of settings must be accounted for and blocked before it is executed. For instance, if a user accesses his/her own profile settings and the username is passed in the URL (a harmless practice since the user knows his/her username),

then a situation could arise where a user types someone else's username in the URL, to see if access is granted to the other user's profile settings. A conditional logic, then, has to be put in place (sometimes with different iterations that check for different conditions or combinations of them).

- Data Integrity: although JavaScript is a straightforward way of checking for data integrity entered in HTML forms, there may be a number of circumstances where the JavaScript code does not execute properly, from a browser with JavaScript disabled to a version of a browser that ignores that JavaScript. There has to be, then, more than once instance were data is checked throughout a data submission process. Data can be checked at the "focus" level, i.e., when the user moves from one form field to another, so that instant feedback is received if the field just left has a problem with the type of data entered. Then data can be checked at the "submit" level, i.e., when the user clicks the "Submit" button. Finally, data should be checked again at the server level through appropriate CFML coding, and data processing should be stopped if data does not match the required type or structure.

- Query Optimization: given that this website makes heavy use of databases and dynamic information, there is a high number of queries performed on different pages and at different times. One of the strategies used to minimize database requests was the use of database joins. This technique allows for the simultaneous query of different tables in only one request, with the data already organized and filtered around one or more criteria. A database join is more efficient than a chained sequence of "AND" and "OR" Boolean operators in the "WHERE" portion of the SQL statement. A second strategy used consisted in the systematic

application of database aliases instead of making reference to the whole table name. This technique allows for shorter names, which translates in faster processing time and less text to be parsed by the CFML interpreter.

- Includes: a modular approach to the development of repetitive tasks was adopted, so that common processes (e.g., modifying the meaning of a word) were placed within includes (files that have all the code necessary to execute that process). Includes were used in the logoff process, the validation of usernames and roles, the modification of user profiles and dictionary entries, and the creation of new words. In this way, the corresponding include can be called from different pages, but it is always the same include. If an edit to the script is needed, there is only one include where the change has to be made, which reduces development time.

As a whole, I can say that this project has proven to be an invaluable experience that has renewed my confidence in the skills and abilities that I acquired in this program. This final project has also allowed me to go deeper into certain areas of expertise that I wanted to be more knowledgeable about, and it has given me the opportunity to develop original ideas and creative content for a real application.

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Appendix I

Sample of Usability Form

The ISDictionary Project

Your help is needed to evaluate this part of the application. Please provide honest answers since they will be used to improve this program. We appreciate your time and cooperation.

Background information

Username: _ _ _ _ _ _ _ _ _ _   Age:_ _ _ _ _ _

I am a   ❑ male
         ❑ female

My confidence with using computers is:
❑ not at all confident   ❑ somewhat confident   ❑ confident   ❑ very confident

Scale: 1- Strongly Disagree
2- Disagree
3- Neutral
4- Agree
5- Strongly Agree

Overall Reactions

	①	②	③	④	⑤
The website loaded quickly.	①	②	③	④	⑤
The interface of this system is pleasant.	①	②	③	④	⑤
Size of input textboxes was adequate.	①	②	③	④	⑤

Screen Layout

Screen layout was well organized.	①	②	③	④	⑤
Fonts on the screen were easy to read.	①	②	③	④	⑤
Amount of information on the screen was adequate.	①	②	③	④	⑤

Ease of Use

Learning to use the system was easy.	①	②	③	④	⑤
Steps to complete a task followed a logical sequence.	①	②	③	④	⑤
The number of steps per task was adequate.	①	②	③	④	⑤

Program Capabilities

Response time for each operation was fast enough.	①	②	③	④	⑤
Ability to correct mistakes was adequate.	①	②	③	④	⑤
System failures did not occur.	①	②	③	④	⑤

Online Help

Terminology used in the help sections was clear.	①	②	③	④	⑤
Warning messages were helpful to identify the problem.	①	②	③	④	⑤
Feedback on the completion of sequence of steps was clear.	①	②	③	④	⑤

General Impression

I felt comfortable using this system.   ① ② ③ ④ ⑤

Your Opinion

What additional features or capabilities would you add to this section of the application?

_____
_____
_____
_____
_____
_____
_____

Any other comments you want to add?

_____
_____
_____
_____
_____
_____
_____

❑ **Interface:** Registration form
❑ **Action:** complete and submit a registration form.
❑ **File(s):** registrationForm.cfm

Date completed: _ _ _ /_ _ _ /_ _ _ _ _

Notes:

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