A STUDY OF COURSE DESIGN FACTORS THAT INFLUENCE E-LEARNING COURSE COMPLETION RATES

THESIS

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ABSTRACT

E-learning has been defined as “the use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere” (Linezine, 2000). E-learning is one of the fastest growing services on the Internet today with revenues between 6 billion and 7 billion dollars (Bizreport, 2003). This growth comes with a peculiar problem – many students never complete their e-learning courses. Although there is significant variation among institutions -- with some reporting course-completion rates of more than 80 percent and others finding that fewer than 50 percent of distance-education students finish their courses … course-completion rates are often 10 to 20 percentage points higher in traditional courses than in distance offerings.” (Carr, 2000).

There have been few credible studies investigating actual non-completion rates and factors that affect these dropout rates (O’Connor et.al., 2003). This study seeks to apply Human-Computer Interaction theory, through use of a usability inspection method called Heuristic Evaluation, to identify course design characteristics that may influence course completion rates. A research instrument was developed and applied to twenty (20) courses offered by the Air Force Institute of Technology’s School of Systems and Logistics, and a Pearson Correlation was performed to identify any relationships between design factors and course completion rates. Analysis indicated some support for using the Heuristic Evaluation method. Practical and theoretical implications for this research are also discussed.

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A STUDY OF COURSE DESIGN FACTORS THAT INFLUENCE E-LEARNING COURSE COMPLETION RATES

I. Introduction

"What I admire in Columbus is not his having discovered a world but his having gone to search for it on the faith of an opinion."

A. Robert Turgot

Background

E-learning has been defined as "the use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere" (Linezine, 2000). E-learning is one of the fastest growing services on the Internet today with revenues between 6 billion and 7 billion dollars (Bizreport, 2003). This pervasive nature of the Internet has created a golden opportunity for corporations and educational institutions to provide knowledge and learning around the globe using e-learning services. The federal government has also taken a keen interest in e-learning. White House Executive Order #13111 (1999) requires all executive agencies to identify one area of training and implement an e-learning solution. The intent of this order is to increase awareness and use of technology to provide government employees with more training opportunities.

In the midst of this enthusiasm, there is a continuing concern over e-learning course completion rates.

> Although there is significant variation among institutions -- with some reporting course-completion rates of more than 80 percent and others finding that fewer

> than 50 percent of distance-education students finish their courses … course-completion rates are often 10 to 20 percentage points higher in traditional courses than in distance offerings." (Carr, 2000).

A study by Reynolds (2002) looked at this problem for the Air Force Institute of Technology School of Systems and Logistics Virtual Schoolhouse (VSH) where completion rates were very close to the range described by Carr with completion rates ranging between 48 percent and 79 percent. Reynolds investigated the VSH's low completion rate problem from a motivational perspective, identifying such factors as completion goals, off-task distractions, availability of feedback for self-regulation, and continued confidence were important factors that distinguished those who completed their courses from those who did not. Reynolds also identified problems with course design like lack of readability and excessive course length as possible contributing factors. His results were not statistically conclusive – mainly because of a small sample size. the present study attempts to correct this problem and then expand on the potential course design characteristics may influence VSH course completion rates.

There has been much research on the motivational factors influencing e-learning completion rates, but less research exploring the effects of course design on course completion rates. A study by researchers at James Madison University that surveyed a group of e-learning managers from various organizations and industries found that instructional design-related factors and lack of motivation had an equal effect on course completion (O'Connor et.al., 2003). This would indicate that problems with course design have as much effect on completion rates as learner motivation.

One key consideration in designing an e-learning course is to separate the needs of a user from the needs of a learner. (Smulders, 2004) differentiates these types based on the operator consciousness of the web-based technology. Users interact with the form of the Web course, the interface, navigation, information architecture, and the visual design of both the screen layout and the actual content. A learner, on the other hand, is a user who can easily navigate their way through the form of the Web-based environment and access the content. The design of the course becomes transparent and the learner begins interacting with the content, instructors, and fellow students, and finally begins to learn. Identifying and addressing design factors that hinder the student's use of the e-learning system should help make the transition from user to learner easier and faster.

Human-computer interaction (HCI) theory provides readily available constructs in the form of usability inspection methods that should allow e-learning course designers to help users become learners. One usability inspection method that is particularly appealing is heuristic evaluation which involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles (the "heuristics") (Nielsen, 1994). The method's appeal stems from its ability to identify many usability problems while being easy to learn and relatively inexpensive to use. Using heuristic evaluation to identify usability factors that inhibit students from easily accessing course materials, and thereby interfering in the learning process, may provide insights into why some individuals complete e-learning courses while others drop out.

Unfortunately, given the anecdotally-claimed wide range of non-completion rates for e-learning in the popular press and trade journals, there have been few credible

studies investigating actual non-completion rates and factors that affect these dropout rates (O'Connor et.al., 2003). According to e-Learn magazine, "the idea of e-learning usability is still so new it is barely on the market's radar screen. When the market eventually insists on usability testing, e-learning usability experts will be the ones making sure e-learning courseware is as effective as it is stylish--and the data they uncover may offer insights on the high dropout rates from online education courses" (2004:2). Because e-learning and, therefore, the study of e-learning usability are such recent developments, more studies are needed to create a body of knowledge that can direct further research.

Research Focus

The Air Force Institute of Technology School of Systems and Logistics is concerned over the apparent low completion rates for some courses offered through their Virtual Schoolhouse. This study will look to HCI usability factors to explain variation in course completion rates, as well as build upon the work of Reynolds by retesting hypotheses related to course length and readability of course material using an expanded data analysis that covers 20 VSH courses. Like most software development, creation and maintenance of e-learning courses can be very expensive. Knowing where to focus design efforts can help e-learning course designers and developers reduce these costs while providing a better product in return.

Implications

This study will have both practical and theoretical implications for researchers looking at the low e-learning course completion rate. Practical implications include identification of maintenance problems such as identifying broken or misdirected hyperlinks, interactive content that is difficult to use, and spelling and grammatical errors. Theoretical implications for this study include development of a heuristic evaluation checklist, tailored to e-learning courses, that is derived from work in usability testing of graphical user interfaces.

Thesis Overview

This chapter has provided a brief introduction to the issues confronting e-learners that course designers must consider when developing e-learning courses. Chapter II expands on work by Reynolds (2002), and builds a case for evaluating course design through heuristic methods as an approach to explain low e-learning course completion rates. Chapter III presents the methodology used to test the hypotheses, describes the development of the instrument used to evaluate the VSH courses, and explains the data collection techniques. Chapter IV presents the statistical analysis of the data collected. Chapter V presents the conclusions reached from this study and recommendations for further research in this area.

II. Literature Review

"When you take stuff from one writer, it's plagiarism; but when you take it from many writers it's research."

Wilson Mizner

Introduction

This chapter begins with an overview of the Air Force Institute of Technology, School of Systems and Logistics Virtual Schoolhouse. The overview includes the goal, structure, and operation of the VSH. Next, literature from usability inspection methods of user-interface design is reviewed to identify system design characteristics that may discourage, or prevent, students from completing an e-learning course. Specific hypotheses are stated to describe the relationship between the heuristic and course completion rates.

Virtual Schoolhouse

The Air Force Institute of Technology (AFIT) School of Systems and Logistics Virtual Schoolhouse is a web-based, asynchronous learning environment with the mission of providing continuing education resources to the student's desk, on the student's schedule (The Department of Systems Acquisitions AFIT Virtual Schoolhouse homepage, 2004). The VSH offers over 20 web-based courses in such areas as acquisition, configuration management, software engineering, sustainment, and systems engineering to United States Air Force and other Department of Defense personnel

working in the acquisition management and logistics career fields. While VSH is designed to allow students freedom in when and where they complete a course, certain time restrictions are placed on the courses to ensure the availability of an instructor should the student have any questions on the use of the VSH system or on the material presented in the course.

VSH courses are not mandatory for certification of acquisition personnel, nor do they provide any academic credit. The VSH courses are, however, an important source of continuous learning for acquisition personnel. A memorandum issued by the Under Secretary of Defense (Acquisition, Technology, and Logistics) requires all acquisition personnel, whether certified or not, to obtain 80 continuous learning points every two years (Under Secretary of Defense (AT&L), 2003). VSH courses offer credits that can be applied toward fulfilling this requirement. According to a VSH administrator, the school is finding it difficult and expensive to maintain courses. The VSH administrator believes, completion rates have dropped in recent years from nearly 80% to 67% in calendar year 2002 as a result of these maintenance issues. In order to address the low course completion rates, VSH developers and administrators are looking for tools that will allow them to continually assess the courses and design effectiveness. One family of tools that might prove helpful in these assessments is usability inspection.

Usability Inspection and Heuristic Evaluation

Usability Inspection (UI) is a sub-discipline of the Human-Computer Interaction field, which has roots in numerous disciplines including computer graphics, operating

systems, human factors, ergonomics, industrial engineering, cognitive psychology, and the systems part of computer science (Hewett, Baecker, Card, Carey, Gasen, Mantei, Perlman, Strong, and Verplank, 2003). UI is the generic name of a set of methods based on having evaluators inspect or examine usability-related aspects of a user interface (Mack and Nielsen, 1994). One usability inspection method that is cost effective and easy to use is Heuristic Evaluation (Nielsen, 1994). The Heuristic Evaluation method involves a small group of evaluators who inspect an interface and judge its compliance with some set of recognized usability principles – the"heuristics" (Nielsen, 1994:28). Nielsen developed an original list of general heuristics that evaluators can choose from to meet the requirements of the evaluation being conducted. In addition to Nielsen's heuristics, practitioners at the Online Computer Library Center (OCLC) have defined additional heuristics to evaluate their online systems (OCLC, 2003).

A heuristic describes qualities or characteristics that are a part of a usable interface. To help guide evaluators during an inspection, Pierotti (2002) developed a checklist of items, or characteristics, for each of Nielsen's heuristics, that evaluators should look for to determine how well a system conforms to the heuristic. Many of these items can be applied to the design of VSH courses. Nine heuristics and the hypothesized relationships for VSH courses are summarized in the paragraphs below. The first seven stem primarily from Nielsen's revised set of usability heuristics and use characteristics tailored from Pierotti's checklist. The last two are taken from the OCLC heuristics. These nine heuristics are depicted in Figure 1 on the next page.

Visibility of System Status

Nielsen (1994) asserts that the system should always keep the user informed about what is going on, through appropriate feedback within reasonable time. Every display should present the user with a title or header that describes the screen contents (Pierotti, 2002). If pop-up windows are used to display error messages, the window should not obscure the field the error message pertains to (Pierotti, 2002). Other important characteristics include some sort of system feedback for every operator action, which

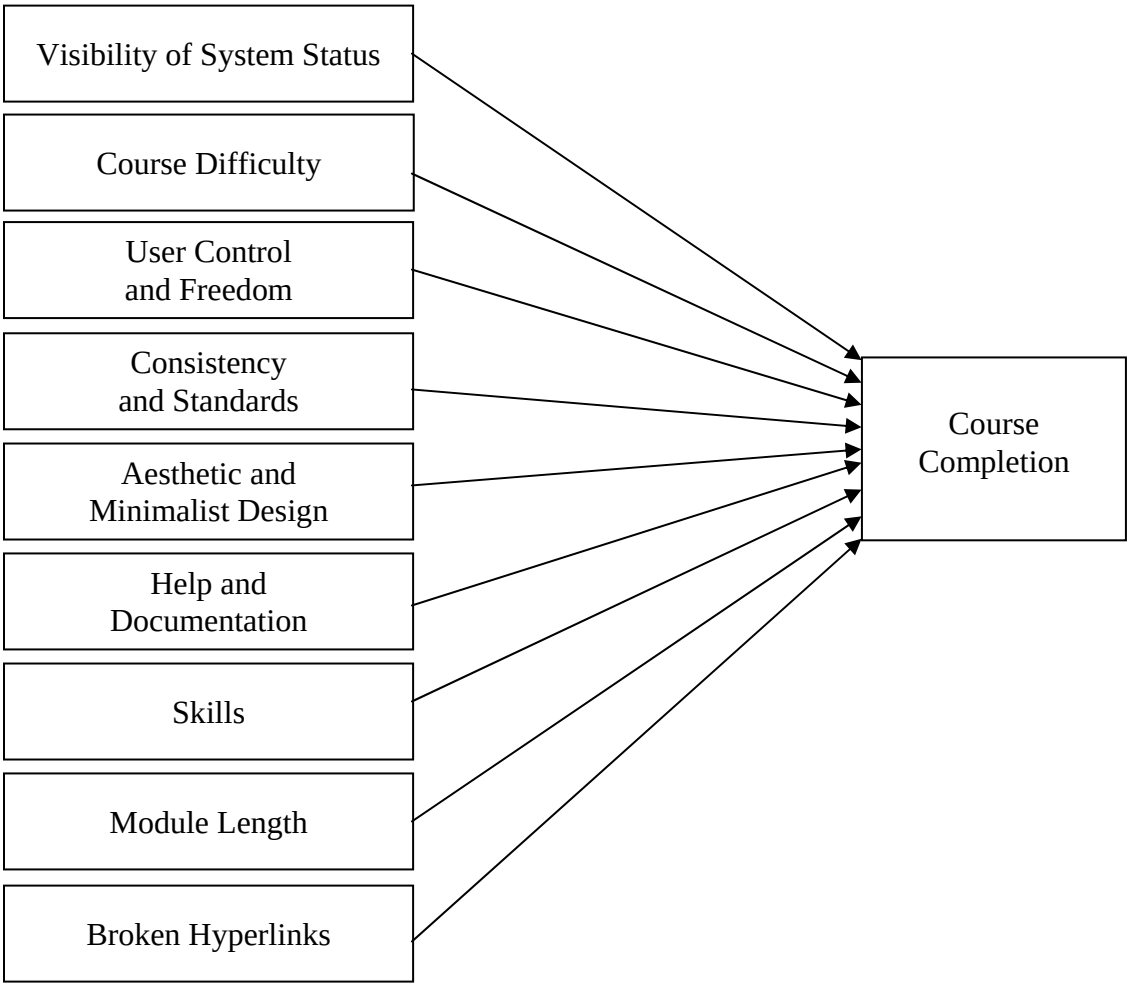

Figure 1. Relationship of Heuristic Constructs to Course Completion.

can be in the form of an indication that the next module can be started when the current module has been completed, a visual indication of where to place objects that are to be moved, or a message to the user informing them of what is going on when there are lengthy delays in system processing (Pierotti, 2002). These feedback characteristics are present in VSH courses to varying degrees except for displaying a message during lengthy delays. The lack of these messages may cause some users to believe the course has stopped responding, leading them to leave the course prematurely.

Other system status indicators include context labels, menu maps, and place markers that act as navigational aids when the user must navigate between multiple screens (Pierotti, 2002). These place markers track a student's progress through a module, indicating how much they have accomplished and how much remains. Place markers can also help users make a decision on whether to stop in the middle of a module or to finish before exiting the VSH system. The effect of these system status characteristics on course completion leads to the first hypothesis.

> **Hypothesis 1:** There will be a positive relationship between the visibility of system status within a course and course completion rates.

Match between the System and the Real World

The system should speak the user's language, with words, phrases, and concepts familiar to the user, rather than system-oriented terms (Nielsen, 1994). Courses that use many unfamiliar terms and complex sentences will be more difficult to use than courses that use familiar words in simple sentences. Reynolds (2002) tapped into this heuristic by measuring course difficulty through readability using a simple tool, called the Flesch

Reading Ease (Flesch, 1962). This tool is readily available through Microsoft Word and is widely used by curriculum developers to match the difficulty of course materials with the reading ability of the students who will be using it. Another tool readily available through Microsoft Word is the Flesch-Kincaid Grade level. This tool converts the readability score to a United States grade-school level (Anderson, 2003). For example, a score of 8.0 means that an eighth grader can understand the document. These quantitative measures may be helpful in identifying an aspect of the VSH courses that is contributing to lower course completion rates and lead to the second hypothesis.

> **Hypothesis 2:** There will be an inverse relationship between the difficulty of course materials and course completion rates.

User Control and Freedom

According to Nielsen (1994), users should be free to select and sequence tasks (when appropriate), rather than have the system do this for them. In courses that use overlapping windows, it should be easy for the user to rearrange the windows on the screen, be able to switch between the windows, and each window should allow both vertical and horizontal scrolling (Pierotti, 2002). As new windows appear on the screen, users can become disoriented and lose track of where they were before the new windows appeared. This disorientation can cause the user to become frustrated while trying to find where he/she came from. If there are multiple menu levels, the system should provide a mechanism to allow the user to go back to previous menus, and if a question and answer interface is used, the user should be able to go back to previous questions or skip ahead to

later questions (Pierotti, 2002). The effect of these user control and freedom characteristics on course completion leads to the third hypothesis.

> **Hypothesis 3:** There will be a positive relationship between the level of user control and freedom within a course and course completion rates.

Consistency and Standards

Nielsen also suggested that users should not have to wonder whether different words, situations, or actions mean the same thing (1994). Formatting standards should be followed consistently in all screens within a course (Pierotti, 2002). Because VSH courses are presented over the World Wide Web, users may expect Web conventions to apply to the course material. An example of this would be underlined text. On the World Wide Web, underlined text is used to identify a hyperlink, so a user will expect a new Web page to appear when they click on the text and could become confused if nothing happens.

Other characteristics to look for when evaluating consistency and standards include labeling of icons, especially system specific icons as they may be unfamiliar to the user, and careful use of attention-getting techniques (Pierotti, 2002). When the system asks for a specific answer to a question and more than a one word answer is required, the valid inputs should be listed so the user will know how the system expects them to enter their response (Pierotti, 2002). The effect of these consistency and standards characteristics on course completion leads to the fourth hypothesis.

> **Hypothesis 4:** There will be a positive relationship between the platform consistency and standards within a course and course completion rates.

Aesthetic and Minimalist Design

Nielsen (1994) also suggests that dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility (Nielsen, 1994). A screen should only display information essential to understanding the current topic or to any decision that the user must make (Pierotti, 2002). While courses that are entertaining can be more interesting, VSH course designers should be sure the information the user needs is not being lost in the presentation. Color should be used with discretion and menu titles should be brief, yet long enough to communicate their meaning to the user (Pierotti, 2002). The effects of these aesthetic and minimalist design characteristics on course completion leads to the fifth hypothesis.

> **Hypothesis 5:** There will be a positive relationship between aesthetic and minimalist design characteristics within a course and course completion rates.

Help and Documentation

Even though it is better if the system can be used without documentation, Nielsen suggests that it may be necessary to provide help and documentation, and any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large (1994). The help function should be visible on every screen within a course, it should be easy to access and return from the help system, and the information provided by the help system should be relevant to the user's task (Pierotti, 2002). Help files, such as a list of acronyms used within a course, that a user can access from every page may reduce the time a user spends searching for the first use

of an acronym. Acronyms that are unfamiliar to the user may need to be referenced numerous times before they are easily recognized. The effects of theses help and documentation characteristics on course completion leads to the sixth hypothesis.

> **Hypothesis 6:** There will be a positive relationship between the level of help and documentation within a course and course completion rates.

Skills

Beyond the other characteristics, Nielsen states in his Flexibility and Efficiency of Use heuristic that the system should support, extend, supplement, or enhance user's computer skills, background knowledge, and expertise – not replace them (1994). Pierotti (2002) renames this heuristic to "Skills" and this name will be used throughout this study. Pierotti (2002) also states that window operations should be easy to learn and use, and the system should provide support for novice and expert users, and that the cursor should be positioned in the textbox when the user enters a screen that contains one. Users should not have to spend more time learning how to use the course software than they spend learning the course material, nor should they have to make unnecessary control inputs. The effects of a user's computer skills on course completion leads to the seventh hypothesis.

> **Hypothesis 7:** There will be a positive relationship between the level of support for the user's skills within a course and course completion rates.

Use of Chunking

To Nielsen's seven heuristics, the Online Computer Library Center adds that material should be written so that documents are short and contain exactly one topic

(OCLC, 2003). The concept of chunking is not unlike Taylor's (1917) concepts of task specialization, and time study. In fact, Taylor uses the example of a teacher breaking a long lesson into daily tasks so the students can accomplish the work in a specific amount of time. The trick in applying Taylor's concepts, using the example of the teacher's long lesson, is in determining how much of the task a student should work before requiring a break.

In applying these concepts to the Virtual Schoolhouse courses, a task would be defined as a module, and the job of course designers would be to size modules in such a way that students are able to complete them before needing a break or being pulled away from completing the module by other demands. This study makes no attempt at trying to determine what the optimal length of a module should be. Rather, this study only attempts to determine if the current average module length has a negative linear relationship to course completion rates.

> **Hypothesis 8:** The average length of the modules within VSH courses will have an inverse relationship to course completion rates.

Don't Lie to the User

The final, and possibly most important heuristic is the elimination of erroneous or misleading hyperlinks. The OCLC warns designers to not refer to missing information (2003). A hyperlink on a World Wide Web page is an embedded command that appears as text within the document. E-learning course developers often use hyperlinks to provide access to background information or supporting documentation for some topic presented in the course. When activated (clicked on), the hyperlink command instructs the browser

to retrieve and display a different Web page. By activating the hyperlink, an e-learner has acted upon a need for the information represented by that link. Repeated failure of the e-learner to access information may begin to erode his or her confidence in the usefulness of the course as a reliable source of information. Reynolds (2002) looked at software problems such as broken hyperlinks and found they did not appear to have a significant impact on an e-learners motivation to complete a course. However, Reynolds' analysis was based on comments from course critiques, which are normally filled out by students after they complete a course. The use of course critiques raises the question of non-contact bias since it seems probable that a student who fails to complete a course will also fail to submit a course critique. By looking at the correlation between broken hyperlinks and actual course completion rates, this study should overcome this bias. The effect of broken hyperlinks on course completion leads to the ninth hypothesis.

> **Hypothesis 9:** The percentage of broken hyperlinks within a course will have an inverse relationship to course completion rates.

Summary

This study used existing literature to identify heuristics that may influence course completion rates. Nine distinct guidelines have been offered as possible factors that may influence course completion rates with the objective to create a checklist tailored to develop and maintain web-based, asynchronous courses. The following chapter describes the methodology followed to test the nine hypotheses.

III. Methodology

"A leading authority is anyone who has guessed right more than once."

Frank A. Clark

Introduction

This chapter describes the methodology used to measure design factors that influence e-learning course completion rates. A literature review was used to develop the research instrument and to identify other measures for this study. The research instrument, entitled the Heuristic Evaluation Checklist (HEC) (see Appendix A), was modeled after a similar checklist developed by Pierotti (2002) and described in Chapter II. The other measures chosen were the Flesch Reading Ease (Flesch, 1962), the Flesch-Kincaid Grade Level (Anderson, 2003), and a word count to measure course length. Twenty (20) courses from the Air Force Institute of Technology Virtual Schoolhouse were chosen for analysis. The following sections describe the course characteristics, instrument development, data collection procedures, and statistical analysis used in this research effort.

Sample Courses

Twenty courses from the Virtual Schoolhouse were selected for this study. These courses were all of the courses available at the time of this study. They cover a variety of acquisition related topics and have a fairly wide range of course completion rates (49 percent to 78 percent). There were a total of 12,234 enrollments for these courses from CY 2000 to CY 2003. The average completion rate across all twenty courses was about 67 percent. Table 1 shows the distinguishing characteristics for the sample courses.

Table 1. Characteristics of Target Courses

Course Name	Course Number	Course Description	Number Enrolled	Number Completed	E_{cr}
Activity Based Costing	FIN160	Introduces ABC and discusses AFMC strategic planning process.	977	479	49.0
Introduction to Risk Management	SYS165	Presents elements of risk management in acquisition.	1293	673	52.0
Advanced Concepts Technology Demonstration	SYS190	Provides information to facilitate ACTD project support.	435	259	59.5
Earned Value Management System	FIN250	Instructs on applying EVM to evaluate contractor performance.	1093	654	59.8
Reformed Supply Support Program	SYS180	Educates students in a reengineering process for supply support.	489	305	62.4
Intelligence in Force Modernization	SYS031	Addresses the role of the Intelligence community in acquisition.	329	206	63.4
Current Topics in Financial Management	FIN150	Presents students with current Financial Management facts and principles.	1118	718	64.2
Incentives for Reducing Acquisition Response Time	SYS352	Addresses incentives to reduce acquisition cycle time on weapon system programs.	141	95	67.4
Introduction to Configuration Management	SYS028	Presents configuration management facts and principles in the light of current acquisition reform practices.	1002	688	68.7
Maintenance Planning Course	SYS170	Covers acquisition policy initiatives for maintenance planners.	340	238	70.0

Table 1 continued on next page

Table 1 continued

Course Name	Course Number	Course Description	Number Enrolled	Number Completed	E_{cr}
Pricing Analysis Methods	QMT110	A concentrated course on price analysis methods.	419	294	70.2
Introduction to Evolutionary Acquisition	SYS149	Provides guidance on using evolutionary acquisition as strategy for achieving shorter acquisition cycles.	439	312	71.1
Reducing Acquisition response Time	SYS350	Presents impact of long development times on war-fighter, budget, acquisition, and sustainment communities.	215	153	71.2
Contract Repair Process	SYS175	Presents contract repair process used by logistics commands.	309	221	71.5
Integrated Product Support Course	SYS171	Provides student with basic processes supporting major systems.	788	565	71.7
AFRL R&D Case File Management Course	LAB150	Covers procedures for maintaining good documentation while ensuring continuity is maintained between researchers.	966	693	71.7
Product Support Management Planning	SYS173	Covers support requirements, sources of support migration planning, partnering policy and service level agreements.	199	144	72.4
Modification Management	SYS172	Emphasizes the reengineered modification management process.	583	430	73.8
Commercial Business Approach	SYS195	Covers commercial business approach to acquisition programs.	349	270	77.4
Operational Safety. Suitability and Effectiveness (OSS&E)	SYS155	Course enables Air Force Material Command to begin policy execution to institutionalize OSS&E processes.	750	588	78.4

Measurements

Course Completion Rates

Course completion rates refer to the number of students who complete an e-learning course compared to the number who enrolled. Completion rates were computed from statistics maintained on the VSH website using the following formula:

$$E_{cr} = \frac{\text{total students completed}}{\text{total students enrolled}}$$

Course Difficulty

For purposes of this study, course difficulty refers to how hard e-learning courses are in terms of their Match Between System and the Real World heuristic score from the Heuristic Evaluation Checklist, readability, and grade level. The heuristic is described in the Instrument Development section of this chapter. Readability is based on the Flesch Reading Ease Score, which is determined by the structure of words and sentences (Flesch, 1962). Its scale ranges from 1 to 100. The higher the score, the easier the text is to read. To collect this data, each screen of text in the courses was copied to Microsoft Word. Then the Microsoft Word readability statistics tool was turned on and run against the text. The readability scores were then averaged to come up with an overall readability score for each course.

Grade level is based on the Flesch-Kincaid Grade Level score and is determined by converting the readability score to a United States grade level. This data was collected and computed in the same way as the readability score.

Reynolds (2002) used a similar construct to determine a relationship between course difficulty and course completion rates. Based on a sample of five VSH courses,

Reynolds found no statistically reliable relationship between course difficulty and completion rates. This study will retest the difficulty concept using a larger sample of courses to determine if sample size influenced Reynolds' results. Table (2) shows the descriptive characteristics of the difficulty construct computed across courses. See Appendix B for individual course results.

Table 2. Descriptive Characteristics for Course Difficulty

Characteristic	*M*	*SD*
Questions Stated in Clear Simple Language.	**4.74**	**0.56**
Readability (Flesch Reading Ease Score)	**31.28**	**8.28**
Grade Level (Flesch-Kincaid)	**11.27**	**0.63**

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Support for Hypothesis 2 (H_2) will be based on the statistically reliable relationship between each the course difficulty factors and course completion rates. The heuristic evaluation score and readability must be positively correlated and the grade level must be negatively correlated. There will be no support for H_2 if none of the relationships is statistically reliable as predicted. One or two statistically reliable relationships will be considered partial support for H_2. Reliable relationships between all three course difficulty factors and course completion rates will indicate strong support for H_2.

Words per Module and Broken/Misdirected Hyperlinks

To find the number of words per module, the text on each screen is copied into Microsoft Word and the word count tool run. The total words for each screen are summed and then divided by the number of modules in the course to find an average module length for each course (see Appendix B). These measures are used to test H_8.

The number of broken and misdirected hyperlinks was determined by following all hyperlinks in a course and recording the links that do not connect to the information they represented. This measure is used to test H_9.

Table 3 shows the descriptive statistics of the measurements for these two heuristics computed across courses. Both items were included in the Pearson Correlation analysis.

Table 3. Descriptive Statistics for Module Length and Broken Hyperlinks

Characteristic	*M*	*SD*
Module Length	**2137.75**	**1182.40**
Broken Links (%)	**0.16**	**0.13**

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Heuristic Evaluation Checklist

A review of current literature on heuristic evaluation yielded an existing graphical user interface evaluation tool, called "Heuristic Evaluation – A System Checklist" (Pierotti, 2002), that could be easily tailored and adapted for use in evaluating e-learning course designs. Based on Nielsen's (1994) heuristics, the checklist provides a set of design characteristics for each heuristic that can be tailored to evaluate the VSH courses.

Rather than use the 3 point "Yes-No-N/A" scale used by Pierotti, this study implemented a 5 point Likert scale ranging from Almost Never to Almost Always. This scale was incorporated to give the evaluator more discretion in assessing how well a course demonstrated compliance with a characteristic. The following sections describe each of the heuristic's characteristics chosen to evaluate the VSH courses along with the mean and standard deviation computed across the courses from the evaluation results.

Visibility of System Status

The first heuristic, Visibility of System Status, was used to evaluate whether the system kept the user informed about what is going on, through appropriate feedback within reasonable time (Nielsen, 1994). Table 4 summarizes the descriptive statistics for the visibility of system status heuristic.

Table 4. Descriptive Statistics for Visibility of System Status

Characteristic	*M*	*SD*
Title or Header on Every Page	5.00	0.00
Pop-up Windows Cover Fields	4.57	1.13
System Feedback for Every Operator Action	**4.79**	**0.71**
Indication to Start Next Group of Actions	5.00	0.00
Feedback on Where to Put Moved Objects	**4.33**	**1.21**
User Informed During System Delays	2.00	--
Place Markers as Navigational Aids	1.10	0.45

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Analysis of the descriptive statistics revealed that some characteristics would not be useful in computing the Pearson Correlation and should be excluded. Title or header on every screen and indication to start next group of actions were excluded because there was no variation. All of the courses fully implemented these characteristics. Pop-up windows cover fields was removed because it only applied to seven courses and only one course score differed from the rest. User informed during system delays was removed because only one course experienced a delay. Place markers as navigational aids was removed because only one VSH course used place markers.

Match Between System and the Real World

The heuristic of Match Between System and the Real World was used to evaluate whether the system spoke the user's language, with words, phrases and concepts familiar to the user, rather than system oriented terms (Nielsen, 1994). See Table 2 for the distinguishing characteristics for this heuristic.

User Control and Freedom

The heuristic of User Control and Freedom was used to evaluate whether users could easily recover from unintended actions without having to go through an extended dialogue (Nielsen, 1994). Table 5, on the next page, shows the descriptive statistics for this heuristic. Analysis of the descriptive statistics for rearranging windows, waiting for a signal from the user, and scroll bars resulted in exclusion of these three items from further analysis due to lack of variation in the scores.

Table 5. Descriptive Statistics for User Control and Freedom

Characteristic	*M*	*SD*
Easy to Rearrange Windows on Screen	5.00	0.00
Easy to Switch Between Windows	**4.84**	**0.50**
System Waits for Signal From User Before Processing	4.95	0.22
Mechanism Allowing Users to Go Back to Previous Menus	**4.20**	**1.01**
Users Can Go Forward and Back Through Questions	**1.80**	**1.10**
Vertical and Horizontal Scroll Bars Provided	5.00	0.00

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Consistency and Standards

The heuristic for consistency and standards was used to evaluate whether users had to wonder if different words, situations, or actions mean the same thing. Table 6 shows the descriptive statistics for the characteristics evaluated for this heuristic.

Table 6. Descriptive Statistics for Consistency and Standards

Characteristic	*M*	*SD*
Consistent Formatting Standards Followed	**4.25**	**1.12**
Heavy Use of All Uppercase Letters Avoided	5.00	0.00
Icons Labeled	**4.70**	**0.73**
Attention-Getting Techniques Used With Care	4.05	**0.89**
Valid Inputs for Question Listed	**4.75**	**0.71**

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Analysis of the descriptive statistics for this heuristic revealed no variation in the heavy use of uppercase letters so this item was excluded from further analysis.

Aesthetic and Minimalist Design

Nielsen (1994) stated in the Aesthetic and Minimalist Design heuristic that dialogues should not contain information which is irrelevant or rarely needed. Table 7 shows descriptive statistics for the characteristics evaluated for this heuristic. All of the characteristics were used in the correlation analysis.

Table 7. Descriptive Statistics for Aesthetic and Minimalist Design

Characteristic	*M*	*SD*
Information Essential to Decision-Making	**4.30**	**0.98**
Brief Menu Titles	**4.95**	**.22**
Color Used With Discretion	**3.95**	**1.00**

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Help and Documentation

Nielsen (1994) further stated in the Help and Documentation heuristic that though it would be better if the system can be used without help and documentation, it may be necessary to provide it. Any such information should be easy to search, focused on the task, and not be too large. Table 8, on the next page, shows the descriptive statistics of the characteristics used to evaluate the help provided in each course.

Table 8. Descriptive Statistics for Help and Documentation

Characteristic	*M*	*SD*
Help Function Visible	**3.10**	**1.86**
Information Relevant	**2.6**	**0.99**
Easy to Access and Return from Help	**2.75**	**1.92**
Errors in Matching Exercises Using Connecting Lines	2.00	--

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Skills

This heuristic, as summarized by Pierotti (2002) dictates that the system should support a user's computer skills, not replace them. Table 9 shows the descriptive statistics for the characteristics used to evaluate how well the courses supported the user's computer skills.

Table 9. Descriptive Statistics for Support of User's Skills

Characteristic	*M*	*SD*
Window Operations Easy to Learn and Use	**3.90**	**1.21**
Support for Novice and Expert Users	--	--
Cursor Positioned in Textbox	1.60	0.55

Note. **Bold** text indicates item included in computation of Pearson Correlation.

Support for novice and expert users looked at things like using shortcut keys; hidden commands that someone familiar with the system could use to use the system

faster. This characteristic was not observed within any the courses. It seemed like a logical item when it was selected for the checklist. The cursor position item was excluded from further analysis because it only applied to a few courses and there was very little variation of scores where it did apply.

Statistical Analysis

The statistical technique employed in this study was Pearson's correlation. Under the assumption of normality, a Pearson correlation is used to determine the linear relationship between a pair of variables. SPSS was used to create a correlation matrix showing the relationships between the criterion variable, course completion rates, and the predictor variables: module length, broken links, readability, grade level, and, for each heuristic, the mean of each characteristics for each course.

All statistical analyses are reported in Chapter IV. The goal was to find statistically reliable relationships to asses the hypotheses presented in Chapter II.

Summary

This chapter explained the research approach and methodology used to identify course design factors that influence e-learning course completion rates. Pearson's correlation was used to identify any statistically reliable relationships between completion rates (E_{cr}) and data collected from an evaluation of VSH courses using the Heuristic Evaluation Checklist, and other measures. The result will then be used to draw conclusions about the effects design factors have on e-learning course completion rates.

IV. Results

"One should never spoil a good theory by explaining it."

Peter McArthur

Introduction

The intent of this study was to identify e-learning course design factors that influence course completion rates. This chapter presents the analysis and findings from the Heuristic Evaluation Checklist, as well as other measurements taken to support or refute the nine hypotheses presented in chapter two. First, a table is presented that summarizes descriptive statistics and the linear relationships of each variable to VSH course completion rates. The table is then followed by a discussion of each variable correlation.

Descriptive Statistics

Table 10 shows the mean, standard deviation, and the Pearson correlation for the study variables. Because the focus of this study was limited to the effects of design factors on e-learning course completion rates, discussion will be limited to the relationships between completion rates and the other study variables.

Unsupported Hypotheses

As Table 10 on the next page shows, the correlations between course completion rates and visibility of system status, consistency and standards, aesthetic and minimalist design, and broken links were not statistically reliable. Therefore, hypotheses H_1, H_4, H_5,

and H_9 are not supported. Additionally, none of the correlations for the variables measuring course difficulty (match between system and real world, readability, grade level) were statistically reliable; therefore, H_2 is not supported. Although statistically

Table 10. Descriptive Statistics and Correlation Matrix

Variable	Mean	SD	Completion Rate Correlation	
Visibility of System Status	4.78	0.70	-.25	
Match Between System and Real World	4.74	0.56	-.11	
User Control and Freedom	4.28	0.83	.31	*
Consistency and Standards	4.51	0.45	.26	
Aesthetic and Minimalist Design	4.40	0.55	-.03	
Help and Documentation	2.82	1.46	.31	*
Skills	3.90	1.21	-.34	*
Words per Module	1914.00	628.05	-.51	*
Readability	31.28	8.07	-.13	
Grade Level	11.27	0.61	-.19	
Broken Links	.16	0.12	.13	

Note. An ***** indicates one-tail correlations statistically reliable at $p < .10$. Sample size for all correlations except words per module was $N = 20$. Sample size for words per module was $N = 19$.

reliable, the inverse relationship between course completion rates and skills was not as predicted. Therefore, H_7 is not supported.

Supported Hypotheses

The following paragraphs discuss those hypotheses that were supported in this study. The supported hypotheses were H_3, H_6, and H_8.

H_3 - User Control and Freedom

The correlation between course completion rates and factors influencing user control and freedom was statistically significant ($r = .31$, $p < .10$). Figure 2 shows the

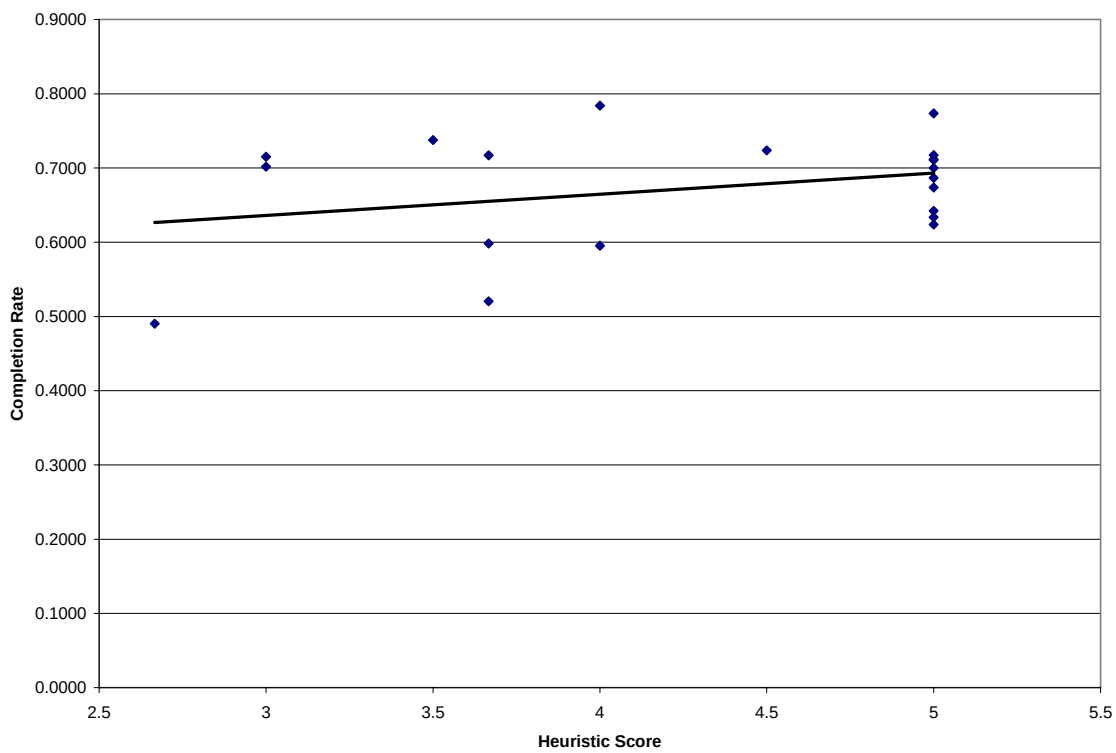

Figure 2. Scatter Diagram for User Control and Freedom.

scatter diagram depicting the positive relationship between the observed user control and freedom factors and course completion rates. These findings suggest that users who are able to exercise greater control over the e-learning environment, and have freedom to easily move back and forth through course materials, are more likely to complete the e-learning course. Therefore, H_3 is supported.

H_6 - Help and Documentation

The correlation between course completion rates and the level and quality of the help and documentation within a VSH e-learning course was found to be statistically significant ($r = .31$, $p < .10$). Figure 3 shows the scatter diagram depicting the positive

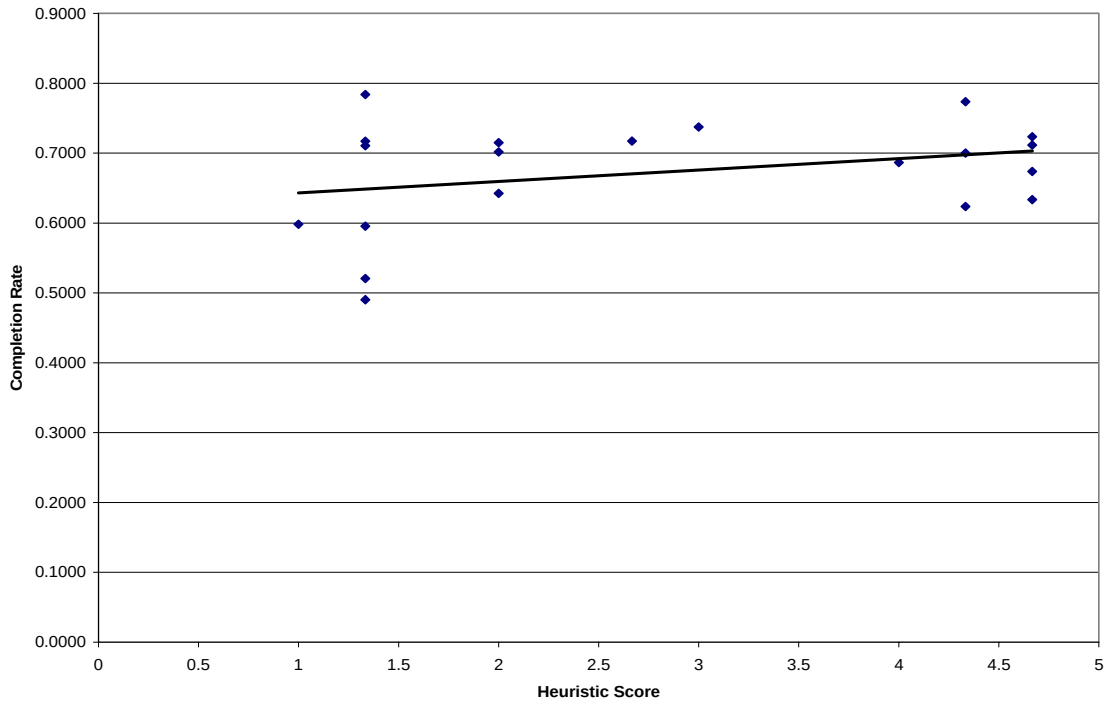

Figure 3. Scatter Diagram for Help and Documentation

relationship between the observed compliance of help and documentation characteristics and course completion rates. These findings suggest that a help system that is easily accessible and relevant to the user's task can assist a user in completing an e-learning course. Therefore, H_6 is supported.

Use of Chunking

Applying the concept of chunking to a VSH e-learning course means to break the course into manageable pieces, or modules that should allow the user to complete a module before off-task demands interfere with completion of the module and, therefore, completion of the course. It was expected that the correlation between course completion rates and word per module would be inverse; that is, as the number of words per module increase, course completion rates decrease. The correlation between course completion rates and average module length for all twenty VSH courses was not statistically significant across all twenty courses ($r = -0.17$, $p > .10$). Examination of the scatter diagram shown in Figure 4 on the next page revealed that the measurement for one course, Introduction to Evolutionary Acquisition (EA), appeared very different from the other courses. The EA course only contained 2 modules while the average across the other nineteen courses was 8.2 modules. One of the modules in the EA course was an interactive exercise and none of the other courses had anything like this. I felt these differences were sufficient to classify the data point as an outlier and warranted removal from the data analysis. After removing the data related to the Evolutionary Acquisition course, the correlation between course completion rates and words per module becomes statistically significant ($r = -.51$, $p < .05$), indicating strong support for H_7.

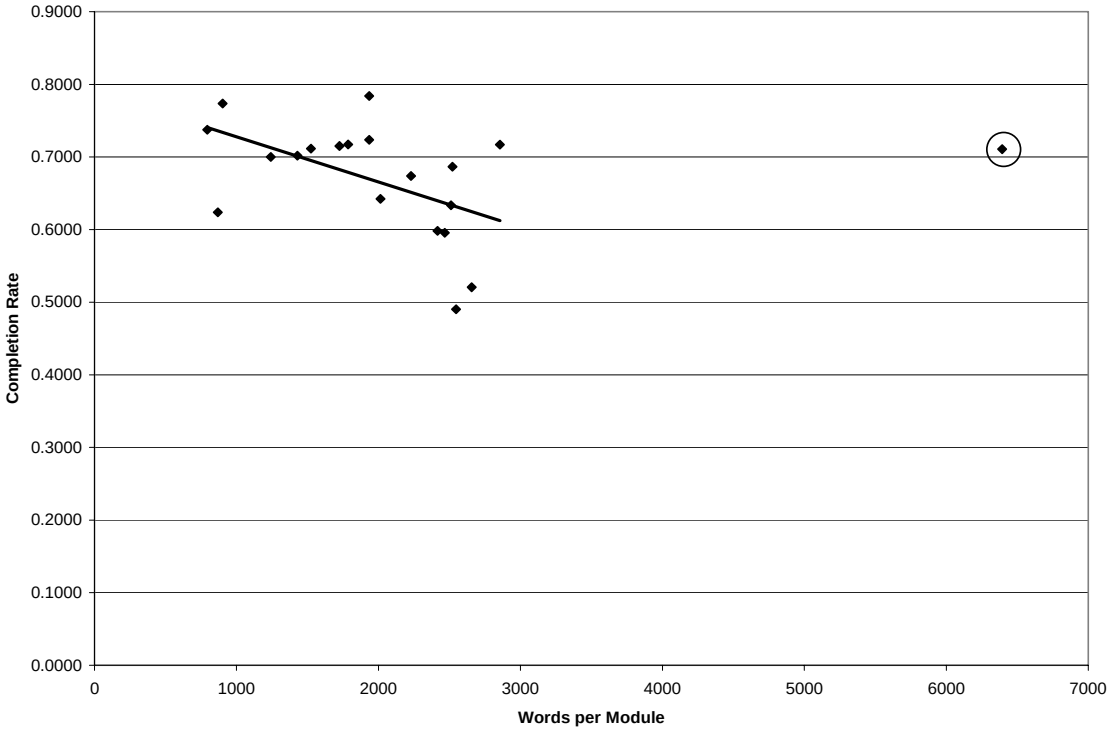

Figure 4. Analysis of Words per Module

Summary

Table 11 on the next page contains a summary of the hypothesized relationships between the heuristics and course completion rates tested in this study. Three of the nine hypotheses were supported. The results provide some support for using heuristic evaluation to identify course design characteristics that influence course completion rates. These results are discussed further in the final chapter.

Table 11. Summary of Hypotheses

Hypotheses	Supported
***H_1*:** a positive relationship for the visibility of system status	**No**
***H_2*:** an inverse relationship for the difficulty of the course material	**No**
***H_3*:** a positive relationship for the level of user control and freedom	**Yes**
***H_4*:** a positive relationship for the level of compliance with platform consistency and standards	**No**
***H_5*:** a positive relationship for aesthetic and minimalist design	**No**
***H_6*:** a positive relationship for the level of help and documentation	**Yes**
***H_7*:** a positive relationship for the level of support for the user's skills	**No**
***H_8*:** an inverse relationship for the average length of the modules	**Yes**
***H_9*:** an inverse relationship for the percentage of broken hyperlinks	**No**

V. Discussion

"All words are pegs to hang ideas on."

Henry Ward Beecher

Introduction

Twenty VSH courses were analyzed using the usability inspection method of heuristic evaluation. A heuristic is a recognized usability principle that guides the evaluator as they attempt to identify usability problems within an interface (Nielsen, 1994:26). Nine heuristics were chosen for this study that formed the basis for the nine hypotheses used to address the following research question:

Can design factors be identified that influence e-learning course completion rates?

This chapter begins with a discussion of the observations associated with the each of the nine hypotheses. Next, implications for the study are addressed, followed by discussion of limitations and recommendations for future research.

Observations

Results of the study indicate some support for using the heuristic evaluation method to identify design factors that influence course completion rates. The following sections discuss the heuristics associated with each hypothesis and the specific observations about why the different characteristics were scored as they were.
The discussions also include recommendations for exclusion of certain characteristics where deemed appropriate.

Visibility of System Status

The first hypothesis looked for a relationship between course completion rates and how well the VSH system kept the user informed of system status. There were four characteristics of system status evaluated.

Title or Header on Every Screen. All of the courses in the Virtual Schoolhouse fully implemented this characteristic. All of the screens contained a title or header that informed the student of the subject being discussed. I found this feature helpful when trying to review the information during an exercise. Recommend keeping this inspection item in future research.

Pop-up Windows Cover Fields. There was only one course that exhibited a discrepancy for this characteristic; however, it was very annoying when it happened. The one example of this was on the Key Steps page of the Performance Based Payments module, in the Pricing Analysis Methods course where the student had to place the mouse cursor over the text line to make more text appear. If the mouse was placed over the number, then the student could read the text even though the alternate text tag appeared.. But if the mouse was placed over the text, the alternate text tag would obscure the underlying text and the student could not read it.

System Feedback for Every Operator Action. This item was scored low where the course provided no feedback for many review questions. In other words, the student isn’t

told whether they were right or wrong. The low scoring course on this characteristic was the Contract Repair Process course. The system did not provide feedback to the student on whether their answer to many of the review questions was correct or wrong. It appeared that a necessary segment of JavaScript code was missing as some question did provide feedback and there was code on the page to do that. A medium score indicated just a few questions provided no feedback. The Commercial business Approach course had a couple of questions where no feedback was provided. High scores indicated good feedback on all questions. Most of the courses received a high score.

Indication to Start Next Group of Actions. This item looked at how the student knew they were finished with a module and ready to begin the next one. The student was kept informed of this information on the class listing page with a complete or incomplete status value, and on the course module page with a pass or incomplete status value. All courses reported this information to the student.

Feedback On Where to Put Moved Objects. Some of the courses had exercises that required the student to click on an object, then drag and drop it somewhere else on the screen. Some of these exercises did not have an indication of exactly where the object should be positioned when the user dropped it. The object would then jump to another location on the screen, forcing the user to keep trying until finally locating the exact position that was needed. This made performing these exercises difficult and time

consuming. Courses receiving low scores on this characteristic contained exercises that displayed this difficulty.

User Informed During System Delays. There were no system delays noted during evaluation of the courses.

Place Markers as Navigational Aids. For the purposes of this study, a place marker was considered to be an indicator on the screen of the number of pages within a module, and an indication of which page the user was currently on. Only one course implemented this type of mechanism. It was noted by the evaluator a number of times that this would have been very useful information for deciding whether to continue working on a module or to stop to take care of some off-task demands. Recommend adding this navigation feature to all VSH courses.

Course Difficulty

The second hypothesis looked for a relationship between course completion rates and course difficulty. A combination of measurements was used to test this hypothesis; the one characteristic, dealing with the clarity of language in review questions under the Match Between System and the Real World heuristic, readability, and grade level.

Questions Stated in Clear Simple Language. This item evaluated how clearly review questions were stated. Most of the courses scored high on this characteristic. An

example of a medium score is the Modification Management course. This course used a lot of acronyms in a number of questions that the student may not have memorized. This forced a lot of searching back through the document just to get familiar with the acronyms. Perhaps access to an acronym list on every page would alleviate this issue.

Readability. Readability was measured using the Flesch Reading Ease score (Flesch, 1962). Though the mean readability across all of the courses (31.28) is in the difficult to read range (Flesch, 2003), this characteristic was not statistically significant and was, in fact, inversely related to completion rates. The Army has used this method extensively in testing training manuals and found it insufficient for matching up the reading skills of soldiers to their ability to understand the content (Kern, 1980). Other studies (Reynolds, 2002) have also found no support for using this tool to measure e-learning course difficulty. I would recommend not using this tool, or this measure, in future research.

Grade Level. Grade level was determined using the Flesch-Kincaid Grade Level tool provided in Microsoft Word. The formula for finding the Flesch-Kincaid Grade level converts the reading ease score to a U.S. grade level. The mean grade level across all courses in VSH was 11.27, which means the reader should have an 11th grade education to understand the material. However, examination of the data revealed a large number of scores equaling 12. It was discovered after collection of the data that the grade level tool provided in Microsoft Word reports a maximum score of 12 (Wats.ca, 2003). This could

mean that the grade level of the material was actually higher than reported for this study. For this reason, and because the grade level is a linear transformation of the readability score, I would recommend not including this measure in future research.

User Control and Freedom

The third hypothesis looked for a relationship between course completion rates and user control and freedom factors. There were six characteristics of user control and freedom evaluated.

Easy to Rearrange Windows On The Screen. The functionality behind this characteristic was actually provided by the web browser and not through any functionality provided within the courses. For this reason, I recommend excluding this characteristic from future design research on the VSH system.

Easy to Switch Between Windows. This characteristic evaluated how easy it was for users to return to a page that a new window had been launched from. While there were no low scores for this characteristic, a medium score was given for the two courses that failed to provide a close mechanism within the text of the window. Not having a readily available method for closing the window forces the user to spend time searching for the window close icon provided by the operating system. Even though few courses were discrepant on this characteristic, it is a convenience that makes course navigation easier. I would recommend having a close feature on all pop-up screens within the VSH.

System Waits for Signal From User Before Processing. Evaluation for this characteristic looked for instances where the system would automatically begin processing some action without the user initiating it. None of the courses displayed a problem in this area.

Mechanism Allowing Users to Go Back to Previous Menu. Most of the courses provided an icon on the screen that allowed the user to return to the module menu page at the beginning of the course. Those courses scoring low on this characteristic only provided navigation mechanisms for moving ahead to the next page and back to the previous page. The ability to navigate back to the module menu page made it easier to jump from one module to another to review information. Recommend providing the capability to navigate to a module's menu page on all screens within a course.

Users Can Go Forward and Back Through Questions. After a few course evaluations had been completed, it was determined that this characteristic was not really applicable to the VSH. One of the objectives for the VSH courses is that the students correctly answer all of the review questions, and moving back and forth between the review questions was not something that needed to be done. Recommend removing this item from future evaluations of the VSH system.

Vertical and Horizontal Scroll Bars Provided. It is important to ensure that scroll bars are available when courses provide information to the student in the form of a pop-up window; especially if the window cannot be resized to fit the contents. There was only

one instance where this problem occurred but I was unable to recreate the problem a second time. Therefore, I'm not sure it was a problem with the course or a problem with the computer. Either way, navigation of the material was impossible. To ensure that this was not a problem with the course, I recommend verifying that all pop-up windows provide scroll bars whenever the VSH courses are being evaluated.

Consistency and Standards

The fourth hypothesis looked for a relationship between course completion rates and design factors for consistency and standards on a web page. There were five characteristics of consistency and standards evaluated.

Consistent Formatting Standards Followed. Low scores on this characteristic were given on courses that used underlined text that was not a hyperlink. The convention for web pages is that underlined text indicates a hyperlink that will provide additional information related to the underlined text. This causes an unnecessary distraction for students when there are other ways of highlighting text on a page. Recommend not using underlining on VSH course screens. A course received a medium score on this characteristic if the layout of the screen was significantly different across pages in a course. As the student uses the course, he/she can become familiar with the location on the screen where text will appear next. This helps decrease the time needed to locate text and begin reading. I have no recommendation for where to locate the text and graphics on the screen, just that it be consistently located in the same area on the screen.

Heavy Use of All Uppercase Letters Avoided. It is web convention that the use of all uppercase letters indicates the sender of the text is yelling at the reader. Use of all uppercase letters was not observed in any of the courses.

Icons Labeled. Icons provided within a VSH course may be unfamiliar and should therefore have some indication of their function visible to the user. A picture or other graphic may not be easily recognized so a label of some kind may be necessary to inform the user of an icon's function. The Price Analysis Methods course was the only course that used icons, specifically, navigation icons that were not labeled. The function of these icons was easily recognized and did not present a problem with using the VSH system.

Attention-Getting Techniques Used With Care. An attention-getting technique can be a distraction in a course when the technique does not enhance the learning experience. The VSH course that scored lowest on this characteristic was Intelligence in Force Modernization. This course had flaming matchsticks beside the menu items on the module menu pages. This feature appeared to be just another distraction in the course.

VSH courses that received a medium score on this characteristic used a number of attention-getting techniques such as spinning saw blades, spinning gears, and other moving objects that did not enhance the learning experience. While it is important to try to make the courses interesting, this type of content competes for the attention of the student with the educational material and distracts them from their task. Recommend

VSH course designers and administrators limit the use of these attention-getting techniques to those that contribute to understanding the material.

Valid Inputs For a Question Listed. The Earned Value Management System course received the only low score on this characteristic. The problem observed was that a review question would require the user to type in an answer in a certain format. If the answer was correct, but in the wrong format, the student would receive feedback that he/she had answered incorrectly. An example of this is a question that required the answer "SOW". SOW is an acronym for statement of work, but if the student typed in "Statement of Work", the feedback indicated an incorrect answer. The student discovered that the acronym was required only after seeing the feedback about the incorrect answer. Having the possible choices listed on the screen would help the student know which form of an answer is required.

Aesthetic and Minimalist Design

The fifth hypothesis looked for a relationship between course completion rates and aesthetic and minimalist design characteristics. There were three characteristics evaluated for this study.

Information Essential for Decision-Making. Courses that scored low on this characteristic contained numerous textboxes in the review questions that would be rendered with stray text displayed in them. This text was often an answer choice from on

of the previous questions and could be confusing when it had no relation to the question being asked. This was most noticeable in the Contract Repair Process course. Medium scores were given to courses where large amounts of text were presented on a single screen that covered more than one topic. Limiting the information on a page to one topic may give the student more time to internalize the information before having to think about something else.

Brief Menu Titles. There should not be more information in a menu title than there is on the rest of the page. None of the courses evaluated appeared to have a problem with the length of menu titles; they were all brief and succinct.

Color Used With Discretion. Courses that received low scores on this characteristic had background patterns that blended with the text, making it difficult to read. The worst example of this was the AFRL R&D Case File Management course which had a medieval castle style block pattern that blended with every fourth line of text; so much so that the text was almost invisible. Courses receiving a medium score on this characteristic used background colors that were bright and had colored text that did not contrast well with the background color. After spending an hour or so looking at these colors, my eyes began to ache. Recommend using white or very light, pale colors with dark fonts to help give some contrast to the text.

Help and Documentation

The sixth hypothesis looked for a relationship between course completion rates and help and documentation design factors. Four characteristics were evaluated for this study.

Help Function Visible. In order for a student to use a help function, there must be some visible way of accessing it. Low scores for this characteristic were given to courses that had no visible link to the help function on any of the screens within the course. There were seven courses that received a score of one on this characteristic. Courses that provided a help link on at least the menu module page received a medium score on this characteristic. High scores were given to courses that provided a link on every page within the course.

Information Relevant. For a help system to be useful, it should provide the student with help in accomplishing whatever task they are having problems with. This help should no be limited to how to use the VSH system; but should include content specific help wherever it makes sense. Low scores on this characteristic were given to courses where the only available help was the system requirements and tutorial on how to navigate the courses. Medium scores were given to courses that included some kind of content related help such as an acronym list, or a list of references. High scores were give to courses that provided all of these forms of help.

Easy to Access and Return From Help. Once a student accesses the help system, they should not have to navigate all the way back through the menu system to return to the page they accessed the help system from. Low scores on this characteristic were given to courses where the student had to navigate to some other page in order to find the help system. Medium scores were given when the student could access the help system, but the navigation functions took the student off to other pages in the system rather than back to the page they were on when they invoked the help system. High scores were given to courses that displayed the help in a separate window so the user could just close it and the window they were on is still showing.

Errors in Matching Exercises Using Connecting Lines. This characteristic only applied to the Contract Repair Process course. This course had an exercise that drew lines between graphics to show how the student had matched them up. The problem was, the lines drew very slowly and caused significant delays in completing the exercise. There were many other examples of matching exercises that had no problems with slow refresh rates. I would recommend changing this exercise to one of those methods. By doing so, this evaluation characteristic would no longer be needed and could be removed from future evaluations of the VSH system.

Skills

The seventh hypothesis looked for a relationship between course completion rates and a user's computer skills. There were four skill related characteristics evaluated for this study.

Window Operations Easy to Learn and Use. Generally, the window operations in the VSH were easy to learn and use. The major problem with using the VSH system was that some courses would redraw the homepage screen inside the course frame when returning to the module menu screen. After three or four iterations through the modules, the screen would be full of main menus and the module menus would no longer be visible. After some trial and error, I found that the screen could be cleared by clicking on the "My Classes" icon on the left side of the screen. This is a major problem that can prevent a less experienced user from completing the courses that have this problem.

Support for Novice and Expert Users. This characteristic deals with providing shortcuts and hidden commands that will allow more experienced users to use the system faster. There was nothing observed in the courses that appeared to implement anything like this. Recommend excluding this characteristic from future evaluations of the VSH system.

Cursor Positioned in Textbox. A course scored low on this characteristic if a textbox appeared on the screen without positioning the cursor in it. This causes the user

to waste a small amount of time having to position the cursor before they can begin typing. This distraction hindered easy operation of the VSH system.

Use of Chunking

The eighth hypothesis looked for a relationship between course completion rates and module length. Module length had the strongest correlation to course completion rates of all heuristics measured. The data point for the Introduction to Evolutionary Acquisition course was removed after it was confirmed as an outlier from all other courses. Removal of this data point had a significant effect on the statistical reliability of module length, changing it from -.17 to -.51. These findings parallel Reynold's (2002) observations of module length's effects on motivation to complete an e-learning course. Determination of an optimal module length that allows students to complete a module before becoming distracted could have a positive effect on completion rates.

Don't Lie to the User

This item was not statistically significant. This could mean that the information that these links are meant to provide is either irrelevant or unnecessary. These findings suggest that the additional effort and cost involved in programming many hyperlinks into the courses may not be necessary. Students may be getting all of the information they require from the main course materials.

Summary of Findings

Three of the nine hypotheses were supported. Two of the measures for course difficulty, readability and grade level, were unreliable and should not be used in future research. The original HEC used for the evaluations contained 29 items. The revised HEC now has 22 evaluation items with some heuristics containing only one or two items. Future research needs to be conducted to provide additional characteristics for these heuristics.

Implications

From a theoretical standpoint, this study has shown some support for using heuristic evaluation to identify course design factors that influence e-learning course completion rates. This study has shown that heuristic evaluation is a low cost, effective, and easy to use tool that can identify important areas where course designers and administrators can focus scarce maintenance resources to improve the usability of the courses. Module length was one area that appeared to have significant potential to improve course usability. Two other areas, user control and freedom, and help and documentation, also proved to be areas for potential improvements. The Air Force has indicated a desire to invest in training opportunities through online training and tools like heuristic evaluation may help maximize the return on that investment.

Limitations

The most notable limitation of this study was the application of the heuristic evaluation method by a single evaluator. Nielsen (1994) states while a single evaluator can perform the evaluation, he/she will find less than 35 percent of the usability problems in an interface, and that heuristic evaluations are most effective when conducted by three to five evaluators.

Another limitation of this study was the unvalidated heuristic evaluation instrument used to rate the characteristics. One surprise observation was the statistically significant inverse relationship between course completion rates and H_7. A positive relationship was expected and possible explanations for this are choosing the wrong characteristics to measure test this hypothesis or improperly scoring these characteristics.

A third limitation is the Flesch Reading Ease tool. This tool only measures the surface characteristics of the text such as sentence length, word length, and syllables. These characteristics may not be the proper items to test on web-based e-learning courses. Finding a better tool to measure the comprehensibility of the material may provide more meaningful results.

A final limitation of the study was the Flesch-Kincaid Grade Level tool. Analysis of the data showed that a value of twelve seemed to be the maximum value recorded. It was found that the tool in Microsoft Word used to compute this value only reports a maximum value of twelve. This means the data could be under-reported for this measurement and should not be used to draw any conclusions.

Future Research

While the heuristic evaluation method proved to be useful in identifying aspects of course design that can improve e-learning course usability, further research using heuristics to evaluate e-learning course design is needed to refine and extend the characteristics used to evaluate the courses. This study has provided a good start for this line of research.

Appendix A. Heuristic Evaluation Checklist

Visibility of System Status

The system should always keep user informed about what is going on, through appropriate feedback within reasonable time.

#	Review Checklist	Almost Never	Almost	Sometimes		Always
1.1	Does every display begin with a title or header that describes screen contents?	O	O	O	O	O
1.2	If pop-up windows are used to display messages, do they allow the user to see the field in error?	O	O	O	O	O
1.3	Is there some form of system feedback for every operator action?	O	O	O	O	O
1.4	After the user completes a group of actions (e.g. a module), does the feedback indicate that the next group of actions can be started?	O	O	O	O	O
1.5	If an object is to be moved, is there visual feedback on where to put the object?	O	O	O	O	O
1.6	If there are observable delays (greater than fifteen seconds) in the system's response time, is the user kept informed of the system's progress?	O	O	O	O	O
1.7	If users must navigate between multiple screens, does the system use context labels, menu maps, and place markers as navigational aids?	O	O	O	O	O

NOTE: Strikethrough text indicates item recommended for removal from HEC.

Match Between System and the Real World

The system should speak the user's language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

#	Review Checklist	Almost Never		Sometimes		Almost Always
2.1	For question and answer interfaces, are questions stated in clear, simple language?	O	O	O	O	O

NOTE: Strikethrough text indicates item recommended for removal from HEC.

User Control and Freedom

Users should be free to select and sequence tasks (when appropriate), rather than having the system do this for them. Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Users should make their own decisions (with clear information) regarding the costs of exiting current work. The system should support undo and redo.

#	Review Checklist	Almost Never		Sometimes		Almost Always
3.1	~~In courses that use overlapping windows, is it easy for users to rearrange windows on the screen?~~	O	O	O	O	O
3.2	In courses that use overlapping windows, is it easy for users to switch between windows?	O	O	O	O	O
3.3	When a user's task is complete, does the system wait for a signal from the user before processing?	O	O	O	O	O
3.4	If the system has multiple menu levels, is there a mechanism that allows users to go back to previous menus?	O	O	O	O	O
3.5	~~If the system uses a question and answer interface, can users go back to previous questions or skip forward to later questions?~~	O	O	O	O	O
3.6	Are vertical and horizontal scrolling possible in each window?	O	O	O	O	O

NOTE: Strikethrough text indicates item recommended for removal from HEC.

Consistency and Standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

#	Review Checklist	Almost Never		Sometimes		Almost Always
4.1	Have formatting standards been followed consistently in all screens within a course?	O	O	O	O	O
4.2	Has a heavy use of all uppercase letters on a screen been avoided?	O	O	O	O	O
4.3	Are icons labeled?	O	O	O	O	O
4.4	Are attention-getting techniques used with care?	O	O	O	O	O
4.5	For question and answer interfaces, are the valid inputs for a question listed?	O	O	O	O	O

NOTE: Strikethrough text indicates item recommended for removal from HEC.

Aesthetic and Minimalist Design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

#	Review Checklist	Almost Never		Sometimes		Almost Always
5.1	Is only (and all) information essential to decision making displayed on the screen?	O	O	O	O	O
5.2	Are menu titles brief, yet long enough to communicate?	O	O	O	O	O
5.3	Has color been used with discretion?	O	O	O	O	O

Help and Documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

#	Review Checklist	Almost Never		Sometimes		Almost Always
6.1	Is the help function visible; for example, a key labeled HELP or a special menu?	O	O	O	O	O
6.2	Is the information relevant?	O	O	O	O	O
6.3	Is it easy to access and return from the help system?	O	O	O	O	O
6.4	~~For matching exercises that connect answers using lines, if the user makes an error, are connector lines redrawn in a reasonable amount of time?~~	O	O	O	O	O

NOTE: Strikethrough text indicates item recommended for removal from HEC.

Skills

The system should support, extend, supplement, or enhance the user's skills, background knowledge, and expertise ----not replace them.

#	Review Checklist	Almost Never		Sometimes		Almost Always
7.1	Are window operations easy to learn and use?	O	O	O	O	O
7.2	~~If the system supports both novice and expert users, are multiple levels of detail available.~~	O	O	O	O	O
7.3	When the user enters a screen or dialog box, is the cursor already positioned in the field users are most likely to need?	O	O	O	O	O

NOTE: Strikethrough text indicates item recommended for removal from HEC.

Appendix B. VSH Course Evaluation Data

Course Name:	Contract Repair Process		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 1			
Page 1	134	21.7	12
Page 2	245	28.9	12
Page 3	160	5.3	12
Page 4	133	0	12
Page 5	88	38.8	12
Page 6	121	17.9	12
Page 7	120	10.3	12
Page 8	96	34	12
Page 9	131	19.7	12
Page 10	118	19.8	12
Page 11	115	5.6	12
Page 12	74	22.2	12
Page 13	137	21	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 2			
Page 1	85	40	11.7
Page 2	215	34.3	12
Page 3	199	47.9	11.3
Page 4	202	23.8	12
Page 5	224	37.5	12
Page 6	141	35.8	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 3			
Page 1	148	37.2	12
Page 2	43	28.4	12
Page 3	205	16.2	12
Page 4	58	58.8	9.8
Page 5	54	32.1	12
Page 6	174	16.6	12
Page 7	142	26.1	12
Page 8	176	10.9	12
Page 9	103	1.4	12
Page 10	122	15.5	12
Page 11	212	25.6	12

Page 12	94	34.9	12
Page 13	160	37	12
Page 14	90	2.2	12
Page 15	124	35.5	12
Page 16	73	28.8	12
Page 17	184	25.3	12
Page 18	170	43.7	11.3
Page 19	203	23	12
Page 20	116	31.8	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 4			
Page 1	74	53.1	10.4
Page 2	132	26.2	12
Page 3	145	30.6	12
Page 4	74	13	12
Page 5	132	48.8	11.4
Page 6	79	0	12
Page 7	70	0	12
Page 8	146	25	12
Page 9	137	25.6	12
Page 10	174	25.7	12
Page 11	197	19.3	12
Page 12	155	16.2	12
Page 13	149	17.7	12
Page 14	128	35.5	11.7
Page 15	155	32	12
Page 16	171	30.2	12
Page 17	200	34.2	12
Page 18	138	26.1	12
Page 19	254	25	12
Page 20	227	41.4	12
Page 21	120	34.6	12
Page 22	133	43	11.3
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 5			
Page 1	82	39.4	12
Page 2	138	50.1	11.1
Page 3	107	59.4	7.1
Page 4	138	35.8	12
Page 5	169	36.2	12
Page 6	107	56.9	9.6

	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 6			
Page 1	141	6.7	12
Page 2	147	19.7	12
Page 3	30	46.1	12
Page 4	104	21.3	12
Page 5	156	23.4	12
Page 6	138	16.8	12
Page 7	159	33.8	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 7			
Page 1	174	15	12
Page 2	102	15.7	12
Page 3	201	32.3	12
Page 4	187	11.7	12
Page 5	224	8.1	12
Page 6	105	21.9	12
Page 7	147	35.4	12
Page 8	196	32.2	12
Page 9	146	19.8	12
Page 10	136	17.5	12
Page 11	149	33.3	11.3
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	171	26.9	12
Page 2	160	39	12
Page 3	209	41.5	12
Page 4	98	15.5	12
Page 5	90	42.6	9.4
Page 6	141	34.3	12
Page 7	136	0	12
Page 8	64	23	12
Page 9	114	6.4	12
Page 10	200	21.9	12
Page 11	192	25.4	12
Page 12	138	24.3	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 9			
Page 1	70	10.5	12

Page 2	140	18.7	12
Page 3	170	15.9	12
Page 4	175	0	12
Page 5	148	0	12
Page 6	145	15.3	12
Page 7	66	4.5	12
Page 8	111	9.9	12
Page 9	66	0	12
Page 10	237	29	12
Page 11	121	15.8	12
Page 12	152	21	12
Page 13	220	23	12
Page 14	131	10.7	12
Page 15	123	20.9	12
Page 16	146	13.5	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 10			
Page 1	96	29	12
Page 2	146	36.8	12
Page 3	164	40.2	11.6
Page 4	178	38.1	11.8
Page 5	120	11.6	12
Page 6	97	32.5	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 11			
Page 1	102	10.7	12
Page 2	89	0	12
Page 3	143	2.9	12
Page 4	78	15.2	12
Page 5	77	32.2	12
Page 6	202	36.5	12
Page 7	134	19.8	12
Page 8	117	21.9	12
Page 9	122	14.2	12
Page 10	153	37.8	11.4
Page 11	149	17.3	12
Page 12	90	20.7	12

	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 12			
Page 1	62	39.5	11
Page 2	117	38.9	11
Page 3	218	41.7	10.7
Page 4	200	44.8	10.8
Page 5	254	29.4	12
Page 6	144	25.9	12
Page 7	252	31	12
Page 8	198	46.2	10.7
Page 9	171	52.5	9.7
Page 10	146	35.5	11.8
Page 11	169	42	11.5
Page 12	239	47.2	10.1
Page 13	165	36.8	11.2
Page 14	233	45.7	10.4
Page 15	179	28.5	12
Page 16	111	25.7	12
Page 17	135	4.2	12
Page 18	142	25.4	12
Page 19	89	13	12
Page 20	204	15.9	12
Page 21	217	15.8	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 13			
Page 1	58	45.8	11.4
Page 2	150	36	12
Page 3	113	25.9	12
Page 4	127	45.3	11.7
Page 5	120	40.6	12
Page 6	58	27.3	12
Totals	**22424**	**26.08**	**11.79**
Avg. Words/Module	1725		
Useability Items			
Review Questions	Mod 1 - Told to choose from a list, but must type the item into a text box.		
Review Questions	No feedback. Java script function missing.		
Link unavailable	Mod 2, Page 2 - Contract Repair Guide, para. 4.1		
Link unavailable	Mod 3, Pg 1 - Contract Repair Process (CRP)		
CRP Exercise	Difficult to locate where to drop images. Would pop around to wrong places.		
CRP Diagram	A lot of links to diagram, but diagram doesn't show where information fits into process		

Confusing Exercise	Mod 4 Applet TitleMgr exercise very confusing. No feedback when linking items.
Progress indicator	No indication of progress in long module 4
Link location	Sent to class listing page after summary in module 5 instead of course page.
Module 6.5 review quiz	Review Quiz does not automatically let me change an incorrect answer
Module 6.5 Summary	System D200A was discussed and tested on but not mention in the summary
Module 7 Objectives	Objectives page shows objectives for Mods 4,5,6,and 7 but other objective pages only show that modules objectives
Module 7 Review Question	Asks user to choose from a list but forces user to type in choice. Why not dropdown list?
Module 7.2	Reference Lightning Bolt 10 link broken.
System Down	System went down during evaluation - 1208PM
Module 7.3	Market Research link resulted in requested URL not found error.
Mod 7 Quiz Questions	User typing in answers can result in wrong answer if spelling is incorrect even if attempted answer was correct
Mod 7.3 Developing the contract	Second sentence-"customary commercial practices" **is will be a**
Mod 8.1 Matching quiz	Confusing. Lines draw so slowly that student doesn't know what they are until 4th try
Mod 8.2 Review qstns	Error checking logic appears to be in applet. Applet takes too long or never downloads
Mod 8.3 Contract Types	Acquisition Reform Initiatives link broken
Mod 8.3 Contract Types	Cost Benefit Analysis link broken
Mod 9.1	Process Action team link broken. Appears to be a glossary page that is unavailable.
Mod 9.1	Acq Policy Memo 99-1 link broken
Mod 9.5	SAF/AQ policy 98A-001 link broken
Mod 9.5	CID glossary lookup link broken
Mod 9.7	HQ AFMC SOO/SOW link broken
Mod 10	Contract Repair link requires credentials that are not available
Mod 10.2	data management link broken
Mod 10.3	Data Item Description link broken
Mod 10.3	Data Accession List link broken
Mod 11.2.1	Small Business Administration link broken
Mod 11.2.1	Contract Repair Team link broken
Mod 11	Review question answer boxes contain extraneous characters
Mod 11.2.3	Early Contract Administration Services link broken
Mod 11.2.3	Contract Administration Offices link broken
Mod 11.2.3	"One Book" link requires special access login
Mod 11.2.4	DoD CAS Directory link requires special access login
Mod 12.1	TRACKER link broken
Mod 12.3	WorldWideExpress link requires special access login

Mod 12.3	Foreign Clearance Guide requires special credentials
Mod 13.1	Contractor Furnished Material link broken
Mod 13.1	Government Furnished Material link broken
Mod 13.1	Contract Line Item (CLIN) link broken
Total Links	150
Broken Links	34
Broken Links %	23%

Course Name:	Activity Based Costing		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 1			
Page 1	265	43.8	12
Page 2	213	49.9	9.6
Page 3	236	19.7	12
Page 4	205	21.1	12
Page 5	136	20.7	12
Page 6	260	20.9	12
Page 7	188	33.4	12
Page 8	147	40.8	12
Page 9	343	22.4	12
Page 10	197	40.2	11.7
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 2			
Page 1	228	39.9	11.5
Page 2	261	42.1	10.6
Page 3	96	52.3	8.2
Page 4	281	38	12
Page 5	179	38.2	12
Page 6	205	28.2	12
Page 7	237	30.5	12
Page 8	240	39.8	12
Page 9	150	46.1	9.5
Page 10	239	33.3	11.8
Page 11	273	37.4	12
Page 12	168	47.9	11.1
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 3			
Page 13	129	45.8	10.7
Page 14	265	33.7	12
Page 15	152	38.7	11.8
Page 16	235	46.4	11.1
Page 17	254	37.5	12
Page 18	185	45.5	11.9
Page 19	81	52.7	10.1
Page 20	108	35.2	11.8
Page 21	252	32.3	12
Page 22	241	39.8	11.3

Page 23	226	43.7	10.5
Page 24	113	43.1	12
Page 25	141	40.1	12
Page 26	264	33.4	12
Page 27	100	52.7	9.3
Page 28	141	34.8	11.3
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 4			
Page 1	328	26.3	12
Page 2	167	30	12
Page 3	72	43.6	10.3
Page 4	48	57	7.7
Page 5	60	52.8	8.3
Page 6	70	26.9	12
Page 7	81	59.2	7.6
Page 8	114	38.9	11.6
Page 9	136	28.1	12
Page 10	131	27.6	12
Page 11	160	27	12
Page 12	177	29.6	12
Page 13	183	22.3	12
Page 14	147	57.4	7.5
Page 15	252	52.4	8.2
Page 16	224	33.6	11.8
Page 17	249	48.4	8.6
Page 18	161	22.9	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 5			
Page 1	305	38.8	11.6
Page 2	120	45.2	10.9
Page 3	206	43.1	11.1
Page 4	210	39.9	10.8
Page 5	255	29.1	12
Page 6	158	30.7	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 6			
Page 1	109	38.9	12
Page 2	225	34.7	12
Page 3	200	38.4	11.5
Page 4	123	41.8	11.7

Page 5	129	54.3	9.1
Page 6	188	36.4	12
Page 7	109	44	11.5
Page 8	134	40.7	12
Page 9	245	41.3	11.1
Page 10	171	21.7	12
Page 11	197	33	12
Page 12	239	40.8	12
Page 13	200	46.4	11.2
Page 14	203	53.5	9.3
Page 15	291	24.6	12
Page 16	255	43.1	10.7
Page 17	117	57.8	8.9
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 7			
Page 1	246	31.5	12
Page 2	63	47.8	9.1
Page 3	164	36.6	12
Page 4	186	37.5	11.5
Page 5	98	47.6	9.6
Page 6	192	21.7	12
Page 7	242	53.9	9.6
Page 8	123	39.1	11.6
Page 9	118	18.7	12
Page 10	133	39	12
Page 11	176	34.6	12
Page 12	182	34.8	11.6
Page 13	65	73.1	6.7
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 8			
Page 1	241	51.4	9.9
Page 2	155	29.8	12
Page 3	331	32	12
Page 4	296	34.6	12
Page 5	337	47.8	11.3
Page 6	178	27.1	12
Page 7	274	37.5	12
Page 8	192	33.1	12
Page 9	179	41	10.8
Page 10	174	33.8	12
Page 11	348	31	12
Page 12	216	33.2	12

Page 13	163	51.5	10
Page 14	258	47.7	10
Page 15	243	41.1	12
Page 16	131	21	12
Page 17	291	25.1	12
Page 18	213	22.5	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 9			
Page 1	201	38.9	12
Page 2	336	37.8	12
Page 3	333	42.4	12
Page 4	262	34.3	12
Page 5	169	46.4	11.4
Page 6	189	46.2	10.9
Page 7	294	35.2	12
Page 8	131	30.9	12
Page 9	303	47.6	10.7
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 10			
Page 1	352	28.9	12
Page 2	286	29	12
Page 3	298	34.1	12
Page 4	284	12.2	12
Page 5	256	21.2	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: 11			
Page 1	229	34.2	11.6
Page 2	279	21.9	12
Page 3	153	17.4	12
Page 4	264	36.1	12
Page 5	212	49.9	8.6
Page 6	192	26.7	12
Page 7	226	19.8	12
Page 8	162	19.7	12
Page 9	371	24	12
Page 10	307	31.6	12
Page 11	316	33.9	12
Page 12	231	25.5	12
Page 13	226	46.7	10.2
Page 14	162	18	12

Totals	**28015**	**36.90**	**11.30**
Avg. Words/Module	2547		
Mod 1.1	Business Management Plan link broken		
Mod 1.1	Strategic Plan for FY2002-2009 link broken		
Mod 1.4	nine mission essential tasks link broken		
Mod 8.2	Not authorized to view content behind Air Force Strategic Vision link		
Mod 8.2	Not authorized to view content behind AF/XPP webpage link		
Mod 8.2	PPBS link opens new window without informing user or including close button…User must figure out where they are		
Mod 8.2	Not authorized to view content behind Annual Planning and Programming Guidance link		
Mod 8.2	AFMC Strategic Plan link broken		
Mod 8.2	Mission Essential Task List link broken		
Mod 8.2	AFMC corporate management structure mission area links (8) broken …		
Mod 8.2	AFMC Strategic Planning link broken		
Mod 8.3	AFMC Mission Essential Tasks, Sep 98 link broken		
Mod 10.1	HQ AFMC/XP website link broken		
Mod 10.2	HQ AFMC/FM website link broken		
Total Links	117		
Broken Links	14		
Broken Links %	12%		

Course Name:	Introduction to Risk Management		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	1367	51.8	10.7
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	238	24.2	12
Page 2	330	26.6	12
Page 3	504	45.5	11
Page 4	393	38.8	11
Page 5	379	36.6	11.4
Page 6	299	36.7	12
Page 7	132	42.1	11.8
Page 8	251	41.6	11
Page 9	158	46.7	10.6
Page 10	412	20.3	12
Page 11	130	0	12
Page 12	274	20.6	12
Page 13	54	30.5	12
Page 14	297	14.6	12
Page 15	138	9.8	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	74	22.8	12
Page 2	210	33.1	12
Page 3	260	16.7	12
Page 4	216	28.6	11.9
Page 5	194	30.6	12
Page 6	282	18.9	12
Page 7	252	17	12
Page 8	228	19.1	12
Page 9	145	28.9	12
Page 10	277	18.4	12
Page 11	89	53.7	8.9
Page 12	171	15.3	12
Page 13	209	32.6	12
Page 14	456	18.8	12
Page 15	130	0	12

Page 16	232	29.1	12
Page 17	171	44.3	11.3
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	308	32.3	12
Page 2	254	21.6	12
Page 3	211	13.4	12
Page 4	144	35.2	11.5
Page 5	34	0	0
Page 6	152	44.9	10.4
Page 7	152	41.1	12
Page 8	118	15.3	12
Page 9	118	2.6	12
Page 10	201	36.5	12
Page 11	167	15.1	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	87	40.8	12
Page 2	229	40.9	10.9
Page 3	230	51.3	8.9
Page 4	286	45.4	10.9
Page 5	150	26.9	12
Page 6	116	45.5	10.7
Page 7	229	41.4	12
Page 8	272	27.9	12
Page 9	319	46.2	10.3
Page 10	186	30.5	12
Page 11	115	18.9	12
Page 12	180	38.5	10.5
Page 13	226	54.2	9.2
Page 14	137	54	8.7
Page 15	128	44.9	10.4
Page 16	354	45.9	11.2
Page 17	165	25.7	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	232	30.6	11.7
Page 2	216	38	11.4
Page 3	272	62.4	8.2

Page 4	179	32.6	11.6
Page 5	167	37.9	11.1
Page 6	262	39.3	11.4
Page 7	242	45.7	11.1
Page 8	365	34.2	12
Page 9	60	33.4	11.4
Page 10	173	25.9	12
Page 11	250	43	11.1
Page 12	168	25.5	12
Page 13	199	31.9	11.7
Page 14	164	34.5	12
Page 15	117	50.4	10.2
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	194	34.9	12
Page 2	158	41.6	10.8
Page 3	438	31.6	12
Page 4	265	42.6	10.5
Page 5	181	25.4	12
Page 6	288	29.5	12
Page 7	283	41.8	11.2
Page 8	120	46	9.9
Page 9	171	40.6	10.1
Page 10	210	37.4	11.8
Page 11	183	42.1	11.6
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	154	24.3	12
Page 2	83	30.3	11.5
Page 3	335	48.4	9.8
Page 4	441	45.4	9.5
Page 5	74	46.9	10.1
Page 6	327	47.8	9.7
Page 7	163	46.5	10.8
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 9			
Page 1	158	39.9	11.3

Page 2	191	23.2	12
Page 3	101	4.5	12
Page 4	241	34.4	12
Page 5	146	47.1	10.3
Page 6	230	29.3	12
Page 7	371	31.7	12
Page 8	411	8.1	12
Page 9	234	34.8	12
Page 10	545	30.9	12
Page 11	245	24.7	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 10			
Page 1	344	35.2	12
Page 2	429	46	9.7
Page 3	142	54	7.7
Page 4	146	36.9	10.9
Page 5	142	31.5	12
Page 6	31	30	12
Page 7	185	51.2	9.1
Page 8	123	54.7	8.4
Page 9	188	48.9	9.1
Page 10	141	56.1	7.8
Page 11	255	53.9	9.7
Page 12	149	49.8	9.9
Page 13	93	63.6	7.7
Page 14	171	24.4	12
Page 15	138	54	7.2
Page 16	183	37.5	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 11			
Page 1	628	22.7	12
Page 2	250	33.1	12
Page 3	305	30.8	12
Page 4	304	43.8	10.7
Page 5	202	17.1	12
Page 6	367	33.3	12
Page 7	84	29.5	12
Totals	**29227**	**34.11**	**11.13**
Avg. Words/Module	2657		

Usability Items			
Module 2.7	Mandatory Procedures for major… link broken		
Module 2.7	Acquisition Risk Management Guide link broken		
Module 2.11	DOD Risk Management Homepage link broken		
Module 3.9	DTSE&E Risk Management link broken		
Module 3.11	DODD 5000.1 "Defense Acquisition" link broken		
Module 3.11	DODD 5000.2R "mandatory…" link broken		
Module 4.3	DSMC Risk Management Guide link broken		
Module 4.3	AFMC Acquisition Risk Management Pamphlet link broken		
Module 4.7	DODD 5000.1 "Defense Acquisition" link broken		
Module 4.7	DODD 5000.2R link broken		
Module 5.8	Pareto Chart link broken		
Module 5.10	"AFMC Pamphlet 63-101…" link broken		
Module 6.8	"AFMC Pamphlet 63-101…" link broken		
Module 7.6	"AFMC Pamphlet 63-101…" link broken		
Module 7.6	Risk Management Guide link broken		
Module 7.6	NAVSD-p-3606… link broken		
Module 8.6	DODD 5000.1 "Defense Acquisition" link broken		
Module 8.6	DODD 5000.2R link broken		
Module 8.6	DSMC Risk Management Guide link broken		
Module 8.6	AFMC Pamphlet 63-100 link broken		
Module 9.4	System Maturity Matrix link broken		
Module 9.4	OSD TPM Webpage link broken		
Module 9.9	AFMC Pamphlet 63-100 link broken		
Module 10.7	AFMC Pamphlet 63-100 link broken		
Module 10.7	DCMC Earned Value Management Systems Center link broken		
Module 11.5	DODD 5000.1 "Defense Acquisition" link broken		
Module 11.5	DODD 5000.2R link broken		
Module 11.5	DSMC Risk Management Guide link broken		
Module 11.5	AFMC Pamphlet 63-100 link broken		
Total Links	188		
Broken Links	29		
Broken Links %	0.15		

Course Name:	Maintenance Planning Course		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	100	39.7	11.6
Page 2	132	55.2	9.7
Page 3	96	45.2	10.2
Page 4	121	46.7	10.4
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	147	15.5	12
Page 2	112	22.1	12
Page 3	89	31.2	12
Page 4	92	17.3	12
Page 5	152	32.6	12
Page 6	181	12.9	12
Page 7	43	36.7	11.4
Page 8	101	38.9	12
Page 9	56	40.2	11
Page 10	182	17.9	12
Page 11	86	15.4	12
Page 12	55	27.4	11.9
Page 13	115	37	12
Page 14	210	24.5	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	101	59.6	8.4
Page 2	145	24.2	11.8
Page 3	198	9.4	12
Page 4	94	11.3	12
Page 5	135	4.2	12
Page 6	135	11.7	12
Page 7	208	40.5	11.5
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	126	16.3	12
Page 2	161	0	12
Page 3	108	61.2	8.6

Page 4	144	19.2	12
Page 5	309	17.1	12
Page 6	191	43.8	11.6
Page 7	168	8.2	12
Page 8	191	36.1	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	248	30.2	12
Page 2	396	33.5	12
Page 3	199	35.1	12
Page 4	85	35.4	12
Page 5	131	29.3	12
Page 6	161	51	9.3
Page 7	147	44.4	11.2
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	213	50.7	10.2
Page 2	377	68.4	7.1
Page 3	185	43.2	10.8
Page 4	191	27.8	12
Page 5	128	19.7	12
Page 6	62	38.8	10.6
Page 7	284	28.8	12
Page 8	158	36.4	12
Total	**7449**	**31.08**	**11.40**
Avg. Words/Module	1242		
Usability Items			
Module 2.1	DOD Directive 5000.1 link redirected		
Module 2.1	DOD Instruction 5000.2 link redirected		
Module 2.1	DOD Regulation 5000.2R link redirected		
Module 2.2	Flexible Sustainment Guide link broken		
Module 2.2	Reliability based Logistics link broken		
Module 2.2	Trigger based Asset Management link broken		
Module 3.1	Maintenance Planning Guide, Section 2.1.1 link broken		
Module 3.1	Maintenance Planning Guide, Section 2.1.2 link broken		
Module 3.1	Maintenance Planning Guide, Section 2.1.3 link broken		
Module 3.1	Maintenance Planning Guide, Section 2.1.4 link broken		
Module 3.1	Maintenance Planning Guide, Section 2.1.5 link broken		
Module 3.2	Maintenance Planning Guide, Section 2.2.1 link broken		
Module 3.2	Maintenance Planning Guide, Section 2.2.2 link broken		
Module 3.2	Maintenance Planning Guide, Section 2.2.3 link broken		

Module 3.2	Maintenance Planning Guide, Section 2.2.4 link broken
Module 3.2	Maintenance Planning Guide, Section 2.2.5 link broken
Module 3.2	Maintenance Planning Guide, Section 2.2.6 link broken
Module 3.3	Maintenance Planning Guide, Section 2.3.1 link broken
Module 3.3	Maintenance Planning Guide, Section 2.3.2 link broken
Module 3.4	The Logistics Elements 7.2.2 Maintenance Planning link broken
Module 3.4	The Logistics Elements 7.2.3 Manpower and Personnel link broken
Module 3.4	The Logistics Elements 7.2.4 Supply Support link broken
Module 3.4	The Logistics Elements 7.2.5 Support Equipment link broken
Module 3.4	The Logistics Elements 7.2.6 Technical Data link broken
Module 3.4	The Logistics Elements 7.2.7 Training and Support link broken
Module 3.4	The Logistics Elements 7.2.8 Facilities link broken
Module 3.4	The Logistics Elements 7.2.9 Packaging, Handling, and Storage link broken
Module 3.4	The Logistics Elements 7.2.10 Computer Resources Support link broken
Module 3.4	The Logistics Elements 7.2.11 Design Interface link broken
Module 4.1	Maintenance Planning Guide 2.2.4 link broken
Module 5.2	SORAP Guide link broken
Module 6.2	Under Title…Part I - The Schedule link broken
Module 6.2	Under Title…Part II - Contract Clauses link broken
Module 6.2	Under Title…Part III - List of Documents, Exhibits, and other attachments link broken
Module 6.2	Under Title…Part IV - Representations and Instructions link broken
Module 6.2	Under Examples of Logistics Inputs… Part I - The Schedule link broken
Module 6.2	Under Examples of Logistics Inputs… Part II - Contract Clauses link broken
Module 6.2	Under Examples of Logistics Inputs… Part III - List of Documents, Exhibits, and other attachments link broken
Module 6.2	Under Examples of Logistics Inputs… Part IV - Representations and Instructions link broken
Module 6.2	Under Section… C: Description/Specifications/Work link broken
Module 6.2	Under Section… J: List of Attachments link broken
Module 6.2	Under Section… L: Instruction, Conditions, and Notes to offerors link broken
Module 6.2	Under Section… M: Evaluation Factors for Award link broken
Module 6.4	Section 8.4.11 of Mil-HDBK-502 link broken
Module 6.4	Maintenance Planning Guide: Appendix A, Section 5.2.1 link broken
Module 6.4	Maintenance Planning Guide: Appendix A, Section 5.2.2 link broken
Module 6.4	Maintenance Planning Guide: Appendix A, Section 5.2.3 link broken
Module 6.4	Maintenance Planning Guide: Appendix A, Section 5.2.4 link broken
Module 6.4	Maintenance Planning Guide: Appendix A, Section 5.2.5 link broken
Module 6.4	Maintenance Planning Guide: Appendix A, Section 5.2.6 link broken
Total Links	149
Broken Links	50
Broken Links %	34%

Course Name:	Pricing Analysis Methods		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: Course Overview			
Page 1	112	51.4	8.6
Page 2	85	28.7	12
Page 3	172	34.5	11.8
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: Price Analysis Methods in FAR			
Page 1	52	20.9	12
Page 2	53	27.4	11.9
Page 3	155	42	10.2
Page 4	154	45.8	11
Page 5	50	64.7	10.4
Page 6	82	51.3	8.1
Page 7	178	38.6	11.6
Page 8	61	30.8	12
Page 9	177	35.3	11.4
Page 10	155	27.6	12
Page 11	185	40.7	11.2
Page 12	100	38.4	12
Page 13	148	38.6	11.5
Page 14	178	51.4	10.3
Page 15	167	43.5	10.9
Page 16	220	45.8	10.5
Page 17	75	59.6	8.4
Page 18	56	51.9	8.7
Page 19	48	67.9	9.7
Page 20	108	20.1	12
Page 21	167	49	9.6
Page 22	113	37.7	12
Page 23	139	53.3	9.2
Page 24	162	41.5	11.4
Page 25	84	20.8	12
Page 26	99	22.5	12
Page 27	120	51.7	9.4
Page 28	70	25.7	12
Page 29	49	66.3	8.4
Page 30	64	28.6	12
Page 31	169	41.4	12

Page 32	84	40	10.2
Page 33	221	51.4	10.6
Page 34	110	33.9	12
Page 35	176	28.9	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: Value Analysis			
Page 1	58	30.9	12
Page 2	130	30.1	12
Page 3	63	32.4	12
Page 4	125	47.9	11
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: Performance Based Payments			
Page 1	103	4.1	9.7
Page 2	157	24.4	12
Page 3	121	46.1	10
Page 4	182	43.4	10.6
Page 5	97	29.6	12
Page 6	279	37.8	12
Page 7	166	54.9	9.7
Page 8	193	51.5	10.3
Page 9	123	46	10.8
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module: Negotiations			
Page 1	59	17.4	12
Page 2	73	0	12
Page 3	103	42.5	11.3
Page 4	110	38.3	11.5
Page 5	94	45.6	10.2
Page 6	152	45.8	11.9
Page 7	108	30.9	12
Page 8	51	37.3	9.8
Total	**7145**	**38.75**	**10.97**
Avg. Words/Module	1429		
Usability Items			
Course Overview	http://www.dodig.osd.mil/audit/reports/fy01/01-129pt1.pdf link broken		
Course Overview	http://www.dodig.osd.mil/audit/reports/fy01/01-129pt2.pdf link broken		

Price Analysis Methods in FAR	Market Research Section https://www.afmc_mil.wpafb.af.mil/HQ-AFMC/PK/PKP/PKPC/MR-CAQC.htm link broken
Price Analysis Methods in FAR	Market Research Section https://afkm.wpafb.af.mil/ASPs/ACQ/PST/PSTHome.htm link broken
Price Analysis Methods in FAR	Market Research Section https://www.conconnect.wpafb.af.mil/welcome/welcome.asp link broken
Negotiations Module	https://www.afmc_mil.wpafb.af.mil/HQ-AFMC/PK/PKP/guide.htm link broken
Total Links	38
Broken Links	6
Broken Links %	0.16

Course Name:	Introduction to CM		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	128	42.5	11.3
Page 2	27	42.7	10.6
Page 3	74	62.9	7.4
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	197	22.5	12
Page 2	126	41	11.2
Page 3	22	72.6	5.8
Page 4.1 CP&M	64	18.9	12
Page 4.2 SA	87	0	12
Page 4.3 ID	204	1.2	12
Page 4.4 Ch.Cntr	189	17.7	12
Page 4.5 Ch. Aud	246	10.4	12
Page 5 Benefits?	41	0	12
Page 6 Develop?	116	45.7	11.6
Page 7	35	80.3	6.4
Page 8 Summary	100	43.5	10.2
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	133	22.9	12
Page 2	320	40.1	11.7
Page 2.1Example	95	55.3	11.4
Page 3	22	57.2	8
Page 3.1Writ Procs	250	48.4	12
Page 3.2 CM Value	418	45.6	10.7
Page 3.3 Consist	167	15.8	12
Page 3.4 CCB	244	23.7	12
Page 3.5 Context	133	49.3	11.8
Page 3.6 Mng Act	193	31.4	12
Page 3.7 CM Trng	152	26.3	12
Page 3.8 Cont Eval	146	24.1	12
Page 4 Principles ?	63	28.4	12
Page 5 Summary	93	54.5	8.8

	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1 Cm Overview	90	21.5	12
2	129	0	12
3 Selecting CIs	159	14.4	12
4	176	23.6	12
5 CIs	184	3.9	12
6	249	46.4	10.8
7	79	59.1	7
8 Baselines	200	37.3	12
8.1 Func Bsln	38	27.8	12
8.2 A&P Bsln	149	13.1	12
9 Specs	251	8.9	12
10 Acq BSpecs	234	14.9	12
10.1 MilStd961	374	15	12
11 Sec3 Rqmnt	101	10.9	12
12 Sec4Verific	188	41.2	11
12.1 Qualification	81	2.9	12
12.2 First Article	84	25.6	12
12.3 Acceptance	58	22.3	12
13 Methods	100	23.2	12
14 Int. Defs	251	20.9	12
14.1 Sys Perf Specs	78	7.7	12
14.2 Item Perf Specs	66	8.2	12
14.3 Item Det Specs	36	0	12
14.4 Assymbly Draw	18	21.3	12
14.5 Install Draw	37	0	12
14.6 ICD	57	0	12
14.7 IRS	33	24.6	12
14.8 IDD	36	0	12
14.9 Src Con Draw	50	21.7	12
14.10 SPS	35	0.2	12
14.11 SoftDetSpec	42	2.6	12
14.12 SRS	65	2	12
15 Summary	122	38.8	10.6
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	243	25.5	12
2	332	21.8	12
2.1 ECPs	204	19.7	12
3	188	25.9	12
3.1 RFDs	169	18.8	12
4 CCBs	238	30.2	12

4.1 Mil HNDBK 61a	238	27.7	12
5 CCB Chair	221	22.3	12
6.1 Pre ECP	101	21.9	12
6.2 Write ECP	348	22.7	12
6.3 Classes of ECPs	221	16.1	12
6.4 Types of ECPs	201	27.6	12
6.5 ECP Priorities	198	26.1	12
6.6 ECP Effectivity	122	20.5	12
6.7 CCB Approves	299	33.9	12
6.8 Upd Base Docs	104	13.1	12
6.9 Upd TO	103	12.2	12
6.10 Write TCTOs	53	28.1	12
6.11 Upd Provis Data	57	38.1	12
6.12 Mod Product	14	11.3	12
6.13 Mod Spares	14	18.4	12
6.14 Other Activities	43	34.6	11.7
7.1 Submit/App ?	91	38	11.7
8.1 Write RFD	131	41.1	11.8
8.2 Classes of Devs	193	9.5	12
8.3 Dev Considerations	220	15.6	12
8.4 CCB Approves	340	31.5	12
8.5 RFD Implementation	144	33.8	12
9 Summary	106	58.1	8
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1 CM Roles	141	43.7	12
2 Roles Cont	190	19.7	12
2.1 Req Analysis	29	35.9	10.7
2.2 Func Anal/Alloc	64	22.9	12
2.3 Synthesis	27	0	12
2.4 Sys Analysis/Cont	67	19	12
3 Func Reviews	229	32.2	12
3.1 ASR	47	11.8	12
3.2 SRR	34	8.3	12
3.3 SFR	52	12.5	12
3.4 PDR	61	6.4	12
3.5 SSR	49	28	12
3.6 CDR	67	16.3	12
3.7 TRR	89	22.8	12
3.8 SVR	85	27.5	12
3.9 FCA	138	11.6	12
3.10 PCA	187	18	12
4	245	24	12

5 Summary	113	49.7	9.6
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	102	17.5	12
1.1 Status Acct.	104	21.3	12
2 CSA Info Media	163	34.5	12
3 CSA Info Media Cont	143	25.7	12
4 CSA Info Media Cont	163	24.8	12
5 CSA Info Media Cont	65	36.7	12
5.1 CSA Question	35	1.6	12
6 Data Categories	102	40	10.3
7 Types of CSA Data	120	36.3	12
7.1 PPO Info	208	26	12
7.2 Devel Info	218	12.8	12
7.3 Tech Baseline Docs	118	14.9	12
7.4 Chg Cont Docs	156	7.4	12
7.5 Rev, Comment	200	27.3	12
7.6 Audit Results	135	27.1	12
7.7 Oper Assets	177	18.1	12
8 Elec Data Security	272	15.3	12
9.1 EDS ?	92	40.1	12
10 Lifecycle Support	163	59	9.3
11 Summary	125	47.2	9.9
Totals	**17646**	**25.18**	**11.58**
Avg. Words/Module	2521		
Total Links	100		
Broken Links	0		
Broken Links %	0%		

Course Name:	Operational Safety, Suitability, and Effectiveness		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1 Instructions	427	45.2	10.9
1.1 Syllabus	524	36.3	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1 Events	242	14.9	12
2 Policy	260	29.3	12
3 Policy Cont	131	1.9	12
4 Certifications	263	7.6	12
5 AF Policy Dir	119	34.5	12
6 Policy Doc Cont	182	16.3	12
7 Policy Doc Cont	140	28.1	12
8 Policy Doc Cont	130	25	12
9 OSS&E Airworthiness	204	17.9	12
10 OSS&E Toolkit	141	40.5	12
11 Summary	83	49	11.3
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1 HHQ Roles	278	7.1	12
2 HHQ Roles Cont	369	14.2	12
3 HHQ Roles Cont	153	22.4	12
4 Single Manager	237	16.2	12
5 Chief Engineer	247	5.6	12
6 SLAs	149	26.7	12
7 SLAs Cont	175	23.7	12
8 Summary	117	50.4	10.1
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1-OSS&E Baseline	248	29.7	12
2 Definitions	304	0	12
3 Definitions Cont	246	24.4	12
4 Product Baseline	198	23.6	12
5 Product Guides/inst	340	16.9	12
6 Baselines to Mng systems	134	31.5	12

7 Baselines to Mng systems	82	2.4	12
8 Summary	74	25.2	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1 Disc Engr Process	345	0	12
2 Disc Engr Process Cont	152	11.6	12
3 CM	303	25.1	12
4 Audits	293	14.3	12
5 T&E	203	0	12
6-Other Mandatory Elements	268	0	12
7 -Systems and End Items	197	33.6	12
8 -Systems and End Items Cont	123	16.1	12
9 Metrics	122	54.7	11.3
10 Metrics Cont.	105	0	0
11 Metrics Cont.	347	36.6	12
12 Summary	142	28.6	12
	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1 Enterprise Overview	320	19.5	12
2 Enterprise Overview Cont	304	11.6	12
3 Enterprise Overview Cont	289	26	12
4 Enterprise Overview Cont	176	24.8	12
5 C2 Enterprise	127	14	12
6 C2 Enterprise Cont	260	6.1	12
7 ESC tailored	230	15.9	12
8 Space and Misile Systems	233	23.4	12
9 Space and Misile Systems Cont	74	31.5	12
10 Air Armament Systems	327	13.5	12
11 Air Armament Systems Cont.	133	31.1	12
12 Air Armament Systems Cont.	321	9.1	12
13 Air Systems	222	0	12
14 Air Systems Cont	398	23.5	12
15 Air Systems Cont	409	9.2	12
16 Air Systems Cont	196	10.2	12
17 Other Products	352	32.1	12
18 Other Products Cont	169	11.8	12
19 Summary	128	58.7	8.1

	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1 Summary Exercise	82	50.9	10.2
Totals	**13547**	**21.47**	**11.63**
Avg. Words/Module	1935		
Usability Items			
Module 2.1 Events leading to OSS&E	When closing the mishap briefing window, system generates a close window icon in main window that closes main window when pressed.		
Module 2.2 Need for OSS&E	AFPD 63-12 Link Broken		
Module 2.2 Need for OSS&E	AFI 63-1201 Link Broken		
Module 2.2 Need for OSS&E	AFMCI 63-1201 Link Broken		
Module 2.3 Policy Documentation	AF Policy Directive 63-12 link broken		
Module 2.3 Policy Documentation	AFMCI Instruction 63-1201 link broken		
Module 2.3 Policy Documentation	Assurance of Operational Safety… link broken		
Module 2.3 Policy Documentation	http://escen.mitre.org:81/escn/ossetoolkit.html link broken		
Module 3.1 HHQ Roles	USAF/IL link broken		
Module 3.1 HHQ Roles	HQ USAF/SE link broken		
Module 3.1 HHQ Roles	HQ USAF/XO link broken		
Module 3.1 HHQ Roles	AFI 63-1201, paragraph 2.1 link broken		
Module 3.3 Chief Engineer	Government Industry Data Exchange Program link broken		
Module 4.2 Baselines used to manage…	Interactive exercise window loses focus after generating		
Module 5.1 Disciplined Engineering Process	Interactive exercise window loses focus after generating		
Module 5.1 Disciplined Engineering Process	AFPD 90-9 link broken		
Module 5.1 Disciplined Engineering Process	AFPD 90-901 link broken		
Module 5.1 Disciplined Engineering Process	AFI 09-202 link broken		
Module 5.1 Disciplined Engineering Process	AFMC Pamphlet 63-104… link broken		
Module 5.1 Disciplined Engineering Process	AFI 99-101 link broken		
Module 5.1 Disciplined Engineering Process	AFI 90-102 link broken		
Module 5.6 Useful Links	AFPD 62-4 link broken		
Module 5.6 Useful Links	AFPD 62-5 link broken		
Module 5.6 Useful Links	AFI 91-103… link broken		

Module 6.1 Documenting Compliance	AFI 16-1002… link broken
Module 6.1 Air Armament Systems	AF Instruction 21-101… link broken
Module 5.6 Other Products/Items	Interactive exercise window loses focus after generating
Module 6.8 Other Useful Links	AFI 21-201 link broken
Module 6.8 Other Useful Links	AFI 63-101 link broken
Module 6.8 Other Useful Links	AFI 63-104 link broken
Module 6.8 Other Useful Links	AFI 63-107 link broken
Module 6.8 Other Useful Links	AFI 91-103 link broken
Module 6.8 Other Useful Links	AFI 91-205 link broken
Module 6.8 Other Useful Links	AFI 99-105 link broken
Module 7.1 Summary Exercises	Interactive exercise window loses focus after generating
Total Links	67
Broken Links	30
Broken Links %	45%

Course Name:	Advance Concept Technology Demonstration		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	477	46.6	10.9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	285	0.7	12
Page 2	368	8.5	12
Page 3	154	21.6	12
Page 4	431	14.8	12
Page 5	206	19.5	12
Page 6	398	11.3	12
Page 7	346	22.8	12
Page 8	670	22.8	12
Page 9	340	15.9	12
Page 10	405	25.6	12
Page 11	345	23	12
Page 12	198	21.1	12
Page 13	222	45.2	11
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	177	36.3	11.6
Page 2	142	12.6	12
Page 3	156	27	12
Page 4	168	25.9	12
Page 5	326	36.3	12
Page 6	120	35.6	12
Page 7	306	26.6	12
Page 8	152	56.2	8.4
Page 9	157	37.2	11.4
Page 10	117	42.1	11.1
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	276	23	12
Page 2	293	11.2	12
Page 3	196	25.5	12
Page 4	323	20.1	12
Page 5	205	14.9	12
Page 6	373	18.9	12

Page 7	62	30.8	12
Page 8	50	24.9	12
Page 9	64	16.4	12
Page 10	190	36.1	12
Page 11	422	18.9	12
Page 12	217	15.2	12
Page 13	74	37.8	11.6
Page 14	122	37.1	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	226	44.6	11.3
Page 2	229	38.9	11.1
Page 3	230	35	12
Page 4	297	42.3	12
Page 5	238	32.3	12
Page 6	97	44.9	10.7
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	280	17.8	12
Page 2	284	18.6	12
Page 3	143	18.6	12
Page 4	251	26.2	12
Page 5	196	23.8	12
Page 6	126	5.3	12
Page 7	402	36.8	12
Page 8	140	41.8	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	320	28.6	12
Page 2	97	25.9	12
Page 3	339	30.1	12
Page 4	258	22.5	12
Page 5	199	10.6	12
Page 6	557	15.6	12
Page 7	376	21.1	12
Page 8	118	0	12
Page 9	207	39.8	11
Page 10	128	40.4	11.3
Page 11	179	22.6	12
Page 12	289	32	12
Page 13	379	41.8	10.9

Page 14	151	32.4	12
Page 15	134	67.5	7.5
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	352	15.6	12
Page 2	276	7.5	12
Page 3	265	11.3	12
Page 4	297	25.9	12
Page 5	294	33.6	12
Page 6	369	18.1	12
Page 7	231	30.5	12
Page 8	344	36.6	12
Page 9	212	32.2	12
Page 10	280	25	12
Page 11	210	23.1	12
Page 12	98	2.3	12
Page 13	104	60.1	9
Totals	**19735**	**26.82**	**11.73**
Avg. Words/Module	2467		
Module 2.1	Joint Requirements Oversight Council (JROC) link broken		
Site Failure	AFIT web server went down at 1550 hrs. Down all weekend.		
2.6 Roles and Responsibilities, cont.	JROC Backgroung Information link broken		
2.6 Roles and Responsibilities, cont.	HQ USAF/XOCW link broken (Restricted)		
2.6 Roles and Responsibilities, cont.	Air Force Materiel Command (AFMC) link broken		
3.1 The Modernization Planning Process, cont.	AFI 61-105, Planning for S&T link broken		
3.2 Origins of ACTDs	Joint Service sponsorship link does not return to calling page		
3.2 Budget subprocess	AFMPP link does not return to calling page		
6.3 AF Guidance Issues, cont.	Air Force and DOD guidance on Ots link broken		
7.4 OSS&E	AFMC Responsibilities (AFI 63-1201) linnk broken		
7.5 T&E of ACTDs	AFPD 99-101, para 5.6 link broken		
7.5 T&E of ACTDs	Operational Utility Evaluation (OUE) AFI 99-102, para 2.3.3 link broken		
7.5 T&E of ACTDs	AFI 99-101 para 3.7/3.8 Development, Test, and Evaluation link broken		
8.1 Transition Planning Guidelines	Transition Planning Guidelines link broken		
	When returning to Student Report Card from Summary screens, a new frameset is created in the right frame of the original frameset		

Total Links	80
Broken Links	11
Broken Links %	14%

Course Name:	Reducing Acquisition Response Time		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	128	48.2	9.9
Page 2	41	42.3	10.7
Page 3	65	32.5	12
Page 4	190	43.6	11.2
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	141	40.2	12
Page 2	131	28.5	12
Page 3	38	54.6	9.4
Page 4	65	17	12
Page 5	156	40.8	9.7
Page 6	120	40.6	12
Page 7	100	34.2	12
Page 8	157	37.9	12
Page 9	104	17	12
Page 10	199	38.9	12
Page 11	287	23.4	12
Page 12	151	36.5	12
Page 13	207	34.1	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	236	46.2	11.4
Page 2	245	33.4	12
Page 3	234	29.3	12
Page 4	198	38.4	11.4
Page 5	141	23.3	12
Page 6	143	34.8	12
Page 7	401	29.2	12
Page 8	174	35.9	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	157	47.8	10.5
Page 2	90	36.7	11.6
Page 3	183	37.5	12

Page 4	53	52.8	10
Page 5	56	53.5	10
Page 6	59	52.2	10.4
Page 7	253	34.5	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	51	21	12
Page 2	98	34.2	12
Page 3	74	13.8	12
Page 4	82	20.8	12
Page 5	79	31.5	11.7
Page 6	78	17	12
Page 7	88	6.1	12
Page 8	104	30.1	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	183	19.9	12
Page 2	84	61.8	7.2
Page 3	110	42.5	9.9
Page 4	97	49.6	10.2
Page 5	69	49.5	9.5
Totals	**6100**	**35.41**	**11.35**
Avg. Words/Module	1525		
3.1 Commercial Business Tools	Activity Based Costing link broken		
3.1 Commercial Business Tools	Balanced Scorecard link broken		
3.1 Commercial Business Tools	Benchmarking link broken		
3.1 Commercial Business Tools	Core Competencies link broken		
3.1 Commercial Business Tools	Customer Satisfaction link broken		
3.1 Commercial Business Tools	Cycle Time Reduction link broken		
3.1 Commercial Business Tools	Knowledge Management link broken		
3.1 Commercial Business Tools	Mission and Vision Statements link broken		
3.1 Commercial Business Tools	Pay for Performance link broken		
3.1 Commercial Business Tools	Reengineering link broken		
3.1 Commercial Business Tools	Scenario Planning link broken		

3.1 Commercial Business Tools	Shareholder Value Analysis link broken
3.1 Commercial Business Tools	Strategic Alliances link broken
3.1 Commercial Business Tools	Strategic Planning link broken
3.1 Commercial Business Tools	Total Quality Management link broken
3.1 Commercial Business Tools	Value Chain Analysis link broken
3.5 Recommended Reading/Resources	Portfolio Management For New Products link broken
5.1 Cycle Time Reduction Recommendations	Policy Memorandum link broken
5.1 Cycle Time Reduction Recommendations	pathfinder projects link broken
Total Links	93
Broken Links	19
Broken Links %	20%

Course Name:	Incentive for Reducing Acquisition Response Time		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	266	46.5	11.8
Page 2	41	42.3	10.7
Page 3	48	51.3	10
Page 4	229	29.6	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	266	35.5	12
Page 2	120	11.3	12
Page 3	107	12.8	12
Page 4	204	10.9	12
Page 5	142	8.2	12
Page 6	81	23.3	12
Page 7	129	19.3	12
Page 8	171	5	12
Page 9	189	16.4	12
Page 10	77	0	12
Page 11	125	25.1	12
Page 12	253	28.1	12
Page 13	31	21.5	12
Page 14	98	42.4	11.8
Page 15	86	30.3	12
Page 16	227	36.7	12
Page 17	198	15.2	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	138	39	12
Page 2	238	46.5	10.3
Page 3	165	47.2	10
Page 4	148	40.1	12
Page 5	210	40.8	12
Page 6	235	29	12
Page 7	198	28.5	12
Page 8	246	10.2	12
Page 9	194	6.3	12
Page 10	184	34.8	12
Page 11	211	37.8	12

Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	137	30.5	12
Page 2	124	26.2	12
Page 3	195	20.9	12
Page 4	110	34.5	12
Page 5	149	4.6	12
Page 6	73	21	12
Page 7	153	15.5	12
Page 8	187	16.8	12
Page 9	37	5.2	12
Page 10	173	25.9	12
Page 11	259	9.1	12
Page 12	98	28.8	12
Page 13	203	35.3	12
Page 14	96	2.8	12
Page 15	303	37	12
Page 16	274	21	12
Page 17	283	32.1	12
Page 18	221	38.8	12
Page 19	224	34.3	12
Page 20	188	42.7	10.8
Page 21	126	42.6	10.3
Page 22	245	21.6	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	141	40.5	12
Page 2	164	38.3	11.8
Page 3	152	20.4	12
Page 4	201	32.5	12
Page 5	157	38.1	12
Page 6	149	37.4	12
Page 7	129	4.8	12
Page 8	117	42.8	12
Page 9	155	20.1	12
Page 10	195	36.7	12
Page 11	145	18.7	12
Page 12	39	31.4	12
Page 13	187	34.6	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			

Page 1	266	39.9	10.2
Page 2	117	21.5	12
Page 3	242	35.8	12
Page 4	85	45.1	10.4
Page 5	25	72.3	6.2
Page 6	247	34.4	12
Page 7	301	2.9	12
Page 8	92	16.5	12
Page 9	234	23.2	12
Page 10	146	25.7	12
Page 11	182	18.1	12
Page 12	223	16.2	12
Page 13	175	26	12
Totals	**13379**	**27.41**	**11.75**
Avg. Words/Module	2230		
6.1 Schedule Based Incentives	Constructing Successful business incentives link broken. Student warned site may be unavailable.		
Total links	119		
Broken Links	1		
Broken Links %	1%		

Course Name:	Intelligence in Force Modernization		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	214	25.7	12
Page 2	110	50.4	9.4
Page 3	115	39.7	12
Page 4	138	50.7	10.4
Page 5	87	56.9	8.5
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	382	18.6	12
Page 2	346	24.2	12
Page 3	81	40	10.7
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	136	1.8	12
Page 2	43	19	12
Page 3	145	18.7	12
Page 4	240	17.6	12
Page 5	156	20.5	12
Page 6	125	31.7	12
Page 7	80	58	8.2
Page 8	242	48	9
Page 9	85	37	10.7
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	148	0	12
Page 2	422	20.6	12
Page 3	179	0	12
Page 4	41	61	7.4
Page 5	352	14.2	12
Page 6	231	5.5	12
Page 7	196	12.9	12
Page 8	439	21.1	12
Page 9	365	9.1	12
Page 10	353	6.8	12
Page 11	411	6.1	12
Page 12	305	10.1	12

Page 13	322	5.6	12
Page 14	126	33.2	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	161	0	12
Page 2	499	32.1	12
Page 3	291	44.3	10.8
Page 4	380	43	11
Page 5	140	47.5	10
Page 6	354	45.6	10.2
Page 7	460	42.5	10.8
Page 8	371	57.3	8.7
Page 9	154	54.8	9.7
Page 10	68	0	0
Page 11	315	56.3	9.7
Page 12	204	46.3	10.2
Page 13	96	21.4	12
Page 14	122	21.3	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	117	27.5	12
Page 2	358	38.7	12
Page 3	166	30.6	12
Page 4	487	40.4	11.5
Page 5	433	34.6	12
Page 6	60	10.5	12
Page 7	251	28.4	12
Page 8	100	36.8	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	84	8.3	12
Page 2	318	12	12
Page 3	423	23.3	12
Page 4	181	39.6	11.5
Page 5	437	47	11.4
Page 6	274	27.7	11.5
Page 7	676	39.2	11.9
Page 8	224	43.7	12
Page 9	249	30.3	12
Page 10	396	0	12
Page 11	207	48.4	9.2

Page 12	434	25.6	12
Page 13	439	23.7	12
Page 14	182	29.4	12
Page 15	466	20.8	12
Page 16	98	16.5	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	45	18.9	12
Page 2	409	21.4	12
Page 3	545	38.9	12
Page 4	99	0	0
Page 5	491	26.9	12
Page 6	461	14.5	12
Page 7	144	30.1	12
Page 8	93	23.7	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 9			
Page 1	366	30.5	12
Page 2	220	13.1	12
Page 3	158	15.5	12
Page 4	52	18.9	12
Page 5	210	30.4	12
Page 6	241	19.4	12
Page 7	284	20.5	12
Page 8	510	15.6	12
Page 9	125	39.5	11.5
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 10			
Page 1	467	3.5	12
Page 2	298	0	12
Page 3	294	3.5	12
Page 4	347	27.2	12
Page 5	272	25.1	12
Page 6	302	12.7	12
Page 7	533	2.1	12
Page 8	115	35.7	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 11			
Page 1	164	19.1	12

Page 2	184	2.3	12
Page 3	212	24.5	12
Page 4	337	17.9	12
Page 5	367	14	12
Page 6	66	20.9	12
Page 7	146	44.2	11.4
Page 8	183	29.2	12
Page 9	239	35.3	12
Page 10	279	40.9	11.5
Page 11	187	25.6	12
Page 12	189	0	12
Page 13	126	31.6	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 12			
Page 1	92	0.9	12
Page 2	404	10	12
Page 3	354	22.3	12
Page 4	221	0	12
Page 5	244	4.3	12
Page 6	223	0	12
Page 7	359	20.8	12
Page 8	351	0	12
Page 9	102	24.4	12
Page 10	511	16.3	12
Page 11	168	14.2	12
Page 12	72	25.4	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 13			
Page 1	100	10.7	12
Page 2	227	12.1	12
Page 3	223	23.8	12
Page 4	236	28.5	12
Page 5	71	29.8	11.7
Page 6	178	29.6	12
Page 7	176	27.2	12
Page 8	141	20.4	12
Page 9	69	30.3	12
Page 10	384	24.3	12
Page 11	149	62.9	6.9
Page 12	140	47.1	10.9
Page 13	149	23.7	12
Page 14	254	23.5	12
Total	**32648**	**24.70**	**11.43**

Avg. Words/Module	2511		
Usability Items			
1.3 AFIFM COP	Comminity of Practice link broken		
1.4 Summary	Air Force is spelled Air Frce in 1.5		
2.2 New Strategy	https://www.afmc-mil.wpafb.af.mil/HQ-AFMS/IN/force_mod/000104strategy.htm link broken		
2.2 New Strategy	AFI 14-111 link broken		
2.2 New Strategy	WSIIO link broken		
3.2 Requirements Generation Process	Chairman JCS Inst(CJCSI) 3170.1 link broken		
3.2 Requirements Generation Process	AF Policy Directive 90-11 link broken		
3.2 Requirements Generation Process	MPP Phases, Definition Deskbook link broken		
3.2 Requirements Generation Process	MPP Phases, Documentation Deskbook link broken		
3.2 Requirements Generation Process	MPP Phases, Validation Deskbook link broken		
3.2 Requirements Generation Process	MPP Phases, Approval Deskbook link broken		
3.2 Requirements Generation Process	AF Instruction 10-601 Guidance and… link broken		
3.2 Requirements Generation Process	AF Instruction 10-601 Operational Requirements… link broken		
3.3 The Acquisition Management System	click here for this diagram in the deskbook library link broken		
3.3 The Acquisition Management System, cont	Interim DoD 5000.2-R link broken		
4.3 Other Organization Supporting IFM	XOI website link broken		
4.3 Other Organization Supporting IFM	AFCA webpagr link broken		
4.3 Other Organization Supporting IFM	AIA webpage link broken		
4.3 Other Organization Supporting IFM	NAIC website link broken		
4.4 US Intelligence Community, cont	Director of Central Intelligence link broken		
4.4 US Intelligence Community, cont	Links to Intel Community link broken		
4.4 US Intelligence Community, cont	The national intelligence community organizations affecting IFM 3rd para is unintelligible		
5.1 Directives and Guidance	DoD 5000.2-R link broken		
5.1 Directives and Guidance	CJCSI 3170.01 Requirements Generation link broken		
5.1 Directives and Guidance	DIAR 55-3 link broken		
5.1 Directives and Guidance	Defense Planning Guidance, FY01-05 link broken		

5.1 Directives and Guidance	AFPD 10-6, Mission Needs & Operational Requirements link broken
5.1 Directives and Guidance	AFI 10-601 Mission Needs & Operational Requirements Guidance and Procedures link broken
5.1 Directives and Guidance	AFI 14-111, Intelligence support to the AF Acquisition process link broken link broken
5.1 Directives and Guidance	DIAR 55-3 programmer notes visible on screen
5.1 Directives and Guidance	Defense Planning Guidance, FY01-05 programmer notes visible on screen
5.2 Threat Information Integration in IFM	Support link in macromedia arrow requires mouse to be over a letter before link activates
5.5 Roles and Responsibilities of AF Intel	Air Force Instruction 14-111 link broken
6.1 Modeling and Simulation Overview, cont.	First paragraph of Cost and Time section needs grammar check for evaluating vs evaluation
6.1 Modeling and Simulation Policy and Guidance	DoDD 5000.59 link broken
6.1 Modeling and Simulation Policy and Guidance	AFPD 16-10 link broken
6.1 Modeling and Simulation Policy and Guidance	AFI 16-1002 link broken
7.3 ISWG/TEM cont.	Intelligence Support planner… link broken
7.5 Requirements and Deficiencies, cont.	Intelligence Support planner… link broken
9.2 Directives and Guidance	AFI 14-111 link broken
9.2 Directives and Guidance	https://www.afca.scottaf.mil/c4isp/ link broken
9.2 Directives and Guidance	Command, Control, Communications… link broken
9.2 Directives and Guidance	Mandatory procedures for… link broken
9.2 Directives and Guidance	Interoperability and Supportability… link broken
9.4 Validation and Approval process	Air Force C4ISP prep guide link broken
9.5 Funding and Implementation, cont.	Air Force C4ISP prep guide link broken
10.2 Requirements Process and Procedures	Community online… link broken
10.3 Characteristics of a well written requirement	AFI 14-201 link broken
10.5 Directives and Guidance for DoDIPP	Air Force Policy Directive (AFPD) 14-1 link broken
10.5 Directives and Guidance for DoDIPP	Air Force Instruction (AFI) 14-201 link broken
10.5 Directives and Guidance for DoDIPP	Title X, USC link broken

11.1 GI&S Definitions	Text Products link broken
11.3 GI&S Requirements Process, cont.	DoD 5000.56 link broken
11.3 GI&S Requirements Process, cont.	DoD 5000.2-R link broken
11.3 GI&S Requirements Process, cont.	CJCSI 3170.01A link broken
11.3 GI&S Requirements Process, cont.	CJCSI 3901.01 link broken
11.3 GI&S Requirements Process, cont.	AFI 10-601 link broken
13.3 Key Players/Structures, cont.	AF/XPP homepage link broken
13.4 Summary	http://www.xp.hq.af.mil/xpp/xpp.htm link broken
13.4 Summary	http://www.xp.hq.af.mil/xpx link broken
Total Links	274
Broken Links	55
Broken Links %	20%

Course Name:	AFRL R&D Case File Management Course		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	570	59.1	8.9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	497	60	8.4
Page 2	244	64.7	8.3
Page 3	325	52.6	11.3
Page 4	306	57.7	9
Page 5	237	60.7	7.7
Page 6	209	66.5	8.3
Page 7	129	48.4	11.5
Page 8	178	35	12
Page 9	99	64.5	9.1
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	51	64.5	7.4
Page 2	613	49.6	10.5
Page 3	181	48.3	10.4
Page 4	65	65.7	7.5
Page 5	205	55.4	10.2
Page 6	284	34.4	12
Page 7	119	47.3	10.8
Page 8	50	57.9	9.3
Page 9	131	52.2	11.3
Page 10	329	58.9	10.6
Page 11	122	53.2	10.7
Page 12	211	54.1	9.4
Page 13	174	57.6	8.5
Page 14	147	63	6.2
Page 15	293	46.4	9.8
Page 16	58	44.7	10.6
Page 17	77	67.3	7.7
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	91	60	9.4
Page 2	281	49	11

Page 3	64	53.6	8.7
Page 4	212	57.9	8.6
Page 5	351	70	7.1
Page 6	241	68.7	9.1
Totals	**7144**	**56.03**	**9.43**
Avg. Words/Module	1786		
Usability Items			
2.1 Public Law and Official Guidance	AFRLI 61-201 link broken		
2.5 Arm/Farm Responsibilities	(AFRL Form 2529a,b,c) link broken		
2.5 Arm/Farm Responsibilities	(AFRL Form 2529a,b,c) page 1 link broken		
2.5 Arm/Farm Responsibilities	(AFRL Form 2529a,b,c) page 2 link broken		
2.7 CRADAs, etc	Research spelled incorrectly in second to last sentence		
3.1 Starting a Case File	AFMC Form 14 link broken		
3.6 Close-out and Retirement	R&D Case File Minimum Requirements link broken		
3.8 Summary	AFRLs R&D case file info are link broken		
4.2 Checklist Items	AF Form 2519 All purpose checklist, AFRL R&D case file overprint, Pg1 link broken		
4.2 Checklist Items	AF Form 2519 All purpose checklist, AFRL R&D case file overprint, Pg2 link broken		
Total Links	53		
Broken Links	9		
Broken Links %	17%		

	Course Name:	Commercial Business Approach	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	546	37.1	12
Page 2	122	37.7	12
Page 3	132	42.4	10.6
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	78	38.4	12
Page 2	206	27.6	12
Page 3	202	42.1	10.7
Page 4	112	55.5	8.5
Page 5	101	56.7	7.5
Page 6	117	18.3	12
Page 7	59	26.2	12
Page 8	163	40.4	11.2
Page 9	119	43.1	11
Page 10	127	28.2	12
Page 11	79	38.7	10.7
Page 12	121	51.7	8.9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	76	43.7	12
Page 2	15	18.7	12
Page 3	125	6.1	12
Page 4	67	0	0
Page 5	110	51.1	9.9
Page 6	68	0	0
Page 7	32	63.6	8.3
Page 8	105	70.3	7.3
Page 9	66	2.3	12
Page 10	153	61	9.4
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	43	8.8	12
Page 2	180	50.8	11.7
Page 3	123	0	12
Page 4	204	34.5	11.9

Page 5	103	22.8	12
Page 6	151	41.7	10.6
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	46	38.3	12
Page 2	83	48	8.8
Page 3	156	42.8	9.9
Page 4	106	38.8	11.4
Page 5	124	62.9	6.3
Page 6	93	54.9	9.6
Totals	**4513**	**36.36**	**10.11**
Avg. Words/Module	903		
3.4 techniques	Vivamus link broken		
Total Links	31		
Broken Links	1		
Broken Links %	3 %		

Course Name:		Reformed Supply Support Program	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	107	44	11.5
Page 2	47	46.8	10.4
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	320	32.8	12
Page 2	117	13.7	12
Page 3	107	57.5	9.2
Page 4	80	58.5	8.8
Page 5	101	37.5	11.9
Page 6	154	37.5	12
Page 7	91	60.1	9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	140	23	12
Page 2	54	88.9	3.8
Page 3	100	29.3	12
Page 4	159	38.1	12
Page 5	327	39.4	12
Page 6	81	60.1	9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	202	5.8	12
Page 2	179	23.4	12
Page 3	259	29.8	12
Page 4	176	26.6	12
Page 5	93	60.1	9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	58	10.7	12
Page 2	45	32.8	12
Page 3	144	10.7	12
Page 4	133	47.5	11.4
Page 5	187	21.5	12

Page 6	104	41.1	12
Page 7	192	32.4	12
Page 8	241	45.6	11.4
Page 9	24	37.9	12
Page 10	143	42.5	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	85	18.9	12
Page 2	93	34.5	12
Page 3	102	33	12
Page 4	63	33.6	11.7
Page 5	140	22.3	12
Page 6	124	36.5	11.8
Page 7	86	50.4	9.4
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	108	46.7	12
Page 2	219	19.1	12
Page 3	279	15.1	12
Page 4	229	23.9	12
Page 5	394	25	12
Page 6	147	60.1	9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	109	14.7	12
Page 2	116	5	12
Page 3	198	10	12
Page 4	115	35.6	12
Page 5	78	58.3	8.4
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 9			
Page 1	146	22.1	12
Page 2	147	21.6	12
Page 3	162	38	12
Page 4	220	23.9	12
Page 5	100	23	12
Page 6	102	26.3	12
Page 7	85	60.1	9
Totals	**7812**	**34.42**	**11.29**

Avg. Words/Module	868		
Usability Items			
2.1 Required Reading	1.1 Scope - 1.2 Background link broken		
2.2 Readings	Deskbook link redirects		
2.2 Required Reading	1.4 Overview of the five tenets link broken		
2.3 Required Reading	Data Exchange link redirects		
2.3 Optional Reading	Archived DoD 5000.2R link redirects		
3.1 Required Reading	Chapter 2: 2.1.1… link broken		
3.2 Required Reading	Chapter 2: 2.1.4… link broken		
3.3 Required Reading	Chapter 2: 2.1.6… link broken		
3.3 Optional Reading	RSSP Guide… link broken		
4.1 Required Reading	Chapter 2: 2.2… link broken		
4.1 Required Reading	Attachment 9.. link broken		
4.1 Optional Reading	Attachment 8… link broken		
4.2 Required Reading	Chapter 2: 2.2.3… link broken		
4.3 Required Reading	AFMCI 23-101 link redirects		
4.3 Required Reading	Chapter 2: 2.2.4.1… link broken		
4.4 Required Reading	Chapter 2: 2.3… link broken		
4.4 Optional Reading	Attachment 20… link broken		
5.1 Required Reading	Chapter 2: 2.4.1… link broken		
5.1 Required Reading	Chapter 1: 1.3.2… link broken		
5.2 Required Reading	RSSP Guide: Attachment 14… link broken		
5.2 Required Reading	RSSP Guide: Sectuion 2.4.1… link broken		
5.2 Optional Reading	RSSP Guide: Attachment 7… link broken		
5.2 Required Reading	RSSP Guide: Attachment 32… link broken		
5.2 Required Reading	Chapter 2: 2.4.1.3.5… link broken		
5.3 Required Reading	Chapter 2: 2.2.4.1.1… link broken		
5.3 Required Reading	Chapter 2: 2.4.1.3.6… link broken		
5.4 Required Reading	Chapter 2: 2.4.2… link broken		
6.1 Required Reading	Chapter 3: 3.1… link broken		
6.1 Required Reading	Chapter 3: 3.2… link broken		
6.1 Required Reading	Attachment 29… link broken		
6.2 Required Reading	Chapter 3: 3.3… link broken		
6.2 Optional Reading	RSSP Guide: Attachment 30… link broken		
6.2 Optional Reading	Chapter 2: 2.3.6.2.1… link broken		
6.3 Required Reading	Chapter 3: 3.4… link broken		
6.3 Required Reading	Chapter 6: 6.3.1… link broken		
6.4 Required Reading	Chapter 3: 3.5… link broken		
6.5 Required Reading	Chapter 3: 3.6… link broken		
7.1 Required Reading	Chapter 4: Tenet 3… link broken		
7.2 Required Reading	Chapter 4: 4.2… link broken		
7.2 Required Reading	Attachment 10… link broken		
7.2 Optional Reading	Attachment 33… link broken		
7.3 Required Reading	Chapter 4: 4.3… link broken		
8.1 Required Reading	Chapter 5: Tenet 4… link broken		

8.2 Required Reading	Chapter 5: 5.2… link broken		
8.2 Required Reading	Chapter 5: 5.3… link broken		
8.3 Required Reading	Chapter 5: 5.4… link broken		
8.3 Required Reading	RSSP Guide: Attachment 33… link broken		
8.4 Required Reading	Chapter 5: 5.6… link broken		
9.1 Required Reading	Chapter 6: Tenet 5… link broken		
9.2 Required Reading	Chapter 6: 6.3… link broken		
9.2 Required Reading	Attachment 33… link broken		
9.3 Required Reading	Chapter 6: 6.4… link broken		
9.4 Required Reading	Chapter 6: 6.6… link broken		
Total Links	128		
Broken Links	53		
Broken Links %	41%		

Course Name:		Product Support Management Planning	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	339	54.5	9.6
Page 2	279	48.2	10.3
Page 3	235	22.6	12
Page 4	242	45.3	10.2
Page 5	87	20.9	12
Page 6	94	38.8	10.7
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	181	28.3	12
Page 2	161	29.1	12
Page 3	169	35.3	12
Page 4	213	40.4	12
Page 5	217	26.9	12
Page 6	214	37	12
Page 7	208	8.8	12
Page 8	284	40.7	12
Page 9	121	29.3	12
Page 10	133	7.6	12
Page 11	152	32.8	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	408	28.8	12
Page 2	118	31.9	12
Page 3	42	21.4	12
Page 4	197	21.6	12
Page 5	381	21.9	12
Page 6	157	40.1	11.2
Page 7	258	21.7	12
Page 8	216	23.9	12
Page 9	225	30.5	12
Page 10	278	18.5	12
Page 11	244	33	12
Page 12	119	28.1	12
Page 13	46	51.7	8.9
Page 14	124	43.7	11
Readability	Words	Flesch Reading	Flesch-Kincaid Grade Level

Check:		Ease	
Module 4			
Page 1	93	29.9	12
Page 2	111	37.2	12
Page 3	199	46.8	11.1
Page 4	356	36.9	11.3
Page 5	180	29.3	12
Page 6	129	28.7	12
Page 7	151	38.4	12
Page 8	433	36.3	12
Page 9	153	43	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	113	31.5	12
Page 2	128	29.9	12
Page 3	153	12	12
Page 4	136	25.3	12
Page 5	197	30.8	12
Page 6	125	21.3	12
Page 7	223	12.8	12
Page 8	99	14.8	12
Page 9	226	37.3	11.7
Page 10	185	20.5	12
Page 11	134	32.7	12
Page 12	79	33.6	12
Page 13	66	74.6	5.3
Page 14	192	25.3	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	97	39.3	12
Page 2	183	23.1	12
Page 3	67	52.5	11.1
Page 4	191	20.9	12
Page 5	75	13.1	12
Page 6	149	27.9	12
Page 7	152	38.8	12
Page 8	178	41.8	11.7
Page 9	379	24.8	12
Page 10	138	25.4	12
Totals	**11612**	**31.25**	**11.66**
Avg. Words/Module	1935		

Usability Items			
	A new frameset is constructed inside the right frame when returning to the student report card from the summary pages.		
3.1 PSMP Components	PSMP CoP link broken - Required to complete the exercise		
6.3 Reclamation, cont	process out description has redundant wording - "customer"		
Total Links	50		
Broken Links	1		
Broken Links%	2%		

Course Name:	Integrated Product Support Course		
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	525	51.5	10.7
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	328	6.8	12
Page 2	461	8.6	12
Page 3	119	12.1	12
Page 4	108	35.7	12
Page 5	162	44.9	9.4
Page 6	82	19.3	12
Page 7	125	2.4	12
Page 8	49	14.8	12
Page 9	311	7.1	12
Page 10	488	11.8	12
Page 11	362	13.4	12
Page 12	428	29.7	12
Page 13	207	11.6	12
Page 14	176	3.2	12
Page 15	307	16.7	12
Page 16	259	16.5	12
Page 17	82	33.6	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	178	6.6	12
Page 2	149	10.6	12
Page 3	151	33.4	12
Page 4	183	26.5	12
Page 5	267	21.1	12
Page 6	213	10.8	12
Page 7	280	20.4	12
Page 8	183	23.5	12
Page 9	296	25.9	12
Page 10	157	33.1	12
Page 11	338	30.8	12
Page 12	181	40.8	12

Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	140	0	12
Page 2	133	0	12
Page 3	251	15.6	12
Page 4	135	13	12
Page 5	96	8.8	12
Page 6	107	4	12
Page 7	117	47.7	10.8
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	193	13	12
Page 2	150	37	11.8
Page 3	258	27.4	12
Page 4	73	61.3	6.8
Page 5	102	10.9	12
Page 6	169	11.6	12
Page 7	300	9.1	12
Page 8	257	14.4	12
Page 9	183	1.9	12
Page 10	248	19.5	12
Page 11	209	25.3	12
Page 12	87	30.1	12
Page 13	97	50.4	9.4
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	247	8.2	12
Page 2	223	6.8	12
Page 3	63	0	12
Page 4	154	37.6	11.9
Page 5	167	21.9	12
Page 6	241	19.4	12
Page 7	301	14.9	12
Page 8	216	8.5	12
Page 9	275	25.6	12
Page 10	199	15.7	12
Page 11	249	11.8	12
Page 12	291	10.3	12
Page 13	244	16	12
Page 14	78	48.6	9.5

Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	132	16.5	12
Page 2	325	22.3	12
Page 3	319	5.4	12
Page 4	182	23.2	12
Page 5	109	23.5	12
Page 6	112	13.8	12
Page 7	114	27.1	12
Page 8	301	12.7	12
Page 9	107	41.6	11.8
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	200	15.9	12
Page 2	201	15.5	12
Page 3	165	33.2	12
Page 4	221	54.5	8.3
Page 5	312	43.7	11
Page 6	84	21.4	12
Page 7	211	45.4	9.7
Page 8	242	43	10.9
Page 9	270	48	10
Page 10	107	28.2	12
Page 11	138	33.3	11.9
Page 12	85	48.6	8.9
Page 13	246	27.3	12
Page 14	322	25.8	12
Page 15	449	22.4	12
Page 16	240	23.1	12
Page 17	202	14.6	12
Page 18	142	37.4	11.2
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 9			
Page 1	190	19.1	12
Page 2	244	8.6	12
Page 3	311	29.5	12
Page 4	310	17.4	12
Page 5	111	29.4	12
Page 6	261	24.8	12
Page 7	256	18.1	12
Page 8	234	22.2	12

Page 9	256	13.5	12
Page 10	219	31.3	12
Page 11	125	36.7	12
Page 12	467	11.7	12
Page 13	109	41.5	10.9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 10			
Page 1	297	27	12
Page 2	247	19.1	12
Page 3	291	18.8	12
Page 4	253	21.9	12
Page 5	116	13.6	12
Page 6	261	26.8	12
Page 7	137	45.6	8.3
Page 8	225	0	12
Page 9	213	11	12
Page 10	239	13.9	12
Page 11	185	31.1	12
Page 12	136	60.8	9
Page 13	403	7.8	12
Page 14	333	24.3	12
Page 15	225	10	12
Page 16	274	35.6	12
Page 17	370	11.6	12
Page 18	352	11.6	12
Page 19	126	36.1	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 11			
Page 1	236	15.3	12
Page 2	174	18.7	12
Page 3	299	3.5	12
Page 4	184	13.8	12
Page 5	270	2	12
Page 6	333	8.6	12
Page 7	196	0	12
Page 8	271	17.9	12
Page 9	251	6.9	12
Page 10	361	18.8	12
Page 11	216	6.3	12
Page 12	267	0	12
Page 13	294	5.7	12
Page 14	292	1.6	12

Page 15	344	8.4	12
Page 16	181	16.5	12
Page 17	82	39.3	11.5
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 12			
Page 1	206	0	12
Page 2	230	15	12
Page 3	261	18.2	12
Page 4	167	0	12
Page 5	282	0.1	12
Page 6	113	10.4	12
Page 7	145	12.2	12
Page 8	126	9.9	12
Page 9	66	60.1	9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 13			
Page 1	278	13.4	12
Page 2	491	21.2	12
Page 3	121	32.4	12
Page 4	116	22.6	12
Page 5	238	15.3	12
Page 6	336	34.5	12
Page 7	269	33	12
Page 8	321	43.1	10.9
Page 9	190	0	12
Page 10	430	5.4	12
Page 11	271	20.2	12
Page 12	106	60.1	9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 14			
Page 1	96	0	12
Page 2	251	25.2	12
Page 3	179	22.1	12
Page 4	284	13.1	12
Page 5	239	25.4	12
Page 6	308	36.7	12
Page 7	210	14.8	12
Page 8	274	42.2	12
Page 9	182	11.9	12
Page 10	296	38.1	12

Page 11	319	31.9	12
Page 12	221	27.4	12
Page 13	310	40.3	12
Page 14	479	10.5	12
Page 15	308	4.1	12
Page 16	217	9.1	12
Page 17	73	60.1	9
Totals	**39982**	**21.30**	**11.73**
Avg. Words/Module	2856		
Usability Items			
2.1 Purpose of Material Management	DoD 4104… link broken		
2.2 Org Chart	Aeronautical Systems link broken on description page		
2.2 Org Chart	Air Armament Systems link broken		
2.2 Org Chart	Space and Missile Systems link broken on description page		
2.2 Org Chart	Oklahoma City Air Logistics Center link broken on description page		
2.2 Org Chart	Sacramento Air Logistics Center link broken on description page		
2.2 Org Chart	San Antonio Air Logistics Center link broken on description page		
2.2 Org Chart	Air Force Flight Test Center link broken on description page		
2.2 Org Chart	Phillips Laboratory link broken on AFRL page		
2.2 Org Chart	AMARC link broken on description page		
2.2 Org Chart	CASC link broken on cataloging and Standardization page		
2.2 Org Chart	DLIS link broken on cataloging and Standardization page		
2.2 Org Chart	AGMC link broken on cataloging and Standardization page		
2.2 AFMC Organization, cont	Test and Evaluation Business Area link broken		
2.2 AFMC Organization, cont	Product Support Business Area link broken		
2.2 AFMC Organization, cont	ISAG Business Area link broken		
2.2 AFMC Organization, cont	IM Business Area link broken		
2.2 AFMC Organization, cont	I&S Business Area link broken		
2.3 Principle Tenets of Materiel Management	AFMC mission link broken		
2.5 Key positions…	Deputy Chief of Staff, Installations and logistics link broken		
2.5 Key positions…	DoDD 5000.1 Defense Acquisition link broken		
2.5 Key positions…	MMT-Material Management teams link broken		
3.4 Agile Combat…	Global Engagement link restricted		

3.4 Agile Combat…	Global Engagement Series link broken
4.1 Introduction	DoDD 5000.1 link broken
4.1 Introduction	DoDD 5000.2-R link broken
5.1 Introduction	DoD 5000.2 link redirects
5.8 Other Useful Links	Air Force Supply Publication link broken
6.1 Introduction	Department of Defense Manuals link broken
6.1 Introduction	AFMC Manual 23-3, Cataloging and Standardization link broken
6.1 Introduction	Defense Logistic Information Service link broken
6.1 Introduction	DoD Cataloging link broken
6.6 Cataloging System	Federal Logistic Information System (FLIS) link broken
6.7 Key Participants	Defense Logistic Information System (DLIS) link broken
6.7 Key Participants	Cataloging and Standardization Center (CASC) link broken
6.7 Key Participants	Directorate of Air Force (DLIS-F) link broken
6.7 Key Participants	HQ AFMC/LGI link broken
6.7 Key Participants	HQ AFMC/LGIA link broken
6.7 Key Participants	HQ AFMC/SC link broken
7.2 Items Managed…	D062 link broken
7.2 Items Managed…	D041 link broken
7.2 Items Managed…	D041 recoverable consumption… link broken
8.3 Commodity Buy Process, cont	Materiel Support Division (MSD) link broken
8.4 Buy Process Tools	Lightning bolt initiative #10 link broken
8.7 Other Useful Links	Air Force Policy Directive 23-1… link broken
8.7 Other Useful Links	Air Force Instruction 23-102… link broken
8.7 Other Useful Links	Aie Force Instruction 23-103… link broken
8.7 Other Useful Links	AFMC Polict Directive 23-1… link broken
9.2 Purpose of DREP and CREP	Air Force Materiel Command… link broken

9.3 Repair Process Steps, cont	EXPRESS link broken
9.7 Other Useful Links	Agile (LEAN) Logistics homepage link broken
10.2 IWSM	Program Master List link broken
10.4 Total Ownership Costs	Total Ownership Costs (R-TOC) link broken
10.5 Key Tools and Information Systems	Weapon System Management Information System (WSMIS) link broken
10.5 Key Tools and Information Systems, cont	AFI 21-103 link broken
10.5 Key Tools and Information Systems, cont	SEMR link broken
10.6 Key Interfaces…	Maintenance Requirements Review Board (MRRB) link broken
10.6 Key Interfaces…	MAJCOM days link broken
12.1 Introduction	Joint Logistics Commanders (JLC's) link broken
12.4 DLA Support to the Services, cont	Defense National Stockpile Center link broken
12.4 DLA Support to the Services, cont	Defense Distribution Systems Center (DDSC) link broken
13.1 Introduction	Agile Combat Support link broken
13.2 Contractor Logistics Support (CLS)	Department of Defense Logistics Strategic plan link broken
13.2 Contractor Logistics Support (CLS)	Reliability Based Logistics (RBL) link broken
13.3 The Foreign Military Sales Program	1998 DoD Logistics Strategic Plan… link broken
13.3 The Foreign Military Sales Program, cont	Air Force Security Assistance Center link broken
13.4 Commercial Items for Military Support	"Defense Acquisition (para 4.2.2)" link broken
13.6 Other Useful Links	DoD 5000.1, Defense Acquisition link broken
13.6 Other Useful Links	DoD 5000.2-R Mandatory Procedures… link broken
14.1 Introduction	AFMCR 65-9 link broken

14.3 Types of Reclamation	AFI 21-104 link broken		
14.3 Types of Reclamation, cont	AFI 23-204 link broken		
14.3 Types of Reclamation, cont	AFMCR 65-9 link broken		
14.3 Types of Reclamation, cont	AFMCR 65-9 link broken		
14.3 Types of Reclamation, cont	AFMCR 65-9 link broken		
14.3 Types of Reclamation, cont	AFI 21-104 link broken		
14.4 Disposal…	Defense Demilitarization Manual link broken		
Exercise	The GO button does not appear after completing the exercise		
Total Links	324		
Broken Links	72		
Broken Links%	22		

Course Name:		Introduction to Evolutionary Acquisition	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	321	33	12
Page 2	296	42.3	12
Page 3	544	18.7	12
Page 4	403	0.8	12
Page 5	172	0	12
Page 6	294	52.2	9.9
Page 7	429	18.6	12
Page 8	320	29.8	12
Page 9	951	54.2	10.5
Page 10	430	28.7	12
Page 11	119	41	11.6
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	169	15.2	12
Page 2	584	33.9	12
Page 3 Interactive Exercise	632	28	12
Page 4	453	31.4	12
Page 5 Sys Eng. IPT	585	27.2	12
Page 6 Test Eval IPT	174	54.1	9.1
Page 7 Logistics IPT	177	56.4	8.1
Page 8 Fin Man IPT	108	55.4	7
Page 9 War Fighter Rep	255	51.8	10
Page 10 New Email	123	38.1	10
Page 11 Refine Inc 1	495	32.2	12
Page 12 Sys Eng Assessment	521	20.4	12
Page 13 Test/Eval Assessment	158	54.1	9.1
Page 14 Log Assessment	155	56.4	8.1
Page 15 Fin Man Assessment	98	53.8	7.4
Page 16 Cont. Assessment	101	55	8.3
Page 17 Warfighter Assessment	249	51.8	10
Page 18 Email	122	41.3	9.5
Page 19 Ref Inc 2	389	22.9	12
Page 20 Sys Eng Assessment	447	19.3	12
Page 21Test/Eval Assessment	139	54.1	9.1
Page 22 Log Assessment	130	56.4	8.1
Page 23 Fin Assessment	88	52	7.8
Page 24 Contract Assessment	95	55	8.3
Page 25 New Mail	122	40.5	9.7

Page 26 Sys Eng Assessment	319	18	12
Page 27 Test/Eval Assessment	119	54.1	9.1
Page 28 Log Assessment	104	56.4	8.1
Page 29 Fin Assessment	78	50	8.4
Page 30 Contract Assessment	89	55	8.3
Page 31 New Mail	117	44.7	9
Page 32	361	28.7	12
Page 33	395	38.7	10.8
Page 34	358	26.4	12
Totals	**12788**	**38.84**	**10.34**
Avg. Words/Module	6394		
Usability Items			
1.2 Policy on-line References	DoDD 5000.1 "Defense Acquisition" link broken		
1.2 Policy on-line References	DoDD 5000.1 word version link broken		
1.2 Policy on-line References	DoDD 5000.2-R… link broken		
1.2 Policy on-line References	DoDD 5000.2-R… word version link broken		
1.2 Policy on-line References	Office of Management and Budget circular A-109 link broken		
Total Links	43		
Broken Links	5		
Broken Links%	12%		

	Course Name:	Modification Management	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	370	22.3	12
Page 2	26	50.4	9.4
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	55	50	10.6
Page 2	106	7.3	12
Page 3	259	16.5	12
Page 4	38	60.7	7.7
Page 5 Kinds-Perm	75	0	12
Page 6 Perm-Safe	46	0	12
Page 7 T1 Mods	162	15.5	12
Page 8	97	17.9	12
Page 9	90	24.4	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	56	28.7	12
Page 2	89	24.3	12
Page 3	225	18.9	12
Page 4	140	15	12
Page 5	74	24.9	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	60	0	12
Page 2	94	23.2	12
Page 3	53	30.6	12
Page 4	44	11.4	12
Page 5	206	30.6	12
Page 6	186	32.6	12
Page 7	128	24.1	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	40	33.9	12
Page 2	76	5.8	12

Page 3	305	23.5	12
Page 4	111	19.5	12
Page 5	111	22.6	12
Page 6	181	13	12
Page 7	90	28.5	12
Page 8	136	39.5	10.2
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	109	30.1	12
Page 2	161	35.5	12
Page 3	299	28	12
Page 4	138	26	12
Page 5	303	21.3	12
Page 6	107	11.9	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	94	57.3	8.5
Page 2	139	26.5	12
Page 3	126	16.3	12
Page 4	43	64.4	7.8
Page 5	133	18.1	12
Page 6	37	59.4	8
Page 7	61	41	10
Page 8	125	21.6	10.8
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	51	69.3	7.6
Page 2	185	11.3	12
Page 3	41	0	12
Page 4	48	26.1	11.9
Page 5	46	36.7	11.9
Page 6	203	24	12
Page 7	45	28	12
Page 8	130	18.8	12
Totals	**6353**	**26.17**	**11.44**
Avg. Words/Module	794		
2.1	AFI 63-1101 link broken		
T-1 Modifications	temporarily is misspelled temporily		
	A complete new frameset is generated in the body frame when returning to student report card		
3.1	AFI 63-1101 link broken		

3.3	AFI 63-1101, Attachment 6 link broken		
3.3	Special Processing link broken		
Module 4	AFI 63-1101 link broken		
5.1	AFPD 63-11 ahead link broken		
5.1	AFI 63-1101 link broken		
5.1	DoD 5000.2-R next exit link broken		
5.1	AFI 65-601 Vol. 1 link broken		
5.2	AFPD 63-11 link broken		
5.2	AFI 63-1101 link broken		
	Text presented when rolling over AF Form 3525 says AF Form 3225 instead		
Module 6	Learning point 5 is ambiguous		
7.2	AFI 63-1101 modification Management, Section 3.9 link broken		
7.4 Summary	Outcome 5 says modes instead of mods		
8.2	AFI 63-1101 link broken		
8.2	AFI 63-1101 link broken		
Module 8 Quiz	Question 8.1.1 is an answer and not a question		
	Some Pop-up windows do not have close buttons on the screen		
Total Links	140		
Broken Links	14		
Broken Links%	10%		

	Course Name:	Earned Value Management System	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	231	34.7	12
Page 2	207	26.5	12
Page 3	190	36.4	12
Page 4	290	26.5	12
Page 5	93	11.5	12
Page 6	214	34.7	12
Page 7	214	17.8	12
Page 8	121	15.5	12
Page 9	288	14.9	12
Page 10	260	29.2	12
Page 11	167	13.6	12
Page 12	119	31.3	12
Page 13	74	28.9	12
Page 14	308	15	12
Page 15	329	21.2	12
Page 16	140	16.5	12
Page 17	158	15.2	12
Page 18	192	41.2	11.2
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	170	40.3	12
Page 2	195	56.4	9.3
Page 3	139	35.1	12
Page 4	115	25.6	12
Page 5	139	41.2	11.5
Page 6	165	54.3	9.2
Page 7	84	43.7	10.5
Page 8	190	62.4	8.9
Page 9	157	49.5	10.6
Page 10	127	34.9	12
Page 11	69	15.6	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	101	36.9	11.3
Page 2	180	36.9	12
Page 3	153	34.8	12
Page 4	126	29.1	12

Page 5	115	53.4	9.8
Page 6	55	45.5	10.1
Page 7	57	55.9	8.8
Page 8	204	40.5	11.6
Page 9	194	30	12
Page 10	194	14.3	12
Page 11	180	19	12
Page 12	127	23.2	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	231	32.4	12
Page 2	219	40.2	11.8
Page 3	150	44.5	11.7
Page 4	105	34.2	12
Page 5	146	41.8	11.3
Page 6	255	49.6	11.5
Page 7	211	25.5	12
Page 8	263	48.8	10
Page 9	255	30.7	12
Page 10	232	31.3	11.4
Page 11	177	32.9	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	167	20.6	12
Page 2	247	23.9	12
Page 3	286	33.6	12
Page 4	194	29.2	12
Page 5	71	16	12
Page 6	244	29.8	12
Page 7	158	46	10.9
Page 8	184	31.3	12
Page 9	294	30.4	12
Page 10	179	37.9	11.1
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	255	30.1	12
Page 2	159	54.3	9.2
Page 3	349	42.9	11.2
Page 4	317	45.7	10.9
Page 5	294	45.9	10.9
Page 6	173	46.6	10.3

Page 7	170	42.8	11.8
Page 8	305	34.3	12
Page 9	276	17.3	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	146	52.6	10.3
Page 2	210	28.7	12
Page 3	239	51	11
Page 4	188	34.7	12
Page 5	315	39.6	12
Page 6	140	56.9	7.6
Page 7	162	33.9	12
Page 8	312	58.8	9.5
Page 9	143	51.1	11.6
Page 10	147	41.9	11.3
Page 11	218	54.7	10
Page 12	251	44.6	12
Page 13	105	48.1	10.2
Page 14	351	44.3	11.2
Page 15	161	43.8	11
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 8			
Page 1	338	24.3	12
Page 2	129	20.7	12
Page 3	244	42.3	12
Page 4	226	22.2	12
Page 5	156	17.7	12
Page 6	108	31.2	12
Page 7	76	36.9	12
Page 8	205	30	12
Page 9	212	36.5	12
Page 10	193	23	12
Page 11	194	23	12
Page 12	197	24.5	12
Page 13	202	53.7	10.1
Page 14	242	62.7	8.8
Page 15	117	0	12
Totals	**19324**	**34.78**	**11.44**
Avg. Words/Module	2416		
Usability Items			
1.4 The revisions of EVMS	achievability is spelled incorrectly…reads as achievibility		
1.6 Field Command Focal	Earned Value Management Implementation Guide link broken		

Point		
EVMS Terminology Exercise	Requires student to enter only certain values but does not show values until wrong value is entered	
7.3 Software Tools	PA WIN link broken	
7.3 Software Tools	Performance Analyzer for Windows link broken	
Total Links	79	
Broken Links	3	
Broken Links%	4%	

Course Name:		Current Topics in Financial Management	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 1			
Page 1	400	46.8	10.9
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 2			
Page 1	158	44.3	11.9
Page 2	97	18.7	12
Page 3	246	17.1	12
Page 4	225	35.5	12
Page 5	154	60.5	10
Page 6	249	38.3	12
Page 7	144	30	12
Page 8	152	38.3	12
Page 9	260	47.6	11.3
Page 10	367	30.4	12
Page 11	286	41.7	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 3			
Page 1	90	49.9	9.4
Page 2	339	36	12
Page 3	182	21	12
Page 4	75	37	12
Page 5	311	44.9	11.5
Page 6	230	31.8	12
Page 7	304	35.3	12
Page 8	301	47.4	11
Page 9	140	49.1	11.4
Page 10	127	40.9	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 4			
Page 1	188	25.4	12
Page 2	162	46.3	10.4
Page 3	198	43.7	11
Page 4	110	55.2	8.9
Page 5	87	16.8	12
Page 6	296	0.8	12

Page 7	160	41.7	12
Page 8	199	37.8	12
Page 9	184	27.1	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 5			
Page 1	222	0	12
Page 2	319	13.6	12
Page 3	231	5.6	12
Page 4	104	0	12
Page 5	150	19.8	12
Page 6	298	37.9	12
Page 7	339	16.2	12
Page 8	217	13.9	12
Page 9	287	8.4	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 6			
Page 1	176	12.5	12
Page 2	264	26.6	12
Page 3	163	39	12
Page 4	112	6.9	12
Page 5	211	37.3	12
Page 6	257	36.6	12
Page 7	259	25.1	12
Page 8	351	33.4	12
Page 9	293	18.12	
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 7			
Page 1	268	15.7	12
Page 2	326	27.3	12
Page 3	234	22.9	12
Page 4	340	41	12
Page 5	263	32.8	12
Page 6	266	18.6	12
Page 7	303	41.6	12
Page 8	201	38.1	12
Page 9	211	36.6	12
Page 10	430	14.2	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level

Module 8			
Page 1	291	28.2	12
Page 2	232	32.8	12
Page 3	289	25.7	12
Page 4	360	37.7	11.3
Page 5	271	25.5	12
Page 6	230	33.9	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 9			
Page 1	104	12.5	12
Page 2	257	21.1	12
Page 3	219	27.9	12
Page 4	271	13.9	12
Page 5	254	37.4	11.9
Page 6	180	40.8	11.8
Page 7	305	39.4	12
Page 8	260	34.4	12
Page 9	141	45.6	10.7
Page 10	181	6.2	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 10			
Page 1	462	18.2	12
Page 2	156	19.8	12
Page 3	361	26.5	12
Page 4	374	28.4	12
Page 5	124	30.6	12
Page 6	213	9.8	12
Page 7	174	19.8	12
Page 8	291	24.2	12
Page 9	351	33	12
Readability Check:	Words	Flesch Reading Ease	Flesch-Kincaid Grade Level
Module 11			
Page 1	172	21	12
Page 2	158	10.4	12
Page 3	250	23	12
Page 4	390	23.9	12
Page 5	286	14.6	12
Page 6	92	26.7	12
Page 7	368	32.7	12
Page 8	243	17.9	12

Page 9	310	26.3	12
Totals	**22136**	**28.46**	**11.82**
Avg. Words/Module	2012		
Usability Items			
2.1 Purpose	AFMC/XPP POM Home Page link broken		
2.3 Preparing the POM Submission	Single Manager Educational… link broken		
2.4 POM Schedule	AFMC/XPP POM Home Page link broken		
3.1 PSMA Resource Allocation…	FY05 AFOM Drafr Guidance link broken		
3.7 Other Useful References	Single Manager Funding Guide link broken		
3.7 Other Useful References	AFMC/DR PSMA Home Page link broken		
4.3 Types of Costs	irrelevant spelled incorrectly		
4.8 Other Useful References	AFMC Cost Division home page link broken		
5.9 Other Useful References	Investment spelled incorrectly in OSAF link		
5.9 Other Useful References	Air Force Instruction (AFI) 33-103… link broken		
5.9 Other Useful References	Financial Management Reference… link broken		
6.8 Other Useful References	Single Manager Funding Guide link broken		
6.8 Other Useful References	AFMC Instruction (AFMCI) 65-601 link broken		
7.7 Other Useful References	Single Manager's Funding Guide, Oct 96 link broken		
8.6 Other Useful References	AFMC Working Capital… link broken		
9.5 Other Useful References	Single Manager's Funding Guide, Oct 96 link broken		
9.5 Other Useful References	Air Force Instruction (AFI) 65-601 link broken		
10.4 Upward Obligation…	HQ AFMC OARS homepage link broken		
10.6 Other Useful References	Adjustments spelled incorrectly in SAF link		
10.6 Other Useful References	SAF/FM memo… link broken		
10.6 Other Useful References	HQ AFMC /PK… link broken		
10.6 Other Useful References	AFMC Law Center Memo… link broken		
Total Links	145		
Broken Links	19		
Broken Links%	13%		

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Vita

Master Sergeant Edward A. Mathews graduated from Hermiston High School in Hermiston, Oregon. He entered undergraduate studies at Texas Lutheran University where he graduated with a Bachelors of Science degree in Computer Science in May 2001. He entered the Air Force as a Tactical Aircraft Maintenance Specialist in December 1984.

His first assignment, July 1985, was as a dedicated crew chief at Spangdalhem AB, Germany. In August 1988, he was reassigned to the 527th Aggressor Squadron at RAF Bentwaters, England. Following this assignment, he retrained as a Communications-Computer Programming Specialist in November 1991 with a follow-on assignment to the 552nd Computer Systems Group at Tinker AFB, Oklahoma. This assignment was followed by a tour at the Air Force Personnel Center, Randolph AFB, Texas. In August, 2002, he was selected, as one of the first eight Air Force enlisted members, to enter the Graduate School of Engineering and Management, Air Force Institute of Technology to persue a Master of Science degree in Information Systems Management. Upon graduation, he will be assigned to the 333rd Training Squadron, Keesler Air Force Base, Mississippi.

AFIT/GIR/ENV/04M-15

REPORT DOCUMENTATION PAGE

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14. ABSTRACT

E-learning has been defined as "the use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere" (Linezine, 2000). E-learning is one of the fastest growing services on the Internet today with revenues between 6 billion and 7 billion dollars (Bizreport, 2003). This growth comes with a peculiar problem – many students never complete their e-learning courses. Although there is significant variation among institutions -- with some reporting course-completion rates of more than 80 percent and others finding that fewer than 50 percent of distance-education students finish their courses … course-completion rates are often 10 to 20 percentage points higher in traditional courses than in distance offerings." (Carr, 2000).

There have been few credible studies investigating actual non-completion rates and factors that affect these dropout rates (O'Connor et.al., 2003). This study seeks to apply Human-Computer Interaction theory, through use of a usability inspection method called Heuristic Evaluation, to identify course design characteristics that may influence course completion rates. A research instrument was developed and applied to twenty (20) courses offered by the Air Force Institute of Technology's School of Systems and Logistics, and a Pearson Correlation was performed to identify any relationships between design factors and course completion rates. Analysis indicated some support for using the Heuristic Evaluation method. Practical and theoretical implications for this research are also discussed.

15. SUBJECT TERMS
E-Learning, Course Completion Rates, Education, Training , Heuristic Evaluation

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