

Automated Patent Examiner Training Tools for TC2100

An Interactive Qualifying Project Report

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Abstract

This report was prepared for the United States Patent and Trademark Office (USPTO).

The purpose of this project was to assess the feasibility of automated patent examiner training for Technology Center 2100. Screencasting tutorials were created from data gathered by studying course content and interviews with training staff. The tools were assessed by interviews, a focus group, and a survey of patent examiners.

Recommendations from this data discuss automated training implementation strategies and encourage future use of automated training.

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Executive Summary

This IQP was conducted at the United States Patent and Trademark Office (USPTO) within Technology Center 2100 (TC2100). TC2100 reviews patent applications related to Computer Architecture, Software, and Information Security. Due to the ever-changing nature of these fields, TC2100 faces a three year backlog of patents waiting to be filed. In order to cope with increased filing trends, TC2100 has implemented a plan to hire 250 new patent examiners for fiscal year 2006 and will continue hiring at least 200 additional examiners in each of the following two years. These patent examiners will be trained through the new School of Examining Education Development (SEED) program that will focus examiner training into an 8 month long session at the Patent Academy. The goal of this training is to equip examiners with the necessary skills to integrate them into the workforce as quickly as possible.

The purpose of this IQP is to create and assess computer-based training tools for new hires as part of the SEED training program and as a reference to all examiners. In order to successfully complete this project, we must fulfill the following objectives.

- Decide which tool of the examination process to automate.
- Choose an appropriate screencasting program.
- Create automated tools that are educationally beneficial.
- Modify these tools based on research results.
- Recommend future training to TC2100.

Research methods were implemented to complete each objective. To determine the content of our automated tools, we gathered data from patent examiner manuals and resources, training classes, interviews with EIC staff, and discussions with Gail Hayes.

The methods employed for choosing a screencasting tool included analyzing professional reviews, personal experience with the programs, and completing a Value Analysis.

Automated training tools were developed that delivered course content. Feedback was obtained through interviews, a survey, and a focus group discussion. Feedback results were analyzed in order to improve the tools and make valid recommendations to TC2100 regarding training. A Cost Analysis was completed to determine the feasibility of implementing automated tutorials and was a basis for our recommendation for the use of the tutorials.

The project team was able to identify the best applications to automate through interviews with the EIC staff and Anne Hendrickson. The content that was selected was the IEEE Xplore and ACM Non-Patent Literature (NPL) databases. After conducting online research and completing a Value Analysis of screencasting tools, Captivate by Macromedia was selected to create automated tools for each database. Interview responses included examiners' modification requests for these tools. Some suggestions included adding a search session history to the advanced search modules, incorporating more examples of searching with Boolean and proximity search operators, and guiding examiners to further assistance. The survey responses provided data which allowed the project team to assess trends, namely student's preference of automated training over classroom training for NPL topics. The focus group discussion provided opinions that could not be obtained through the survey. It covered topics including the target audience of these tools; automated training versus classroom training, and suggestions for other aspects of examiners' training that might be automated. The Cost Analysis provided a

metric that compared time and money saving scenarios from which to base recommendations.

These results provided a foundation for recommendations on how to implement the automated tools and for future projects within the USPTO. The automated tools that were created for TC2100 would best serve the needs of new hire training. It is recommended that this should be implemented by reducing the current two hour IEEE Xplore, ACM, and Citeseer class to a one hour class that incorporates the automated tools. This class will provide an instructor that is available to answer student's questions regarding the automated tools that may arise. This strategy will maintain the quality of NPL training while reducing training time and training cost. The automated tutorials may also serve as a valuable reference for new hires and more experienced examiners, which will be especially useful if the work-from-home program is implemented. The automated tools should be available for all examiners on either the TC2100 website, or part of the NORTH examiner education server in order to be used as an effective reference.

There is a high demand for Computer Architecture, Software, and Data Security patents as the global economy becomes increasingly reliant upon the safe, secure, and rapid exchange of knowledge and ideas. Securing intellectual property rights is the main priority of the USPTO and encourages the healthy intellectual competition that is the fundamental basis of the current economy. Automation of patent examiner training in TC2100 will reduce training time, and in turn, increase the time available to review patents. The sooner an idea or concept is patented, the sooner it becomes economically viable, for the ultimate benefit of society.

Introduction

This IQP was conducted at the United States Patent and Trademark Office within Technology Center 2100 (TC2100). TC2100 is a sub-department of the Office of Patents and Patent Operations, whose main purpose is to review patents pertaining to Computer Architecture, Software, and Information Security. Currently TC2100 employs approximately 840 personnel, over 700 of which are patent examiners. Due to the dynamic and ever-changing nature of computer-related fields, this is one of the fastest growing sub-departments. TC2100 is scheduled to hire 250 new patent examiners in 2006, 200 to 250 in 2007, and 200 to 250 in 2008 in order to cope with increased application filing trends of these fields.

Hiring large numbers of new examiners is akin to investing in real estate. A certain amount of risk is involved on each initial investment. In order for the land to become profitable, improvements need to be developed on the investment to increase its value. In the same way, new examiners need to be trained with the necessary skills that enable them to become productive patent examiners. The optimal end result is the state at which examiner workforce productivity matches or exceeds the filing of Computer Architecture, Software, and Information Security patent applications.

A new training program, the School of Examining Education Development (SEED) will be initiated in January 2006 for all new USPTO examiners. This program consists of an intensive eight-month training period in which examiners are taught the skills, procedures, and trade of patent examining. Since there are 16 students per class, in addition to a teacher, this training may be costly for the department. The USPTO is

interested in exploring new methods with which to train new examiners, including screencast tutorials.

The USPTO is also investigating the possibility of designing a work-from-home program. However, this program may negatively impact employee training. The continual integration of computer technology and the workplace makes this trend possible, and work-from-home programs have successfully increased productivity in the corporate world. With this program, the USPTO may be able to increase its overall productivity, but as a consequence it may have a negative effect on new hire integration. Examiners and managers would no longer be available as a reference for new hires, requiring additional training for new hires to compensate for this resource loss. Employees working from home would need to take time away from their home-office to attend training on updates in patent examining resources and procedures.

The purpose of this IQP is to create and assess the feasibility of computer-based training tools for new patent examiners as part of the new SEED training program, and as a reference tool for all patent examiners. A set of objectives is outlined in order to fulfill this statement of purpose. These objectives are to:

- Choose an appropriate screencasting program,
- Decide which tool of the examination process to automate,
- Create automated tools that are educationally beneficial,
- Modify tools based on research results, and
- Recommend future training to TC2100.

A set of research methods was used to collect data in order to complete each objective.

Product research, professional reviews, and Value Analysis were employed in order to

choose an appropriate screencasting program. Content was selected based upon data gathered from patent examining manuals and resources, unobtrusive examiner observation, patent examiner initial training classes, interviews with EIC staff, and collaboration with Gail Hayes, the TC2100 Practice Specialist and our project liaison. Automated tools were developed using the information learned during this research. These tools were modified based upon a round of interviews, and recommendations were made for future training from examiner responses to a survey, focus group, and cost analysis.

The purpose of the Interactive Qualifying Project (IQP) is to challenge students to relate social needs or concerns to specific issues raised by technological developments. The IQP is typically conducted in each student's Junior Year, and the topic of focus is chosen independently of each student's major. The completion of the IQP is a necessary graduation requirement of WPI, and works to achieve the school's goal of graduating well-rounded engineers. The fields of Computer Architecture, Software and Information Security have become entwined with the American way of life and the global economy. Patent protection is necessary for an idea or invention to be economically viable. The automated tutorials that have been created, combined with increased automated training, will decrease patent examiner training time, and thus increase patent examiner efficiency. New products and ideas will be commercially available sooner, and will fuel additional research in these computer-related areas more rapidly. Streamlining the process of scientific development to commercially available products and services benefits society as a whole.

Literature Review

This project seeks to develop automated training tools for patent examiners in TC2100 of the U.S. Patent and Trademark Office. The initial step in successfully accomplishing this goal is to understand the related issues. Automated training tools for examiners in TC2100 are a small part of a much bigger picture. Background knowledge, such as a deeper understanding of patents, procedures for acquiring a patent, examining procedures, and the USPTO itself, is crucial. This literature review provides background information in those areas necessary for a greater understanding and appreciation of the project.

United States Patent and Trademark Office

History

American patent law is modeled after British patent law. The Eighteenth Century British patent law model granted the inventor the exclusive rights of sale and manufacture of an invention or ingenious process, if the sovereign saw it as useful to the kingdom.

American patent law diverged from this model during the Constitutional Convention of May 1787, when monopoly grant abuses were considered as one of the grievances against King George III of England (Foster, 9). This sentiment caused the framers of the United States Constitution to define the granting of patents as a responsibility of the public at large, through the powers of Congress. It was the responsibility of Congress

“To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;” (United States Constitution, Article I, Section 8, Clause 8)

This clause signified the first time in the history of the world that individuals were recognized as the sole owners of their inventions and ideas.

The United States Patent and Trademark Office was created on April 10, 1790, with an office located in Philadelphia. The Act of 1790 created a board to examine the validity and uniqueness of patents that was comprised of Secretary of State, Thomas Jefferson, Attorney General, Edmund Randolph, and Secretary of War, Henry Knox. This act also defined the term of a patent as 14 years (Foster, 10). The first patent was reviewed and approved by Thomas Jefferson and George Washington. During its first year of operation, two more patents were issued. Sixty-four more were patented within the next three years (Foster, 10). Though many valid patents were registered, the process of examination proved too time-consuming for higher-level officials to undertake. In 1793 a bill was brought before Congress to reform the procedures of the office.

The Patent Act of 1793 replaced the process of patent examination with mere patent registration, which left patent claims and the resolution of disputes to individual inventors. It created the position of a patent administrator to manage patent applications, and the Patent Office came under the jurisdiction of the State Department (Jones, 7). The Act of 1793 also allowed inventors to appeal for a 7-year extension on a previously registered patent (Foster, 10). Under these regulations and administration, patent filing increased steadily from 20 patents filed in 1793 to 752 patents filed in 1835.

The year of 1836 was particularly significant for the United States Patent Office. Congress approved The Patent Act of 1836, in July of that year. The Act provided for a new Patent Office Building in order to increase the capacity for patent record and model storage, and reorganized the Patent Office under the Department of the Interior. It also replaced the patent registration process with the process of examination. Before the process of patent approval by examination, inventors could submit an invention and it would be registered so long as the patent fee was paid. It was common to grant a patent to multiple inventors for the same invention because claims were simply not reviewed. Because claims are reviewed in the examination process, it decreased the number of non-essential and common sense patents filed each year. To uphold the new examination process and the ever-growing number of filed patent applications Patent Office staff also expanded to include the Patent Commissioner and seven additional employees (Jones, 14).

Six months after this act was passed, the Patent Office caught fire. It is estimated that at least 9,000 patent models and records were destroyed. The Office effectively shut down for a one-year period after the destruction of its headquarters. Patent records were not recovered until the following year, when Congress funded a restoration effort. With the help of individual inventors, approximately 1,000 of the most essential patents were re-filed in 1837 (Jones, 12).

Despite the devastating fire and new, more stringent patent regulations, the number of registered patents in the United States continued to grow throughout the 19th Century. New employees were hired for examination, transcription, and management as the number of filed patents increased. Thirteen thousand eight hundred fifty-seven patents

were registered by the United States Patent Office by 1845. Four hundred ninety patents were filed in 1845 alone. By the end of the 19th Century, over 650,000 patents had been filed in total (USPTO, “Issue...”). The resulting annual revenue of the Patent Office at this time exceeded 1 million dollars (Weber, 30).

The next large legislative measure to change patent law occurred in 1870. Ninety-eight thousand four hundred sixty patents were filed in this year alone, and the Office recognized that it was necessary for a reform of certain patent processes. The Act of 1870 consolidated 40 years of minor patent process changes since the Patent Act of 1836. The Act of 1870 streamlined the patent process significantly, and removed obsolete procedures. It also increased the duration of a patent to 17 years. Along with consolidating responsibilities within the Patent Office, the Act of 1870 deferred copyright registration to the Library of Congress. The Patent Office was moved from the Department of the Interior to the Department of Commerce in 1925, but patent procedure remained unchanged until it was modernized in 1951 (Foster and Shook, 11).

The Current USPTO

The USPTO is currently a federal agency within the United States Department of Commerce. The President of the United States appoints the Director of the USPTO, who is currently John W. Dudas. It is his responsibility to enforce patent registration and filing laws, and manage the \$1.7 billion budget (USPTO, “Office...”). The USPTO is fully funded from patent filing and renewal fees, and may use these funds for its various programs.

Since the inception of the USPTO, it has registered over seven million patents. In 2004 alone, 382,139 patent applications were processed. Of this number, only 181,302

were approved as valid patents (USPTO, “U.S. Patent Activity...”). Earned revenue for the year 2001 totaled over \$1.04 billion (USPTO, “Results...”). The number of patent applications filed each year has doubled since 1994 (USPTO, “U.S. Patent Activity...”). The increase in patent applications requires additional patent examiners and support staff. “The office employs over 6,500 full time staff to support its major functions” (United States, “Introduction”). This staff is currently organized under 7 different departments, which are managed by the Director of the United States Patent and Trademark Office.

In 2005, the USPTO moved the majority of its operations to a campus in Alexandria, Virginia, composed of eight different buildings. The five main buildings, Randolph, Knox, Madison, Jefferson, and Remsen, are connected on the lowest level, making it convenient to travel between buildings. TC2100 is located on the second, third, and fourth floors of the Randolph building. The United States Patent and Trademark Office also currently has branches in Arlington, Virginia, Springfield, Virginia, and Boyers, Pennsylvania.

The USPTO consists of five general departments, namely The Office of Patents, The Office of Trademarks, General Counsel, Administration of External Affairs, Financial and Administrative Office, and Chief Information Officer. The Office of Trademarks examines trademark applications for federal acceptance. The General Counsel consists of 250 attorneys, paralegals, secretaries, and administrators that provide legal recommendations for the Deputy Director and Director of the USPTO in policy decisions. It also provides internal regulation and testing of patent attorneys, and determines whether rejected patent applications may be appealed. The Administration of External Affairs acts as a liaison between foreign countries and Congress, protecting

United States Patent rights abroad. The Financial and Administrative Office contains departments that manage the finances of the USPTO and provide basic services, such as human resource management, and corporate planning advice.

The Office of Patents examines each patent that is submitted for review. The Office of Patents contains its own administrative structure and departments whose function is to ensure that applications are filed efficiently, under proper protocol, and without errors. These departments are Patent Resources and Planning, and Patent Examination Policy. While these sub-departments are important to the function of this branch of The USPTO, it is Patent Operations that contributes directly to the prime function of the United States Patent Office. Patent Operations is responsible for the review of patents. Patent Operations consists of over "...3500 skilled scientists and engineers..." (United States. "Patent Operations."), that are employed as patent examiners. In addition to this large number of examiners, over 450 management personnel are required to administrate direction.

Patent Operations is further broken down into sub-departments, based upon the area of interest that pertains to each patent. These divisions are called Technology Centers. Some examples of these divisions are TC2800, which pertains to semiconductors, electrical/optical systems, and components, TC1600, which pertains to Biotechnology and Organic Chemistry, and TC2100, which pertains to Computer Architecture Software and Information Security. This IQP will directly work with Technology Center 2100.

Patent examination within Technology Center 2100 is organized by topic into nine distinct workgroups. TC2100 has three Directors, Peter Wong, Paul Sewell, and Jack

Harvey. They supervise the department and are each responsible for three of the nine workgroups. Computer Architecture, Computer Applications, Cryptography and Security, Computer Networks, Database and File Management, Graphical User Interfaces, and Interprocess Communications and Software Development are the workgroup sub-disciplines of TC2100. A workgroup's size is based upon the average number of applications that the workgroup processes, and hiring is based on estimated demand in the future. The size of each sub-discipline ranges from 44 to 159 employees, and there are approximately 800 patent examiners in this Technology Center.

Organized separately from the nine patent examination subdivisions, there is an administrative structure that provides services to assist patent examiners in training, examination, and intercommunication. Eight Quality Assurance Specialists (QAS) and Special Program Examiners (SPE) work directly with the department to ensure that programs are moving smoothly. The office has 16 administrative officers that organize personnel and report to the Office of Patents on the status of the TC. There are 4 technical support teams that ensure examiners have access to the proper computer resources. The Electronic Information Center (EIC) of TC2100 has 7 staff members, which represent a local branch of the Office of Patent's Science and Technology Information Center (STIC). The Science and Technology Information Center, through the Electronic Information Center located within TC2100, is charged with training patent examiners in new procedures, and offers courses that review skills that refresh patent examiners on rarely used, but immediately necessary skills.

Patents

Patents are an important aspect of today's society. They allow inventors to have the security to ensure that no one will steal their ideas without legal repercussions. In general, there are several aspects of an invention that will make it patentable. David Burge provides a comprehensive set of requirements for a patentable invention:

- 1 Fit within one of the statutorily recognized classes of patentable subject matter.*
- 2 Be the true and original product of the person seeking to patent the invention as the inventor.*
- 3 Be new at the time of its invention by the person seeking to patent it.*
- 4 Be useful in the sense of having some beneficial use in society.*
- 5 Be nonobvious to one of ordinary skill in the art to which the subject matter of the invention pertains at the time of its invention.*
- 6 Satisfy certain statutory bars that require the inventor to proceed with due diligence in pursuing efforts to file and prosecute a patent application*

(Burge, p. 32)

The first requirement states that the patent must fit into one of the recognized classes of patentable subject matter. An inventor trying to acquire a patent on an invention that does not fit into a class will be unable to do so because the invention will lack an examiner specifically trained in evaluating these patents. The second requirement states that a product must be an invention of the inventor. The third and fourth requirements are important because if the product is not new or useful then there is no necessity to protect it under a patent. The fifth requirement is important because this requires that one's invention is not obvious to one skilled in the profession. Finally, a

person must have the initiative to invest the time and effort required into prosecuting a patent.

Inventor's Tasks

The first step in preparing a patent application is to perform a prior art search in the field of the idea or invention that is potentially patentable. The main purpose of this search is to make the inventor aware of what similar patents exist and how the inventor's product differs or improves upon any of these previous patented inventions. This step can eliminate the hassle of preparing the documentation and paying processing fees, only to discover that a patent already exists, making the invention unpatentable.

An inventor may decide to hire a patent attorney to prepare the application and familiarize the attorney with the specific functions and features of the invention. Patent attorneys are trained to state claims in such a way that competitors will have difficulty designing similar inventions around the language of the claims. It is possible for an inventor to complete his own application, but patent applications entail specific requirements and may be difficult to prepare without the assistance of a patent attorney.

A patent application contains three major parts, including a specification, a drawing if necessary for further clarity, and an oath or declaration by the inventor. The specification needs to fully document and explain the background of the invention and how it works. It should summarize the results of the prior art search clearly stating how the invention "patentably differs from prior art proposals" (Burge, 48). This section should end with a list of claims, which clearly state what the inventor regards as his invention. The oath is a written statement signed by the inventor declaring that he is the

first inventor of his product and that he has no knowledge of any other invention that would make his patent claim invalid.

A properly prepared patent application must be able to “tell the story of the invention... and be capable of educating a court regarding the character of the art to which the invention pertains” (Burge 49). This allows the inventor to defend the invention in court, in the case that a company uses the discovery without his or her consent. Once the inventor is satisfied that the claims of the invention are defensible in a court of law, the application may be submitted to the USPTO.

Patent Examining Procedures

United States Patent and Trademark Office Procedures

As patent applications are received at the USPTO, the Office of Initial Patent Examination reviews each patent application to make certain it is “complete and satisfies formal requirements sufficiently to permit its being assigned a filing date and serial number” (Burge 56) and they are given a barcode and serial number. They are then distributed to the appropriate Technology Center (TC). Supervisors of the various TC’s review the applications to be sure they belong in that unit. However, the primary examiner does have the right to request a transfer of the application if he believes it does not belong in that unit. It is the supervisor’s job to classify the patent application.

Patents must be classified as described in the Manual of Classification. This manual is updated every two years, as new technology and inventions require more classifications. New classes and subclasses are added or revised as needed. There are currently over 400 classifications in this system. Each class has a corresponding number

and title that describes its subject matter. Classes are subdivided multiple times, each subdivision having another descriptive title and number. The numbers of the subdivisions may contain integrals, decimal points, and/or alpha characters. For example, “417/161.1A identifies Class 417, Subclass 161.1A” (USPTO, Manual... section 902.01 Manual of Classification). The break down of classes and subclasses are referred to as class schedules. Once the application has been classified, it is assigned to a primary examiner.

When an examiner receives a new application for what the applicant believes to be a new invention, process, or improvement of one, the examiner must review the application to be sure it meets all application requirements. This includes a claim of invention, concise written description of the invention using conventional terminology, figures and/or drawings, an oath stating that he is the first and original inventor of the invention or idea to the best of his knowledge, and that all required fees have been paid. If any of this is missing, the examiner must communicate the errors to the applicant, who in turn must provide amendments to the examiner in order to continue the process. If the application is clear and complete, the examiner begins searching for documents most relevant to the invention applied for.

A claimed invention should be entirely understood by the examiner before the prior art search procedure begins. The examining procedure begins with a thorough search of the prior art relevant to the area of the claimed invention. According to the General Search Guidelines of the USPTO, there are three main steps to conducting a thorough search: identifying the field of search, selecting the proper tools to perform the search; and determining the appropriate search strategy for each search tool selected (USPTO, Manual... section 904.02 General Search Guidelines).

In identifying the field of search, examiners refer to the class and subclasses under which the application was classified. These topics will guide examiners to information relevant to the claimed invention. However, the search cannot be limited to these topics. The search needs to be as thorough as possible. References from domestic patents, foreign patents, and non-patent literature must be considered (USPTO, Manual... section 904 How to Search,).

Next the examiner must determine which tools are appropriate for the search. Examiners have access to traditional sources of information, including Books, periodicals, and CD-ROMs. Within the USPTO there are also automated search tools such as Examiner's Automated Search Tool (EAST), the Web-Based Examiner Search Tool (WEST) and the Foreign Patent Access System (FPAS). In addition to these resources, there are also special collections of Non-Patent Literature available to examiners that include the biotechnology/chemical library and government publication databases. When the appropriate tools have been designated, a search strategy will be prioritized and carried out (USPTO, Manual... section 904.02 General Search Guidelines).

The documents obtained by patent examiners from the prior art search provide the necessary knowledge to approve or reject the patent application. Prior art informs the examiner of similar inventions that have been patented. The documents act as references in areas that the examiner may not be fully competent with, depending on his background. The examiner must keep a record of the most relevant resources accompanied by the date searched, for future reference during potential appeal. Thorough research must be completed so that the examiner fully understands the technology and

essence of the invention. It is important that the most relevant literature is obtained in order to educate the examiner to decide if the alleged invention is patentable.

Examiners have access to foreign patent literature from the Foreign Patent Access System and the Foreign Patent Branch. The USPTO also keeps the most current documents accessible to examiners via automated search systems. Documents that are originally printed in other languages contain English language abstracts (USPTO, Manual... section 901.05(c) Obtaining Copies). The Translation Branch of the Scientific and Technical Information Center (STIC) can provide an oral translation for further understanding of the complete patent document. Written translations are also available (USPTO, Manual... section 901.05(d) Translation).

During the search, it is likely that the examiner will find defects in the application. Claims may not be explicit or may be too broad; figures may be unclear, insufficient, or missing. Quite often, the examiner will reject most of the claims if not all of them. Examiners may find the closest art and "...present rejections based on this art to encourage the inventor to put on record in the file of the application such arguments as are needed to illustrate to the public exactly how the claimed invention distinguishes itself patentable over the cited art" (Burge 57). The patent examiner will prepare an office action that will be mailed to the applicant's patent lawyer indicating which claims were rejected. The applicant will then be given a period of three months in which he can respond.

Depending on the type of rejections that the examiner finds with the claims, the applicant has several options. One action the applicant and his patent lawyer can take is to evaluate the claims and to propose amendments to these claims. "It may be necessary

to limit your claims to the more detailed features of your invention or to simply narrow the overly broad terms used in your claim” (Konold 31). In the event that the examiner applied the prior art mistakenly, the patent lawyer and inventor will need to prepare an argument clearly showing the error that was made.

If and when the applicant makes amendments, the examiner may have to do a second search. It is also possible, especially in the case of new branches of technology, that relevant documents will not be available to the examiner. In this case, the examiner may request the applicant to submit any relevant documents that he may have access to. Several requests for additional information and replies may be made before a final decision is made on the application. Although the applicant has the right to an appeal, the examiner has discretion over the initial decision of the application.

If the examiner finds contradictory prior art, if the claims stated by the applicant are disproved, or if there is insufficient information in the application, then the examiner will reject the request for a patent and a notice of final rejection will be sent to the inventor. In this case, the application is either appealed or the applicant may abandon the application. It is possible for the examiner and inventor to meet in order to discuss viewpoints and to present arguments or amendments. If the appeal process is successful, then the patent will be issued once all fees are paid. If the examiner finds all the claims to be patentable and that there are no infringements he will send a Notice of Allowance to the applicant.

European Patent Office Procedures

Patent examining procedures at the European Patent Office are quite similar to those at the USPTO. USPTO examiners frequently check patents filed at this office in prior art

searches. There are many steps involved including searching prior art and seeing that regulations are met. An examiner will follow a set of guidelines to perform a documentary search and examination of the application for approval or rejection of a patent application. Approval of the application is granted, “if the conditions of patentability, laid down in a code of law called European Patent Convention (our blue booklet) are satisfied” (European Patent Office).

An examiner will first skim the patent application to be sure it has been classified correctly under his technical field. The next step is the documentary search of the patent. This involves a thorough study of the application’s description, claims, and all figures provided to obtain an understanding of the technical contribution the invention has to offer. The examiner must identify “...possible lack of unity, i.e. the application has more than one invention. In case of lack of unity, the different inventions are identified, and only the first will be searched for the moment; the applicant will be requested to pay additional search fees” (European Patent Office, Search Procedure). For instance, if an application was submitted for an improved keypad and improved antenna on a cell phone, this would be considered a case of lack of unity because “the first inventive concept is the improved keyboard, the second is the improved antenna” (European Patent Office, Search Procedure). Under these conditions, separate applications would need to be filed for each individual invention. The examiner would continue his work with the first invention, and the applicant would be asked to pay additional fees for the documentary search of the other. The examiner will next classify the invention to a very specific class under his technical field, made up of a combination of letters and numbers that correspond to the specific area of technology.

Under this classification, the examiner must perform a thorough search strategy. Through selected databases, he must obtain documents that pertain to the invention, and that were written before the date of the patent application. From these documents, he must carefully study all relevant documents. Relevant documents are defined as “documents that appear at first sight to disclose technical matter similar to the invention disclosed in the patent application” (European Patent Office). After a thorough study of these documents is completed, the examiner must decide if he can move on to the actual examination of the patent.

In order to proceed to the examination process, the examiner must be sure the claims of the application are clear, non-ambiguous, and complete. They must also be sure that the invention appears significant to the most relevant documents and patents studied, that it involves an inventive step, and that it meets all requirements of the European Patent Convention. The result of the examination has two possible outcomes:

1. If major defects are found (e.g. claims are not novel), then a communication is written, in which all defects are noted and explained in detail (e.g. for a lack of novelty, it will be explained where all the features of the invention claimed can be found in the document);
2. If no or minor defects (that can be corrected by the examiner) are found, a note is written, briefly explaining the reasons for patentability of the claimed subject-matter”

(European Patent Office, Search Procedure)

If a communication is written, the applicant is given a certain amount of time to amend the defects. If a note is written, meaning there are no major defects or problems with the application, then a search report must also be written. The search report includes the relevancy of the documents studied. This is sent to the applicant and published with the

application. The applicant then has six months to decide to continue with the application and pay the examination fee. Otherwise, the application is considered abandoned.

An examining board of three people completes the examination process: the initial search examiner, an additional examiner, and the chairman. Upon reply to a note listing defects in an application, the application is re-examined by the examining board to determine if the defects have been corrected. This process may be repeated until the application is approved, abandoned, or rejected.

If there were no defects in the application, then the application and note listing the reasons of patentability is reviewed by the additional examiner and chairman for their approval. Once approved by these two members, the full text of the patent (including original application, note or communication, and any amendments) is sent to the applicant. The applicant may be requested to pay additional fees, file paperwork, etc. Once this is completed, the patent is granted (European Patent Office, Examining Procedure).

Computer-Based Training Methods

Advantages

Automated training processes hold many advantages over classroom training. Automated training is cost-effective and increases the retention of knowledge in students through hands-on learning. Computer based training allows students to take an active role in their own education. “Curriculum materials that force students to respond, to make choices, to perform, to organize, to think deeply about material, and so forth have better outcomes, generally, than ones which they just read and listen” (Brooks, p. 14). It is the goal of a

computer-based curriculum that includes automated training tools to promote student interest in subject material through hands-on application.

Courses that provide interactive tools aid in self-learning and independence from mentors in the future. Students that are allowed to learn at their own pace tend to gain a better understanding of material than in a program that teaches at one pace regardless of prior knowledge or ability. Learning at ones' own pace allows students who are having trouble in an area to seek additional information in a properly designed training curriculum, and gain additional knowledge on an as-needed basis. More advanced students may quickly gloss over material that they have already covered or know about in an automated training curriculum.

The cost effectiveness of a web-based or automated curriculum is another major advantage. An automated curriculum not only saves the instructor time, but it also allows students to learn at their own pace. Automated training tools allow trainees to allocate their own time towards education. This increases training efficiency if implemented properly. Ensuring that these advantages are highlighted in an automated curriculum is a complex and dynamic task.

Disadvantages

Automated training tools have a few major disadvantages that instructors and designers of training curricula seek to minimize. A high dropout rate in poorly designed web-based curricula is common. As a corporate example, "Motorola University found that a significant gap existed between the number of employees who register for online courses and the number who actually complete them, with 70% of online learners dropping out."

(Fisher, p. 88). Students undertaking a computer-based training course must understand that a high degree of personal responsibility is required to learn effectively.

A disadvantage of an automated training system is that it is more difficult to assess student's individual needs and learning styles. Oftentimes instructors are not readily available to answer questions or relate material to the trainee's tasks. Trainees may become disinterested if they do not understand how the material presented may be used in solving problems encountered during the workday. Computer-based training also contributes to a feeling of trainee detachment from other students receiving similar training. Frequently student interactions normally found in a classroom setting provide discussion on different approaches to problems that mentors may not have thought about. A classroom setting will "...foster playful interaction..." (Fisher p. 87), that will add to member interest in an otherwise dry learning field. It is necessary to minimize these disadvantages in order to incorporate automated training tools into a broader training curriculum.

Optimizing Methods

In order to optimize the use of automated training tools, it is necessary to minimize the aforementioned disadvantages, while still retaining cost-effective benefits. This may be accomplished by building a comprehensive training curriculum around computer-based tools. While automated training tools may eliminate the necessity of a mentor or instructor of a course, an instructor provides valuable support to knowledge included in the program.

An automated training course should incorporate an instructor to ensure the quality of knowledge being presented to students. It is the instructor's goal to ensure that

students are learning appropriate material. Automated training tools are used for primary instruction in computer-based courses, and selection of topics is of vital importance. “The interactive web tool is not as important as what the learner does with it.” (Fisher, p. 18). These tools must be designed in such a way as to be directly applicable to trainees’ daily problems and tasks. Designing training tools is often a matter of balancing a broad conceptual understanding of a problem, and the pragmatic application of this knowledge.

Once a curriculum is defined, the instructor’s job focuses more on the administrative role of training tool assessment. Students will only learn what is presented through automated training tools, and the instructor should be available to answer questions if more information is required. He may also introduce students to resources that may help provide a solution to their problem. This may be done through email, discussion board, chat-room session, or other electronic means that would minimize overall instructor time per student.

A discussion board approach is the preferred method of many web course designers as it serves a two-fold benefit. Firstly, the use of a discussion board in a course provides valuable student-student interaction. Students may attain a similar degree of interaction in solving problems as they would in a classroom setting. Helping others to solve a problem, knowing that others have thought along similar lines, is encouraging to students. The second benefit of a discussion board is that it emphasizes the advantage of tackling a problem at ones’ own pace. Students may present a question to the discussion board at their convenience and have many responses from fellow classmates to tackle a particular problem. In this setting the instructor of a course would have to act as a type of moderator, ensuring that proposed solutions are accurate, and may comment as well.

Other students may benefit because their attempt at the formulation of a solution will help in improving their understanding of a particular problem. If a solution is not accurate, someone may post an accurate solution in response, thus educating multiple students at once. The ideal number for a discussion board to be effective is 15 to 25 students. Any number less than 15 may lead to lack of interaction, while any number greater than 25 may lead to lack of responses to many students' questions (Fisher, p. 87).

Another consideration that the instructor of a web-based or computer-based learning curriculum must keep in mind is appropriate assessment design. Automated training tools must incorporate a method of self-assessment for students to learn and apply techniques. "We focus on increasing knowledge and retention by providing a means for our distant students to actively participate in learning through software simulations, which provide instant feedback, coaching, and more importantly greater retention of knowledge" (Fisher, p. 97). It is important to insert quizzes into course content as well as at the end of each lesson. It is even suggested by some course designers to assess students before material is taught, to determine whether or not students need to be taught certain information. It is the goal of every assessment to encourage the use of course content in practical application than by simply having the knowledge presented in the course.

Screencasting Programs

Screencasting programs allow users to capture events that occur on the computer screen, edit the screen shots, add audio, and add interactive features. Such programs are used to create tools that clearly demonstrate to their target audience how to carry out a desired task. The demonstrations produced by the screencasting program provide a step-by-step

method for learning how to use the applications shown. This makes it easy for the target audience to use, even for those who are not as computer literate.

There are several prominent screencasting programs available. Some of these programs include Captivate by Macromedia, TechSmith Camtasia Studio, BB Flashback, and ViewletCam. These programs include the basic screen capturing features as well as the ability to overlay audio, text, or images into the screenshots to make an interactive training tool.

Conclusion

The information provided in this literature review is of great importance to the understanding of many aspects of the project. All of these areas are relevant to the project's success. The understanding of the background information of patents, the USPTO, and the procedures currently utilized by examiners is needed in order to fully understand and appreciate the essence of the project. An understanding of training methods and familiarization with screencasting programs is crucial to the success of developing the automated training tools. With this knowledge and understanding, the next phase of the project, the actual methods of developing the automated training tools, can now be executed.

Methodology

This chapter presents the research methods used to produce effective automated training tools for patent examiners of TC2100. The research and analysis of screencasting tools on the market allows for the determination of the best program to utilize for the creation of automated training tools. Preliminary research of the examining process is completed through reviewing the examining manuals and resources, observing examiners, and interviewing staff members. The data collected with these methods is used to determine the most beneficial content to include in the automated training tools and the best way to present the information. Focus groups are used in conjunction with surveys for feedback of the automated tools we create.

Screencasting Program Value Analysis

Professional reviews and personal experience are used to research and compare existing screencasting tools on the market. A search of all existing screencasting programs has been conducted to discover what is on the market. Programs with the best reviews and most useful features for training such as interactive uses and quizzing are selected for further research. Trial versions of these programs are downloaded and tested to gain personal experience.

A Value Analysis is a method commonly applied to qualitatively compare qualities of products or services. The analysis first identifies all relevant aspects of each screencasting product. These aspects are then quantitatively weighted upon their importance with respect to the expectations of the customer. In this case the customer is

the USPTO, and the products being compared are the screencasting programs. Each programs' performance in weighted aspects are then judged quantitatively (i.e., scale from 1 to 5) in what is called a Value Analysis Matrix. Professional reviews and personal experience are used to rate the performance of features, relative to other programs. Each quality's weight and programs' ranking are multiplied. These values are totaled for each program. The highest score signifies the best program to utilize for creating automated training tools for TC2100.

Natural Observation

Natural observation allows for a first hand discovery of exactly how patent examiners execute the examination process. Types of natural observation include attending classroom training sessions and shadowing examiners. We learn course material presented by instructors and discover the student-student and student-teacher interactions that occur. These subtle interactions are important to document, and may be beneficial when personalizing an automated training course.

Attending classroom training sessions is useful for discovering current training methods while simultaneously learning various aspects of the examination process. It is important that we learn the examination process in order to create training tools that are effective and beneficial to examiners. A classroom setting is valuable for gathering data because we learn the material while discovering aspects of the examination process that students have questions about. The purpose of this data collection is to answer these questions about examining through the automated tools we will create.

Shadowing examiners enables us to observe how their time is spent on an average day. The goal of this method is to directly discover the steps taken by examiners and to

identify the problems that they encounter. Knowing when and where they encounter problems is valuable information for determining which aspects of procedures may be taught more effectively with an automated training program. Shadowing is an alternative to interviewing when examiners cannot find the time to set up a meeting and answer specific questions. This method of data collection is convenient for examiners because they may continue their work while we collect beneficial data.

Examiner Manuals & Resources

Examiner manuals and resources are tools currently available to examiners that provide us with an understanding of the material that is taught to new patent examiners. The Patent Examiners Initial Training (PEIT) Manual & Workbook and the Introduction to Practices and Procedures Trainee Manual are given to new examiners as training guides. Examiners also use the Patent Examiner's Toolkit, located on the USPTO intranet. The Patent Examiner's Toolkit provides references, search tools, Office Action forms, and a variety of other necessary tools in a neat package that is readily accessible. These tools include, but are not limited to, the prior art search databases of the United States, European, and Japanese Patent Offices, non-patent literature (NPL) databases, namely IEEE Xplore and Association for Computing Machinery (ACM), the Manual of Patent Examining Procedures (MPEP), OACS, and other automated references. OACS is the Office Action Correspondence Subsystem, which assists examiners in filling out Office Action forms.

These materials are selected for review because they give insight into the tasks of patent examiners who research these manuals. These resources provide a basis for the

interview question development. This research also helps determine aspects of examining on which to focus and provide automated training.

Interviews

Interviews provide a means to acquire information through questions specific to what researchers want to know. Interviews are advantageous for this particular project because they offer the opportunity to answer concerns about the training curriculum, identify problem trends with the current training program, and determine the level of impact new computer based training tools will have on examiners. Though interviews thoroughly answer specific questions that interest researchers, they have a major caveat. Often, interviews do not include topics that researchers did not think to ask about, though these topics are applicable to their study. This information may lead to breakthroughs to understanding the fullest scope of a problem that researchers would have otherwise not known. When using interviews as a research method it is important to have a full understanding of what information needs to be gathered, and design questions accordingly (Berg p.80).

The interview questions are based upon the data garnered from archival research. Questions are formulated as a guideline to shape the course of the interview and provoke responses that uncover problems that new examiners face, specific to the topics for which we choose to create automated tools. Interviews are conducted in an informal manner. This allows both the interviewees, as well as interviewers, to pursue aspects of concern that may arise during the interview.

The interviewee pool consists of employees associated with the Electronic Information Center (EIC). The EIC is responsible for the education of patent examiners

in procedure and subject knowledge required to review patents. Since EIC employees have expertise in the education of patent examiners, as well as experience creating automated training curriculum, their input is extremely valuable.

Survey

Surveys are a useful means to collect data because they provide participant anonymity and time-efficient large group response. Anonymity is sometimes important because it alleviates the social dynamics that may be incorporated in interviews. The survey also has several major drawbacks. Participants are only asked to address questions that are included on the survey and may provide incomplete responses. The success of a survey also depends upon sample size, sample selection, and the amount of participant feedback (Joppe).

We conduct surveys in conjunction with focus groups in an attempt to assess the perceived effectiveness of the automated training tools that are created. Questions are designed to assess the automated training tools in two ways. In the survey, the first set of questions provokes responses concerning the quality and effectiveness of the tools so that we may modify and improve them. The second set of questions are formulated for feedback regarding the comparison of automated vs. classroom training. This feedback may have an impact on future training methods for TC2100. Surveys are conducted twice during this project

The first survey is conducted with a group of beginner examiners. The examiners will test the automated tools and be requested to answer survey questions and partake in a discussion. Modifications will be made to the automated tools to improve the quality, user-friendliness, and effectiveness based on responses and suggestions of the group of

examiners. The second survey will be conducted to a class of about 10 to 12 examiners. Examiners will again test the tools and be requested to respond to survey and discussion questions. This second round of surveys allows for the assessment of the automated tools after modifications are made based on initial responses. Similar questions will be asked as in the first round of surveys. We expect it to be an efficient means to measure examiner satisfaction. The results of these surveys provide a logical basis to decide on features that are either further emphasized or excluded in the automated tools.

Focus Groups

The Focus Group is a form of interview that is designed to gather qualitative opinions from a group of participants that cannot be collected through surveying means. The focus group is more advantageous than individual interviews when time is critical because a focus group allows for the collection of a larger number of responses at one time. Focus groups are ideal for collecting data that identifies trends in personal opinion among group members. The format of the focus group is a guided discussion whose direction is loosely based upon research questions. The ideal size of a focus group is between six and twelve participants and one moderator. The moderator's task is to ensure the interview is conducted in a timely manner, that all viewpoints and details are expressed, and that the focus group moves in a direction that answers researchers' inquiries (Berg, p.125).

Focus groups are conducted in conjunction with surveys to assess the effectiveness of automated training tools created. The first focus group is comprised of examiners and EIC staff. It is executed in an office where supervisors and teachers are not present in order to receive responses from examiners that are not hindered by the presence of their superiors. The second focus group is executed after the automated

training tools are modified based on feedback from the first focus group and round of surveys. It is executed during an examiner training class, with the teacher and member of the EIC staff also present. The automated training tools are presented and all attendees are encouraged to provide feedback in the form of questions, comments, and opinions. The discussion is lead by asking questions about the significance of the covered material, the user-friendliness, and what was learned. During the discussion, examiners are also encouraged to offer opinions concerning the effectiveness of automated vs. classroom training so that we may offer suggestions to TC2100 about how to modify future training techniques. Automated training tools are modified for the final time after responses are gathered and analyzed.

All of the discussed research methods help tailor the automated training tools that will be created. A screencasting tool is chosen based on the training needs of TC2100. Attending classroom training and reviewing examining manuals and resources assists us in discovering the various tasks of the examining procedure. This knowledge enables us to prepare for and conduct meaningful interviews. The interviews assist us in determining beneficial content to include in the automated training tools. This content is automated with the chosen screencasting tool, and assessed with focus groups and surveys. The automated tools undergo modification based on responses from focus groups and surveys to improve their quality and effectiveness. Upon final modification, the automated training tools are ready for use in TC2100's new training plan for January 2006.

Results

Screencasting Programs

The four screencasting programs that were selected for closer analysis include TechSmith Camtasia Studio, BB Flashback, Qarbon ViewletCam, and Macromedia Captivate. These programs are chosen based on articles that explained their features and reviews by experts. Trial versions have been downloaded and explored in order to confidently report the best program to use. These top four programs were analyzed by comparing their various features and performance. Each of these programs provides the same basic screencasting functionality; however, they have different strengths and weaknesses depending on the task being demonstrated. The programs were analyzed based on the training needs of TC2100, such as quizzing ability and interactive functions.

Camtasia Studio

Camtasia Studio's main strength is that it is excellent for filming every detail on the screen. Camtasia's main file format is a video. Therefore, if a major portion of a screencast demonstration consisted of a video then this program would be the best suited for use. The editing abilities of the files created with Camtasia allow for callout objects, zoom and transition effects, as well as Flash hotspots that could be added into each demonstration. The zoom effect is a unique feature that allows the user to force the focus of a demonstration to a desired area of the screen. Another strength is that Camtasia has the largest selection of screen resolutions and output file types that the user can control.

However, because Camtasia records every detail that occurs on the screen the user needs to carefully plan every mouse movement before recording. In Camtasia there is no way to smooth out mouse movements as its competitors can, and every erratic mouse movement will be visible during the demonstration. The user is also unable to change the path of the cursor while editing the screencast. The interactivity of Camtasia is limited to Flash hotspots and this program has no quizzing features to allow for the assessment of demonstrated material. The cost of a single Camtasia user license is \$299.

BB Flashback

BB Flashback has an effective dual-timeline display that allows the user to quickly navigate the entire movie during editing. BB Flashback enables one to re-record sections of the cursor/mouse movements after the demonstration has been initially recorded, and adds attractive click effects. BB Flashback is a relatively inexpensive option for a screencasting tool, at \$199 for a single user license.

On the other hand, BB Flashback is a relative newcomer to the market so there are bugs that may be encountered when using this program. One problem is with a multi-monitor setup. In this case, the program is only able to capture events from one screen. The program will not record anything that is not on the primary monitor. Although maneuvering through the dual-timeline for the whole movie is quick and easy for the user, some details on the timeline are implemented more effectively with other programs. For example, when adding a textbox callout, the program will only add an indicator to show when the event ends. This makes it difficult to gauge the time-placement of the object. Other programs use a more effective duration bar. Another weakness of this program is its audio editing ability. With this program it is difficult to re-narrate portions

of the movie without having undesired consequences, such as overdubbing or lost synchronization. BB Flashback does not include interactive features or the ability to produce quizzes as an assessment.

Qarbon ViewletCam

ViewletCam is a screen capture tool designed to record desktop movies that include graphics and sound. In this program the mouse movements are shown as points on a curve that the user is able to modify and reshape. This program offers an inviting user interface with intuitive controls for adding textbox callout objects, buttons, or images. In comparison to the other screencasting programs this is the most inexpensive full-version application at only \$149 for a single user license. However, its features are the most limited.

The usability of ViewletCam's timeline is worse than its competitors. Their timeline lacks an overview timeline for their whole demonstration, making it the most difficult program to navigate in the editing phase. In addition, this program lacks interactive features and the ability to quiz the targeted audience.

Macromedia Captivate

Macromedia Captivate combines multiple approaches and includes features that make it stand out from the competition. Captivate divides up the recorded demonstration into discrete slides. Each slide can range in duration from half a second to five seconds or longer depending on the user's preference. Captivate combines the ability of using the slide-based approach of simple screenshots when there is little action, and the ability of taking high-speed video capture when a movie is required. In this way Captivate attempts

to find a balance that fits the needs of designers. In addition, the slide-based approach makes editing with Captivate simple because one can easily click and drag a slide to rearrange slide order, delete slides, or record new ones. Captivate will automatically create captions during a recording for instructional purposes that the user can edit. Captivate also allows the user to edit the path that the mouse cursor takes after the demonstration has been recorded.

On an interactive basis, there are no programs that can compare with Captivate. Simulations can be created that allow the students to follow the procedure learned from a demonstration. The simulations provide guidance if the student does not know the next step in a procedure. In addition to these simulations, Captivate also has the ability to create quizzes that assess a student on how well the course material has been absorbed. The interactivity that Captivate offers is unparalleled, and sets it ahead of its competitors.

Despite the advantages in interactivity, there are also several drawbacks to the program. The more substantial of these drawbacks is that Captivate is slower than the other programs in loading, saving, and exporting files. In addition, the file sizes that are associated with the output are large, although they are comparable in size to that of Camtasia. Captivate is also the most expensive program of the ones listed, costing \$500 for one user license.

Content Selection

The automated tools created by this IQP are specifically designed to assist examiners in searching non-patent literature (NPL) with the IEEE Xplore and ACM databases. Other aspects of examining were considered for automation, such as filling out forms using OACS and how to conduct EAST and WEST searches. Our research of examiner manuals and resources led us to automating training for IEEE Xplore and ACM for three reasons. IEEE Xplore and ACM are the most commonly used search databases for NPL, there were not interactive tutorials made for these programs yet, and training for both will be part of the new SEED training program.

We reviewed the Patent Examiner Initial Training (PEIT) Manual & Workbook and the Introduction to Practices and Procedures that new examiners receive as training guides. We reviewed the PEIT Manual and Workbook as we sat in on classroom training. There we learned the various steps in examining a patent application. These manuals are not easy to use as reference tools, however, because they are so large and difficult to navigate. They also do not illustrate the procedures in an interactive manner, as is possible with automated training tools. It may have been possible to automate certain aspects of the PEIT Manual & Workbook and the Introduction to Practices and Procedures, but the time frame required to develop exact content was a limiting factor. The PEIT Manual & Workbook and the Introduction to Practices and Procedures automation was also ruled out because our goal was to completely automate an aspect of educational content within a seven-week time frame. From here, we focused on aspects of the examining procedure that could be completely automated.

We also navigated through the Patent Examiner's Toolkit, available on the USPTO computer network. This toolkit contains all the programs used by examiners, and links to specific search databases for each TC. With the help of our liaison Gail Hayes, we were able to choose a few programs for which automated training tools would be beneficial. These programs included OACS, EAST, WEST, MPEP Insight, and Non-Patent Literature (NPL) searches. However, we found that OACS and EAST already had automated training for them, and WEST was too similar to searching EAST. These factors eliminated these programs' eligibility in the search for tools to automate.

From Non-Patent Literature, we narrowed the scope of our project to IEEE Xplore and ACM databases based on an interview with Anne Hendrickson, Division Chief of the EIC. We learned through the interview that part of the new SEED training program includes a two-hour class to teach the 250 new examiners of TC2100 how to search NPL with IEEE Xplore, ACM, and Citeseer. We also learned that IEEE Xplore and ACM are the two most widely used NPL databases. We obtained presentation slides from Anne Hendrickson prepared for the SEED NPL class. These slides served as a helpful guide to us because they contained the most important information to convey to the examiners about IEEE Xplore and ACM with our tools. The interview led us to our final decision of creating automated training tools for searching NPL with IEEE Xplore and ACM. The goal of the automated training we created is to replace the classroom training currently in place for IEEE Xplore and ACM.

IEEE Xplore and ACM Databases

The IEEE Xplore and ACM databases are two of the most widely used by examiners of TC2100 to search non-patent literature (NPL). Examiners of TC2100 have access to

twenty-seven different databases in order to search NPL, available through the Patent Examiner's Toolkit. NPL is found and reviewed by examiners as part of their Prior Art search, in order to fully understand the background of the invention being examined. IEEE Xplore provides full-text access to over 1,000,000 IEEE (Institute for Electrical and Electronic Engineers) and IEE (Institute of Electrical Engineers) journals, transactions, and conference proceedings published since 1988. In addition, it contains all IEEE standards and selected content dating back to the 1950's. The ACM (Association for Computing Machinery) Digital Library provides full-text access to over 160,000 journal titles, transactions, conference proceedings, theses, and books published since the 1950's. These databases allow the user to browse through journals, magazines, and conference proceedings, conduct basic or advanced keyword searches, search for material by a particular author, and more. Each database has an associated set of Boolean operators to assist the user in searching more efficiently.

MPEP Insight

MPEP Insight is a computer program that allows examiners to browse or search through the Manual of Patent Examining Procedures. This manual contains information on every aspect of the patent examining process. Therefore, this is a very important document that examiners look to for guidance regarding how to proceed with an examination when they encounter questions or problems with the given patent application. The ability to search through this manual with the program MPEP Insight is essential because it will accelerate the examiner's ability to find the information they need to continue, while also increasing the examiner's productivity. Currently, examiners from TC2100 are required to take a class on how to use this program.

Creating Automated Tools with Captivate

Captivate is the tool that was used to create the screencasts of the IEEE Xplore and ACM databases. The creation of a high quality screencast using Captivate is a straightforward, 3-step process. The process begins in the Recording phase, where most of the visual interactions on the computer monitor are recorded. The second phase is the Editing phase. During this phase slides are refined into a coherent finished product. The third phase is the Publishing phase. Since the files being editing in the previous phase require Captivate to view, the publishing phase is necessary to convert these files to ones that may be viewed without the Captivate program. This section will discuss the basics of our experience screencasting with Captivate and identify common problems that were encountered during each phase of this process. To gather a more complete understanding of the screencasting process with Captivate, visit Macromedia's Online Help Site: www.macromedia.com/software/captivate/productinfo/features or Mesa Community College's Captivate Workshop Resources: http://www.mc.maricopa.edu/other/ctl/_ctl_SD/resources/helpdocs/workshops/captivate/index.html.

These were found to be the most complete resources available that discussed the specific features of the software. The following is a discussion of the pragmatic features that were used to create the automated training tools for IEEE Xplore and ACM databases.

Recording

Recording with Captivate is a simple undertaking. While recording, the software uses a slide-based method to capture actions on the computer screen. Captivate automatically determines the beginning and end of each slide based upon each mouse-click. The program also determines the shortest mouse path for each segment and determines an appropriate time. For “click and drag” motions of the mouse, Captivate automatically switches from a screenshot capture method to a video recording method. This method of recording is enabled by default, but is optional. During our recording, we left these automatic recording options enabled.

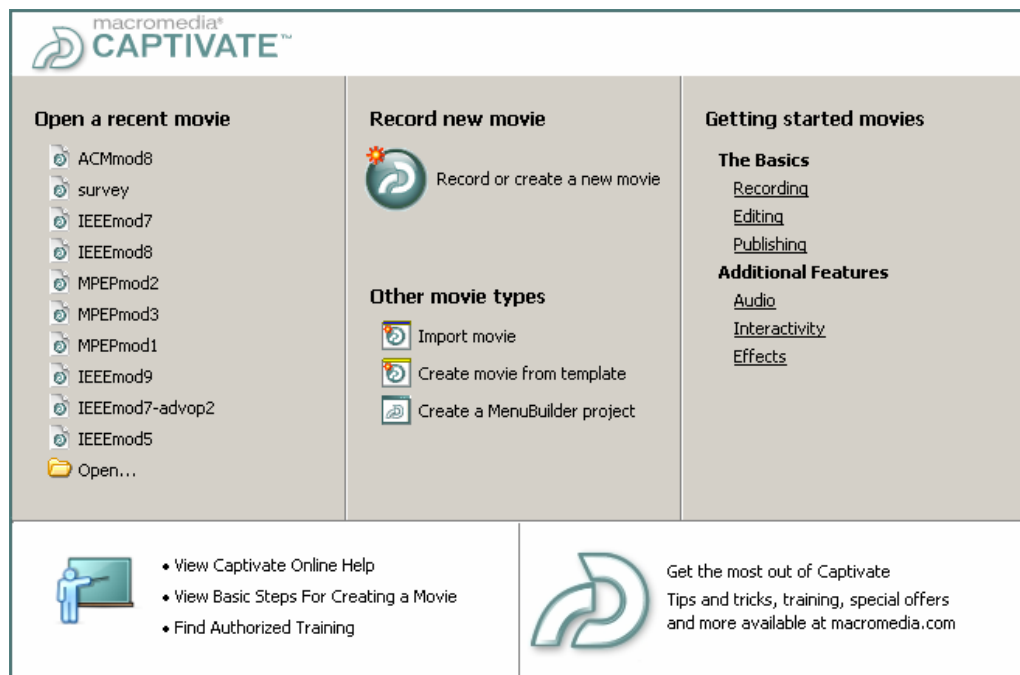


Figure 1 - Menu Screen

The next step in the recording process is to select a recording mode. Recording modes are templates that initially set options based upon their descriptions. These options may be changed manually, before or after recording. The layout of Captivate makes these options readily available based upon the goal of the presentation. In general, when

selecting a recording mode, it is best to select the one that suits the object of the training tool, demonstration, interactive training, or assessment. The three basic recording modes are Demonstration, Training Simulation, and Assessment Simulation.

Demonstration mode is the basic screencasting mode that simply captures actions on the screen that will become an instructional movie after editing. It was the most applicable mode to use when creating the database tutorials of this project. The Training Simulation mode contains all the basic features of the Demonstration mode, but has interactive components. Instead of merely demonstrating the informational content of the tutorial, the Training Simulation mode adds a layer of interaction that prompts the user to click, drag, type, and scroll as they would using the IEEE Xplore or ACM databases. This mode is not used in this project because we thought the actions and examples would be more tedious than educational, and that the Demonstration mode was more effective in displaying content. Training Simulations also require more planning to produce, and time is a limiting factor. The Assessment Simulation mode is similar to the Training Simulation mode in every aspect, except instead of prompting the user a hint on how to proceed throughout the tutorial, it records the score of right and wrong actions. While assessment options were used in creating the survey, the Assessment Simulation mode did not fit in the scope of the information presented.

Another initial option to consider is selecting a screen resolution that will be recorded in Captivate. An appropriate screen resolution is determined by the lowest screen resolution of the target audience. The introduction slides of the IEEE Xplore and ACM database tutorials use 800x600 pixel screen resolution, which is typically the lowest screen resolution on machines that use the Windows operating system. All other

slides were recorded using 1600x1200 pixel screen resolution, since we did not need to use the full screen. Higher screen resolution means more content is visible on each web page, and allows a higher flexibility in framing this content in an appropriately sized window.

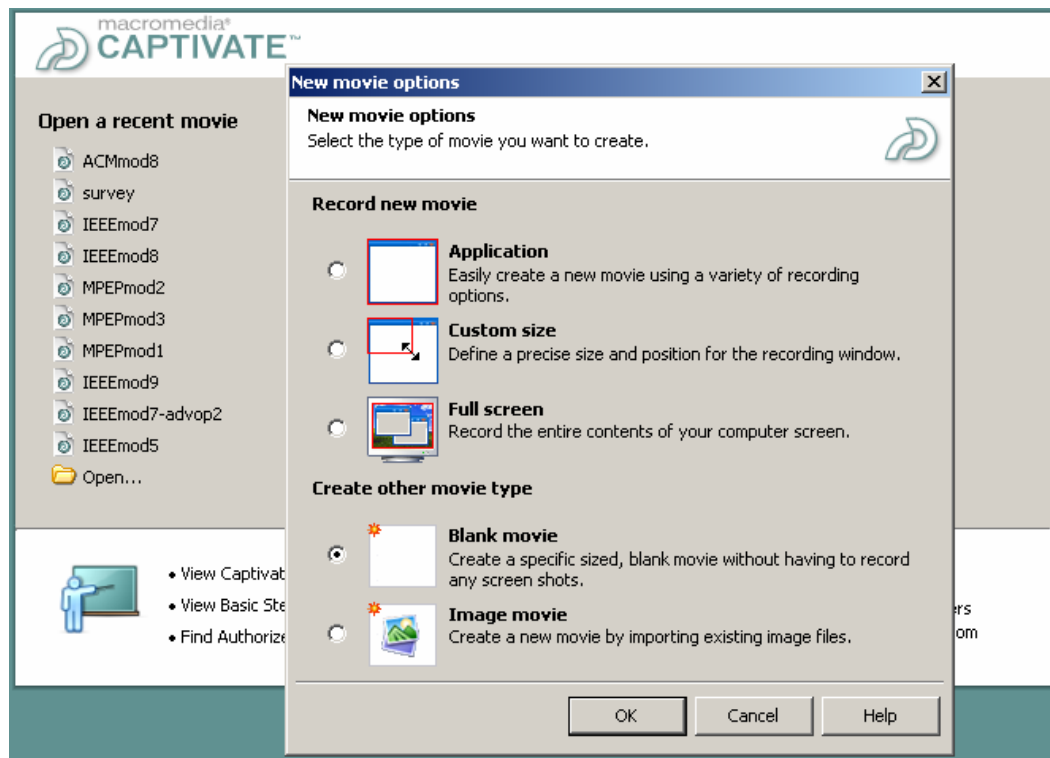


Figure 2 - Window Size

Window size is the next concern when recording. Captivate provides three different window options. The first window option is Full Screen, which captures actions on the entire screen. The second window option is a selectable Application-sized window. It allows the Captivate user to select a window that is fitted to an application of interest on the screen. The third window option is a custom window size. Captivate provides sample window sizes, or allows the user to input the exact pixel dimensions of the window. The Custom Window option is the most flexible, and may be stretched to fit the entire screen like the Full Screen option, or may be fit to a window like the

Application-sized Window option. Since the Custom Window option is the most flexible, it is used in this project for recording. The introduction slides to each database are recorded with a full screen-sized window, since they require actions across the entire screen. The other slides are recorded using a 1008x665 pixel window that fit the width and height requirements of the data being presented for each database. After these options are selected, a window appears that prompts the developer to begin recording. The window size may be changed after recording, based upon the output requirements, but it is more convenient to set that option before recording.

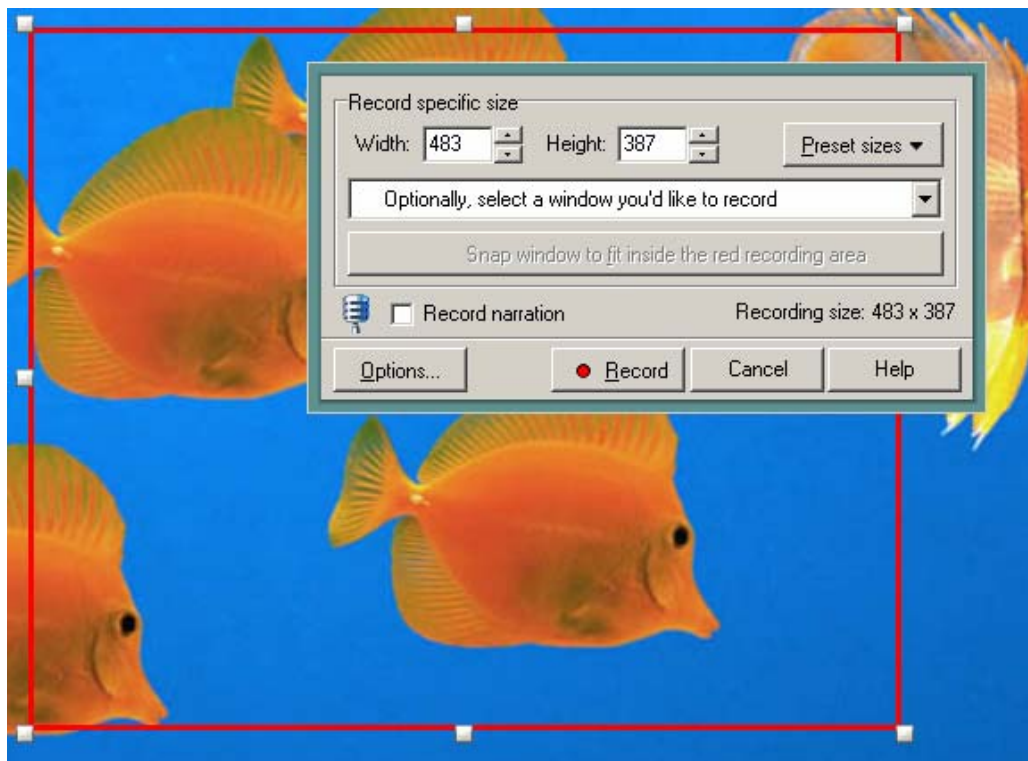


Figure 3 - Recording Options

Timesaving shortcuts and beneficial tips have been discovered through our recording experience. The first tip that we discovered is that it is important to practice the exact demonstration before recording. It is beneficial in this respect, and later in the editing process, to break recording into small sections, no more than 15 minutes each.

Secondly, Captivate includes the option of recording narration for each slide during recording. It was determined that it is easier for beginner users to incorporate audio into each slide during the editing process. Thirdly, Captivate breaks slides up by mouse-click. There were many extraneous slides that were recorded. Captivate would record a click at the end of one slide, but include a slide after that would simulate a click again. These secondary slides are unnecessary to the overall presentation, and may be deleted during editing. The next major recording concern is scrolling. Scrolling is a click-and-drag style action and Captivate takes a movie of that action. The result could be an image that is of interest, but Captivate does not pause on this image as long as may be necessary to convey the information clearly. While the movie may be slowed down during editing, it cannot be paused. It is easiest to remedy this situation by taking a screenshot manually by pressing the “Print Screen” button on the keyboard. This option is available throughout the entire recording process. Another problem that was encountered was typing errors. When typing, ensure that there are no errors by typing slowly. When typing fast, Captivate does not record many of the letters, since it takes time to record a screenshot for each keystroke. Editing a typing segment cannot be conducted later. If an error is encountered or if another window needs to be opened, it is beneficial to pause recording by pressing the Break button on the keyboard. This saves extraneous slides from being recorded. The Break button may be used at any time to pause recording.

Editing

Editing the recorded slides is the most time consuming process, but it is fairly intuitive because of the simplicity of the Captivate interface. Editing each slide takes approximately five minutes, including audio voiceover. The editing interface consists of a

tabbed system, which allows the developer to select either Storyboard or Edit mode. The storyboard tab allows a developer to view the entire presentation, in slide order. This is useful in understanding the general slide progression throughout the screencast. From this tab, the developer can delete unnecessary slides, edit their properties, or change the order of the presentation. The edit tab provides the primary editing functions of the Captivate program. The tab shows the selected slide in the primary window, places a timeline of events above the primary window, and a filmstrip of slides to the left for quick viewing.

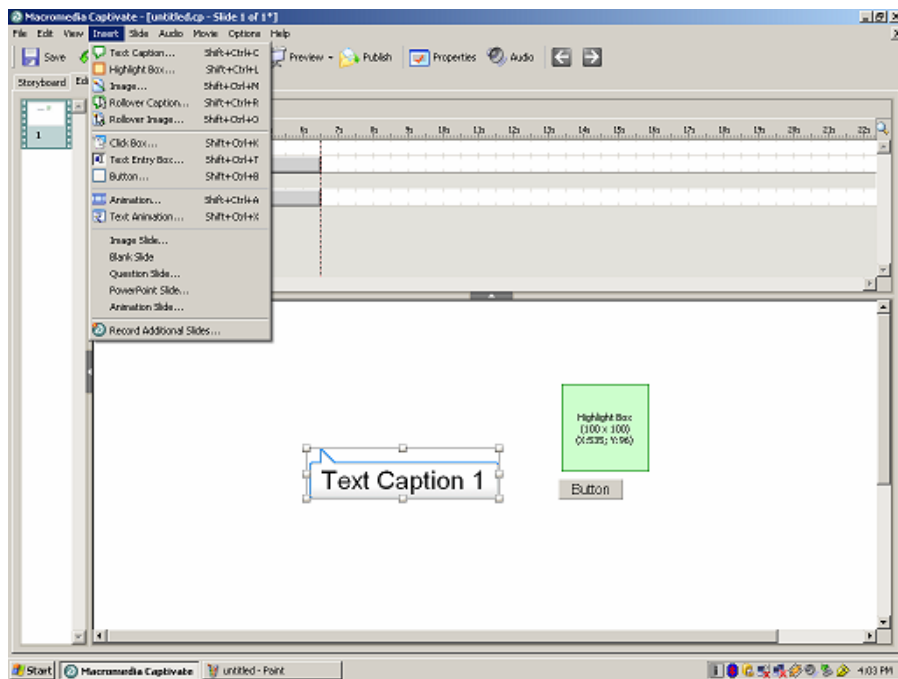


Figure 4 - Editing Layout with Objects

When editing, the first step is to delete any unnecessary slides. The deletion of slides is at the discretion of the developer. Deleting extraneous slides before editing slide content clarifies the presentation, reducing confusion of slide order for the developer. Experienced developers are able to create slides that hold as much information as possible, which is more beneficial than creating many smaller slides. This is because each slide is associated with a specific minimum file size and time duration. When a

presentation is accessed from a website, it requires time to download. Longer and shorter slide file size does not vary appreciably between slides with longer and shorter time durations. When slides are made to be as long as possible, it allows the presentation to be downloaded over a longer period of time, reducing the amount of bandwidth required. Captivate includes a Bandwidth Analysis tool that determines the minimum connection speed required to view the presentation fluidly. The screencasts that we have created aim to meet the 56 kbps speed, since examiners may be able to work from home in the future. This also ensures that the files stored on a USPTO server will play smoothly.

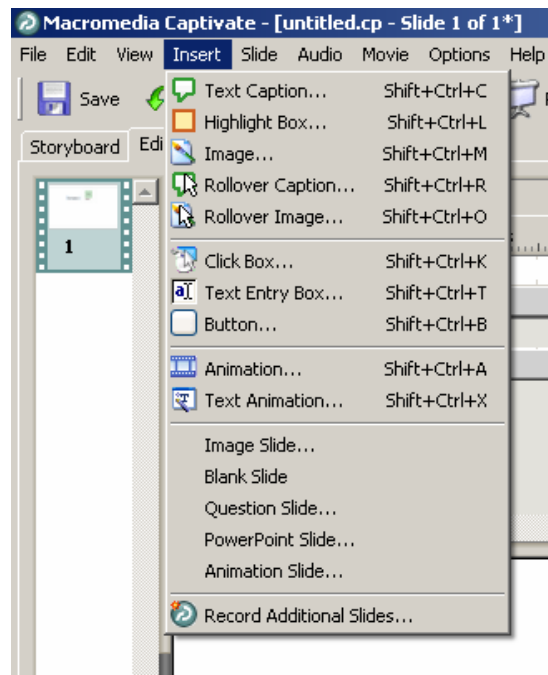


Figure 5 - Insert Menu

The second step of editing is to modify individual slide content. This may be done through the primary window. The primary window contains all of the actions that occur throughout each slide. Mouse movement, mouse clicks, highlight boxes, and text captions are automatically inserted into the Demonstration style of presentation. Highlighting and text captions are filled with generic data, and were modified during the editing process.

Within the primary window, the mouse path may be moved, removed, or have its properties altered. Additionally, the Insert menu contains visual features that may be placed within the slide to aid in highlighting areas of the presentation. These include additional text and highlight boxes, buttons, animations, click boxes, images and the ability to record additional slides. Recording additional slides is similar to the recording process of recording a new project. The window size settings of the project are maintained and applied to recording of new slides. These slides are placed into the presentation after the currently selected slide in the primary window. The timeline is a valuable feature that allows one to specify the timing and duration of events on screen. Each object, whether it is a text box, highlight box, or other visual object has a specific start and end point that defines when and how long it will appear in the slide. One may synchronize visual cues with audio tracks in this fashion. The timeline also includes a playback feature, for viewing a slide-by-slide sample of the presentation. Recording audio is a simple process, and an audio track may be inserted in each slide. To insert audio, select the Audio button on the Main toolbar. The features are adequate for the recording needs of a high-quality screencast, and include record and playback functions, cut, paste, import and export audio, and insert-silence.

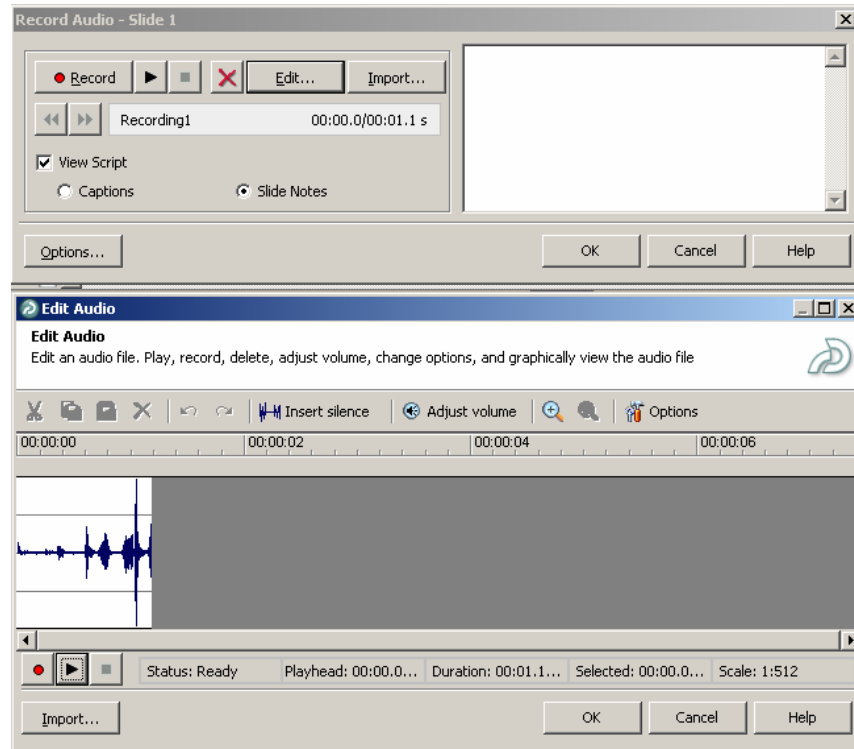


Figure 6 - Audio Options

The movie may be previewed using the Preview button. The Button has four preview options. The options are Movie, Next 5 Slides, From This Slide, or In Web Browser. The Movie option will compile the slides into a video window and is an accurate display of the entire presentation. The Next 5 Slides option compiles a video of the currently selected slide and the four slides following the current slide. The From This Slide option compiles a video of the currently selected slide and all the slides after the current slide. The In Web Browser option compiles the slides into a flash file that is displayed within a web browser. These options allow the developer to preview the presentation as it would appear to an audience before the final version is published.

An online survey is created for data collection from modified question slides. The question slides form the basis of the quizzing and survey features available in Captivate. These features are unsurpassed by other screencasting programs in ease of use and

variety. There are six varieties of question slides. These include Multiple Choice, True or False, Fill in the Blanks, Short Answer, Matching, and Likert slides. Used in conjunction with Assessment Simulations, which record each user interaction, Captivate becomes a robust educational assessment creation tool. The question slides record the score and responses, depending upon the type of question asked. They have various reporting formats, which include email, SCORM, AICC, Authorware, and Questionmark Perception. The online survey presented during the focus group used email reporting to send survey results to our email address for later analysis.

Publishing

After editing is complete, and the developer is satisfied with the project, it is necessary to publish the project in a format that is accessible without using Captivate. Captivate first compresses the project files into a single Macromedia Flash movie file (extension *.swf). If necessary, the flash file may be converted into another file format. These publishing formats include email, Standalone Executable (*.exe), Breeze (Macromedia presentation software), or Archive (*.zip). Standalone Executable and Flash formats were tested. It was decided that Flash format with the “export html” feature was the best possible method of publishing. With the “export html” option selected, a java script is created that will automatically email the results of questions through the Internet Explorer window. Other formats open a local Microsoft Outlook window and would require additional user input. The export html option also automatically places the Flash file in a usable format, regardless of whether the local machine has Macromedia Flash installed. The final published format is the finished screencast project. It does not require Captivate to run,

since it is an html file (web page), and may be used across operating systems and system interfaces.

A menu system has been developed with the MenuBuilder tool within the Captivate menu. This menu system is created to organize the final, published files into a neat and visually appealing package. The MenuBuilder tool's interface and functions are similar to Microsoft PowerPoint. PowerPoint backgrounds may be imported into MenuBuilder to provide a background and theme for each menu. In order to create a functional menu, begin by placing text headings or image files. MenuBuilder allows the developer to link these text fields and images to the location of the published screencasts through their properties' screen. By double-clicking on the text field or image, the properties are displayed. In order to create a MenuBuilder menu, one must publish the document in html, exe, mac, or flash formats. We opted for the exe format, since the html format does not work with the popup blockers now standard with each internet browser, flash is not universally accessible, and most USPTO computers are Windows-based.

Since the MenuBuilder program is not the primary function of Captivate, we have discovered one critical bug (out of potentially many) that is worth noting. When published screencasts are moved from one file location to another, the MenuBuilder program occasionally loses the link information, and error messages appear when attempting to access these links. The "save file with project" checkbox within the properties of the text box or image is an effort to remedy this situation, but does not always work when published. The only way to fully remedy this solution within MenuBuilder is to thoroughly test each link and return the link path to reference the file location. A developer could, of course, forgo the MenuBuilder program altogether. Many

menu formats are available, that are widely accessible. If files are stored on a server, a simple example is to create a webpage that uses html links to each screencasting file, individually. We explored this option as a potential alternative.

IEEE Xplore and ACM Tutorials Created

Automated training tutorials were created which instruct how to search NPL with the IEEE Xplore and ACM databases. These tutorials provided step-by-step instructions on exactly how to use the databases by showing where to click. Instructions begin with clicking the start menu on the desktop and illustrate how to reach the databases. Different types of searches are illustrated, such as searching authors and journal titles. Audio narration is included through each tutorial. Sections of the screen are highlighted as each part is explained. Instructions end with a list of search results and show how to obtain an abstract and full text. The user sees a demonstration of exact steps from start to finish.

The IEEE Xplore tutorial was broken down into eight modules (a 9th module was later added for Boolean and search operators), including an Introduction module which gives an overview of the different search options. The ACM tutorial was also broken down into eight modules, including an Introduction. Each module illustrates a different type of search, such as an author search, searching journal articles, and advanced search options. See Appendix E – Computer-Based Training Modules for a complete list of these modules.

The tutorials were published on a webpage to make them available to examiners and certain USPTO staff for feedback. The home page included links to each tutorial and to the survey discussed in the Procedure. This page also contained a brief introduction of

the project team and our project. A picture of this webpage can be found in the Appendix E – Computer-Based Training Modules.

MPEP Insight Tutorial Created

The Manual of Patent Examining Procedures (MPEP) describes the entire protocol of examining patent applications. This manual is frequently referenced by all examiners, therefore, MPEP Insight was created to allow examiners to easily search this manual.

An MPEP Insight automated tutorial was recommended by 38% of patent examiners during the examiner interviews. This was the highest recommended program to be made into an automated training tool, during these interviews. Because of this trend, the group discussed the feasibility of producing an automated tool for MPEP Insight with Gail Hayes. After reviewing the success of IEEE Xplore and ACM automated tools, Gail suggested that we begin developing an automated tool. MPEP Insight automation was not included in the scope of the project, but screenshots were recorded and initial editing had begun. Time constraints prevented us from refining these tools into a finalized format.

Feedback

Original methods to obtain feedback were modified based on the lack of examiner availability and time constraints.

Round One

Modifications were made to the original methods proposed to obtain feedback of the automated tutorials we created. Initially, the first round was to be conducted in our office. A group of beginner examiners would have been invited to a demonstration of the tools,

encouraged to answer a brief survey, and partake in a focus group thereafter. Instead, we decided to ask the examiners to review the tools on their own because that is how the tools are intended for use in TC2100. Since examiners would not be reviewing the tools in a group, we could no longer conduct a focus group in conjunction with a survey for this round of feedback.

Procedure

A group of eight examiners was chosen by our liaison to participate in our first round of feedback. The examiners had six to eighteen months experience at the USPTO. Each examiner was sent an email with a link to the automated IEEE Xplore and ACM tutorials and was asked to review the tutorials on their own. A copy of the interview questions was sent in the email so that examiners would know the type of feedback we were looking for and ensured that interviews would be brief. We asked examiners to schedule a time to meet us to discuss his or her opinions of the tutorials we created, as well as opinions of automated vs. classroom training. Interview questions can be found in the Appendix B – Interview Questions.

Results

Feedback interviews were conducted as planned. We received seven out of eight responses to the email the same day we sent it out, and the last response was received the next day. We were able to conduct three interviews the first day, three the second day, and the last two interviews on the third day. Three of the examiners filled out the survey on their own and emailed it back to us, even though this was not asked of them. We still

scheduled an interview with these examiners so that we could get into a deeper discussion of their opinions and so that each examiner interview was treated the same.

We asked each examiner all six of the interview questions during an informal interview. We asked follow-up questions to responses we wanted examiners to elaborate on. For example, one response to question 1 (Was this tutorial educationally beneficial?) was that the examiner thought the tools were basic and he did not gain much from them. We asked if there was something we could improve to make the tutorials more beneficial or if there was a reason that they were not very beneficial to him personally. He responded that he had been employed with the USPTO long enough that he knew how to search with IEEE Xplore and ACM. The tools were too basic for him, but he thought that it would be more beneficial to newer employees. All of the examiners were cooperative and willing to give their true opinions. Analysis of the interview responses can be found in the Analysis Chapter.

Interview Responses

Upon analyzing the responses, several interesting trends were noticed, along with a few comments that stood out from the rest.

Educationally beneficial

All eight of the examiners we interviewed responded that the tutorials we created were educationally beneficial. Aspects of the tutorials that examiners pointed out as being educationally beneficial are:

- Great overview of all the possible search options (in IEEE Xplore and ACM)
- Step-by-step instructions of exactly what to click on to search

- Search operators
- Thorough and detailed
- Better than brief NPL training as part of PEIT

Three examiners mentioned that the tools would be more beneficial for newer examiners. One examiner thought the tutorials “got the point across”, and stated that the tools may be “oversimplified for this TC – in general anyone in 2100 is going to have a good working knowledge of using the internet and online databases.”

Reference Tool

Five out of eight examiners responded that the tutorials would be beneficial reference tools. Positive responses we received include:

- Tutorials are laid out in individual modules so it is easy to find what you’re looking for.
- Navigation buttons allow users to find the part where instruction is needed.

The other three examiners did not think these tutorials would make effective reference tools. These responses include:

- Serve as reference only for new employees. After about two months, it is no longer needed.
- May be used to brush up skills, rather than a reference.
- Would be a better reference if presented in a shorter, faster-paced version.

One examiner responded that he would prefer a paper reference he could flip through because it would be quicker and easier to find. In comparison, a different examiner exclaimed, “We have enough paper!” She explained that everyone in TC2100 is

computer literate. If everything is available on the computer, it is faster and easier to reference than to sift through manuals and paperwork.

Automated vs. Classroom Training

Seven out of eight examiners responded that they would like to see more computer-based automated tutorials. Positive responses for automated training include:

- Classes are long and boring.
- Tutorials are more hands on and less boring than classes.
- Tutorials allow students to move at their own pace. Students can spend more time on something they don't understand, and less time on an aspect they are more comfortable with.
- Students will not be held up by those who do not understand the material. Likewise, students who require further instruction are able to review modules multiple times and will not be rushed.
- The step-by-step instructions are accessible on the computer, allowing examiners to perform a search in a separate window while the tutorial is still visible.
- "I would LOVE to see many applications taught like this! It would be a great teaching tool and a great point of reference in case one was ever to get stuck somewhere!"

One out of the eight examiners we interviewed stated that he would not be interested in seeing more automated tutorials. He explained that after reviewing the tutorials, examiners would have questions and need someone to go to for further instruction. He believed that computer-based tutorials could not possibly address every concern.

Suggestions for Future Automated Tutorials

Four of eight examiners interviewed suggested applications that may be beneficial to automate. These suggestions include:

- MPEP Insight
- EAST
- WEST
- Other NPL, including e-book Safari
- Classification tools

We have made a tutorial for MPEP, but it is not refined and was not shown to the examiners. One suggestion was to touch on advanced EAST/WEST options. One suggestion was to run an EAST/WEST class in conjunction with an automated tutorial and gear it to specific art groups to teach people how to pick terms to search. One examiner noted that EAST is covered thoroughly in current training, but WEST is “glossed over”. He would like to see a tutorial for WEST, and possibly for other NPL, namely the e-book Safari.

Suggested Additional Content

In order to make the tutorials as effective as possible, we asked examiners if any important information was missing. Six of eight examiners responded with suggestions for additional content as bulleted below.

- Search history
- Back button, or show menu screen again at the end
- Help within the database

- Modify or narrow down a search
- Conclusions to IEEE Xplore and ACM modules
- Help within USPTO
- ACM advanced search tips
- “Transaction” definition
- Illustrate IEEE Xplore advanced search pull-down menu

This information was included as effectively as possible before conducting the second round of feedback. The other two people could not think of any information that would be beneficial to add.

More Examples

Examiners were asked if additional examples of searching were needed, and what could be better illustrated with these examples. Responses received include:

- Additional examples be optional
- Extra examples would be nice, but not essential
- Include more examples of Boolean and search operators
- Include more examples of advanced searching
- Include examples geared toward specific art groups

No one had a negative response to the idea of additional examples.

Presentation Clarity

The examiners were asked if any information was not presented clearly. One examiner did not comment. Three examiners responded positively. Positive responses include:

- Everything was clear, concise, and easy to understand.

- Presentation was well laid out.
- Sections are highlighted as the audio gives an explanation.

The other four examiners suggested something to add or change to improve the clarity of the presentation. These suggestions include:

- Add conclusion modules.
- Presentations moved slowly.
- Voice fades in and out at times.
- Clarify parts of modules including:
 - Illustrate IEEE Xplore pull-down menu.
 - Divide IEEE Xplore search option 2 into two parts and provide extra examples.

Round Two

The automated tools were modified before the second round of feedback, according to responses from the first round. For example, a tip that discussed how to access the search history, and an additional Boolean and search operators module were added.

Modifications to the tools corrected the negative feedback from the interviews in an effort to eliminate negative responses in the second round of feedback. A survey was created as a quiz function that allowed examiners to submit answers electronically so that responses would be sent directly to the team email.

Procedure

The second round of feedback was conducted in a classroom of the Patent Academy on Friday, December 9th, one week after the first round. We were allotted one hour for the

second round of feedback, from 8:30 to 9:30am in room 241. The room number was later changed to 243. The procedure included an introduction to our project, followed by allowing the examiners to review the tutorials individually for IEEE Xplore and ACM, request that they complete the survey, and then lead a focus group discussion.

An introduction was written and practiced. The tutorials were published on a webpage and ready for review by the examiners. Headphones were ordered in advance so that examiners could listen to the audio component of the tutorials and move at their own pace as they reviewed the tutorials individually. The survey was included on the webpage. Survey questions were designed to assess examiners' experience with computer-based training and search engines, and to gather opinions of classroom vs. computer-based training. From the responses, conclusions can be drawn about examiners' overall opinion. In turn, this will allow us to make valid recommendations to TC2100 regarding their training curriculum. Survey questions can be found in the Appendix.

We composed comments and questions to lead the focus group. Discussion questions were designed to initiate dialog between examiners and probe examiners to think critically about their training. The goal of the focus group was to discover reasoning behind the examiners' opinions. Although we were well prepared to conduct the second round of feedback, unforeseen events caused us to modify the original plan.

Results

The presentation was scheduled for 8:30am to 9:30am but we quickly deviated from this plan due to a room number miscommunication. As a result, the presentation started thirty-five minutes late. We began by introducing our project to the class. When we asked the examiners to review the tutorials from the webpage where they were published, we

realized that the computers in this room were not headphone compatible. The tutorials include an audio narration though the entire presentation and are not as effective without it, so we decided to demonstrate the tutorials on a projector using the one set of speakers available. There was not enough time left for a complete demonstration of each module of the two tutorials as well as allow time for the survey and focus group. Only two modules were shown from each tutorial.

We requested that the examiners complete the electronic survey. Examiners were also given the option to fill the survey out by hand in order to remain anonymous since electronic responses would reveal their email address and name. All examiners chose to submit the survey electronically. When all eight responses had been received in the team email inbox, we began the focus group discussion. The discussion covered all topics originally planned, with the exception of comments about specific content of the IEEE Xplore and ACM tutorials. Examiners did not see enough of the modules to comment on how to improve the tools, or if important content was missing. All examiners participated in the discussion, which lasted about ten minutes. The discussion ran about fifteen minutes past the time we were allotted. The examiners did not mind because they were scheduled to be there for another class. Feedback from this focus group provided us with responses which we will use to make valuable recommendations to TC2100 about future training.

Survey Responses

The survey consisted of eight “yes-or-no” questions, three of which led to follow-up questions. The results of these surveys were input into an excel spreadsheet for further data manipulation. Questions one, two, and seven were branching questions that asked

follow-up questions depending upon the examiner's response to preceding questions. The responses are listed under each question.

1. Have you used a Computer-Based Training Tool before?

Seven out of nine examiners responded that they have used a Computer-Based Training Tool before. One examiner responded that they had not used a Computer-Based Training Tool before. The examiners that responded "yes" to this question were directed to follow-up questions 1.a, 1.b, and 1.c.

1.a. If so, what tool did you use and how did you use it?

Their responses are:

- At a previous employer, I used a CBT that explained how to perform job functions, then presented a short quiz after each lesson.
- Microsoft Web Editing Training Tools with basic guided tutorials
- EAST CBT
- I used some safety training CBT's at my previous work. Had to complete them before I could start working.
- Flash based, simple, just ran through some steps
- It was a training tool for a software development application
- Safety training, and it was a set of power point slides

1.b. Did this Computer-Based Training Tool have audio narration?

Five out of these seven examiners said that the automated training that they had previously used had audio narration. Two of these examiners used automated training without audio narration.

1.c. Overall, was it a positive or negative experience?

Seven out of seven examiners said that the automated training that they had previously received was a positive experience.

2. Have you had prior experience with search engines?

Nine out of nine examiners responded that they had prior experience with search engines. The examiners that responded “yes” to this question were directed to question 2.a.

2.a. If so, which search engines have you used?

Their responses are:

- Google, yahoo, etc
- All of them. I'm a nerd, that's what we do.
- Google, Infoseek, Altavista, IEE, ACM, Lycos, etc.
- EAST, WEST, google, etc.
- Google, Yahoo, ACM, IEEE
- Google, IEEE Xplore, ACM Portal, other NPL database search engines, other web search engines
- Google, EAST, ACM, IEEE... many others

- Google, Alta Vista, Yahoo, Lycos, Metacrawler, EAST, WEST, Amazon, eBay
- Google, Alta Vista, Yahoo, ACM, IEE, Inspec

3. Do you think the IEEE Xplore and ACM tutorials provided you with enough information to use each database, at least at a basic level?

Nine out of nine examiners responded that they felt that the IEEE Xplore and ACM tutorials provide enough information to use each database at a basic level.

4. Do the IEEE Xplore and ACM tutorials provide enough training such that a class is not necessary for these topics?

Eight out of nine examiners responded that they felt that if these tutorials were available, a class on their topics would not be necessary. One out of eight responded that a class was still necessary.

5. When learning how to search with IEEE Xplore and ACM, would you prefer classroom training or CBT?

Nine out of nine examiners said that they would prefer the Computer-Based Training of IEEE Xplore and ACM databases.

6. Do you think that these tutorials would be useful as reference tools?

Eight out of nine examiners responded that they thought these tutorials would be useful as reference tools. One out of eight examiners said that they thought they would not be useful as a reference.

7. Would you consider using automated tutorials to learn other aspects of training?

Eight out of nine examiners said that they would consider using automated tools to learn other aspects of training. One out of eight responded that they would not. This is a branching question, so the examiners that responded “yes” to this question were asked questions 7.a and 7.b.

7.a. Do you think that Computer-Based Training would have been useful for learning how to complete forms, such as #892 and #1449?

Six out of eight examiners said that they think CBT would have been useful to learn how to complete forms. Two out of seven said that they think CBT would not have been useful.

7.b. Do you think that Computer-Based Training would have been useful to learn how to complete other forms that are used less often, such as PCT?

Eight out of eight examiners said that they think Computer-Based Training would be useful to learn how to complete uncommonly used forms.

8. Are there any other considerations or concerns about the automated tools that you would like to mention?

Their responses are:

- The "clicky click" was kind of loud. The voices were a little droning at times (though the subject matter might have contributed to that)
- I like the CTS for this better, because instructional training goes too slow. We have engineering degrees, and we usually don't need step-by-step instructions given by the teacher, so this would make it much better.
- A printed reference guide to each of the automated tools would be good as a quick reference, rather than spending the time loading an automated training tool.
- At times the audio was quiet or difficult to hear
- Only that it seems to crash on the advanced search for ACM. Overall I believe that these tools would be plenty to allow new examiners to learn IEEE Xplore and ACM databases
- Keep up the good work!
- Nope
- None

One response was left blank.

Table 1 – Survey Results

Survey Results		
Question	Yes/Positive/CBT	No/Negative/Class
1	7	2
1.a	See comments	See comments
1.b	5	2
1.c	7	0
2	9	0
2.a	See comments	See comments
3	9	0
4	8	1
5	9	0
6	8	1
7	8	1
7.a	6	2
7.b	8	0
8	See comments	See comments

Focus Group Responses

The patent examiners felt that the automated tools would be beneficial to both new and experienced examiners. They reasoned that the automated training tools would provide new examiners with the necessary means to navigate each database and search effectively. The examiners thought that many experienced examiners who need to use Non-Patent Literature databases, but have forgotten how to use them, would not want to attend a class to relearn this material. Instead, they thought that experienced examiners would rather review the tutorials as reference material. Examiners suggested that these tools be available to everyone on a department web server, so they could be reviewed whenever a problem arose.

Most examiners felt that a class would not be necessary, and all examiners felt that class time could be significantly reduced through these tutorials. They were satisfied with the content of these tutorials, and thought they would be an excellent means to learn how to use each database. They suggested that NPL courses could be condensed into a single NPL course that teaches new examiners the benefits and drawbacks of each database and how to decide which one to use during an NPL search. This class would include the automated tutorials as essential material to review outside of the classroom.

Students suggested additional tasks that would benefit from automated tutorials. They also recommended automating everyday employee duties. An example of this is “how to fill out a time sheet”. Examiners said that tasks like this were not covered in any training or orientation, and wasted their time or another employee’s time to figure out on their own. They suggested that an automated tutorial that is readily accessible would save employee time.

Other Sources

Feedback was also received from the project liaison Gail Hayes and members of the EIC staff, including EIC Division Chief Anne Hendrickson and EIC Team Leader Pam Reynolds. Each person reviewed the tutorials and offered constructive comments on beneficial content to add, as well as indicating where more clarity is required. They also helped to pinpoint spelling mistakes and eliminate other minor mistakes that otherwise may have gone unnoticed. The modifications to our tools were made as soon as we received their comments. The suggestions that were given from these people were important changes that needed to be made. These ranged from easy to fix changes, such as minor spelling errors, to major revisions, like adding additional content. Many

suggestions echoed the results of examiners during interviews. Together these suggestions ultimately helped strengthen the tutorials.

Discussion and Analysis

Value Analysis

The Value Analysis matrix in Table 2 – Screencasting Tools Value Analysis Matrix shows a quantitative analysis comparing the various features pertaining to each screencasting program. A weighting and scoring system was applied. The numbers in the first column are the weight or translated significance of each feature. These numbers range from one to five, five representing a very important feature for TC2100’s training needs, whereas one represents a trivial feature. In the program columns, each program is ranked from one to five for each of the features. Again, five represents the best possible performance and a one represents the worst possible performance, or even lack of each particular feature. The “Score” columns are the multiplication of the weighting and the rank for each feature. The two bottom rows are the totals of both the ranked numbers and the scored numbers, indicating the favorable choice.

Table 2 - Screencasting Tools Value Analysis Matrix

Weighting	Qualities	Camtasia	Scores	BB Flashback	Scores	ViewletCam	Scores	Captivate	Scores
	Recording								
5	User Friendliness	4	20	2	10	4	20	5	25
3	Video Capture Quality	5	15	3	9	5	15	3	9
5	Ability to Record Audio Narrations	5	25	5	25	5	25	5	25
	Editing								
5	User Friendliness	3	15	3	15	2	10	3	15
4	Audio	5	20	1	4	1	4	4	16
4	Visual	4	16	4	16	4	16	5	20
4	Cursor Movement	1	4	5	20	5	20	5	20
	Features								
5	Support for Interactive Features	2	10	1	5	1	5	5	25
5	Quizzing	1	5	1	5	1	5	5	25
3	Mouse Click Effects	2	6	5	15	3	9	3	9
3	Smart Automatic Captioning	1	3	2	6	2	6	4	12
	Output								
3	User-Configurable Output Quality	5	15	5	15	3	9	2	6
3	Support for Multiple Output Formats	5	15	5	15	3	9	3	9
4	File Size	3	12	3	12	4	16	2	8
4	Price	3	12	4	16	5	20	1	4
	Raw Total	49		49		48		56	
	Weighted Totals		193		188		189		228

The Value Analysis illustrates the performance of each of the screencasting programs. From the analysis of these programs it is shown that Captivate is the best program to use to complete this project. Captivate includes all the features necessary for creating valuable computer based training (CBT) tools for examiners of TC2100. The wide range of features included in Captivate by Macromedia score it above the other software evaluated. Most importantly, the interactivity aspect allows for the student utilizing CBT tools to interact with them in a way that other programs cannot. The combination of a slide-based approach with the ability to record movies when necessary is a unique feature that lends itself toward an easy editing process. The ability to produce

quizzes to assess what is actually learned is another facet unique to Captivate that makes it useful for training purposes.

Interview Response Analysis

Interview Feedback

Interviews were conducted to assess the perceived effectiveness of the automated tutorials for IEEE Xplore and ACM that we created, and to acquire opinions of computer-based training vs. classroom training. Analysis of all interview responses was used to make improvements to the tutorials and also to make recommendations to TC2100 for future training.

Table 3 – Interview Responses depicts the main points of the interviews conducted as the first round of feedback for the automated tutorials created for IEEE Xplore and ACM. The table summarizes the received responses, and complete responses are not represented. Table categories are based upon the six main interview questions. The reasons behind this grouping are explained in the Questions Analysis section.

Table 3 – Interview Responses

Category	Response	# Answers	Percentage
Educationally beneficial?	Yes	8	100%
	No	0	0%
Beneficial reference tool?	Yes	5	63%
	No	3	37%
Like more automated tutorials?	Yes	7	88%
	No	1	12%
Suggested for automation	MPEP Insight	3	38%
	EAST	3	38%
	WEST	2	25%
	Other NPL, e-book safari	2	25%
	Classification tools	1	13%
Suggested content to add	Nothing	2	25%
	Search history	3	38%
	Back button	3	38%
	Narrow down, modify a search	3	38%
	Help within database	2	25%
	Conclusions	2	25%
	Help within USPTO	1	13%
	ACM advanced search tips	1	13%
	"Transaction" definition	1	13%
	Illustrate IEEE advanced Search pull-down menu	1	13%
	Clarity	Clear/concise	4
Something was not clear		4	50%
Necessity of more examples	No comment on helpfulness, but suggested something	3	38%
	Helpful	2	25%
	Nice, but not essential	2	25%
	Should be optional	1	13%
	Not needed	0	0%
Additional examples requested	Boolean/search operators	4	50%
	Advanced search	3	38%

Interview Analysis

Interview questions were designed in a way that feedback would be obtained in three categories. Feedback was needed to access and improve the IEEE Xplore and ACM tutorials (Questions 1, 3, 4, and 5), to decide how the tutorials should be implemented at the USPTO (Questions 1 and 2), and to enable us to make valid recommendations regarding future automated examiner training projects (Question 6).

Tutorial Modification Suggestions

Responses pertaining to the content of the IEEE Xplore and ACM tutorials were analyzed to determine how to modify the tutorials. Instruction for obtaining search history was added to the tutorials because a record of this information must be submitted for each patent application examined. Three examiners suggested adding these instructions, including one examiner who revealed he had figured out IEEE Xplore Search History only two weeks before the interview, and he has been an examiner for one and a half years. Since records of search history are such an important aspect of examining, and because this examiner had not been aware of instructions for accessing this information for almost a year and a half, this was the first modification made to the tutorials after interviews were completed.

Instruction for how to use Boolean and search operators for advanced searching was added because this was suggested by seven examiners, a few of whom also stated that they still have trouble with how to use these operators properly. Other improvements made to the tutorials based on examiner suggestions included adding instruction for

finding help within the database and also within the USPTO, and displaying the menu after the end of each module. These were small changes, but will be beneficial to examiners.

Suggestions that did not result in a modification of the tutorials include conclusion modules for IEEE Xplore and ACM and modifying a search. Although two examiners suggested conclusion modules, we did not feel they were necessary. One examiner thought the conclusion module could contain instruction for getting help and obtaining search history. These two topics were added elsewhere in the tutorials. Another examiner thought the conclusion should include a summary of the topics. We felt that the Introduction module covered this information sufficiently.

Three examiners suggested we illustrate how to modify or narrow down a search. This option is available in IEEE Xplore, but not in ACM. This is an important aspect of searching. Although this instruction would be beneficial to examiners, we were limited by time constraints. This instruction should be included in the IEEE Xplore tutorial before it is finalized and becomes available to examiners.

Tutorial Implementation

Questions 1 and 2 were designed to obtain the examiners opinions about the way the tutorials would be best implemented at the USPTO. Examiners were asked if they thought the automated training tutorials were educationally beneficial and if they would be beneficial reference tools for examiners. Every examiner responded that the tools were educationally beneficial. One examiner thought the tutorials were better than brief NPL training he received as part of PEIT. Another advantage of these tutorials is that the step-by-step instructions are accessible on the computer, allowing examiners to perform a

search in a separate window while the tutorial is still visible. Exact responses can be found in the Results section. Overall, examiners thought the tools would be more beneficial for new examiners who were not familiar with the search process because the tutorials are basic and offer step-by-step instructions to illustrate all search options available.

When asked if the tutorials would be beneficial reference tools, responses varied. Personal preference must be taken into consideration when analyzing the results of conflicting responses. Six examiners responded positively to the thought of these tutorials as reference tools. Two negative responses were received. One examiner thought the tutorial moved too slowly to use as a reference and would look elsewhere for the information. On the contrary, another examiner said the tutorials would make a good reference because tutorials are broken down into modules for each type of search and it is easy to find the area of interest in a module with the navigation buttons. Users can forward through the module to the part of interest. One examiner said he would prefer a paper reference. On the contrary, another examiner said, “We have enough paper!” She explained that TC2100 examiners are computer literate and it is easier to pull up an application on the computer, rather than refer to a manual or sift through paperwork. Three examiners thought the tutorials would make beneficial reference tools, but would be used more frequently by newer examiners. Overall, examiners believed the tutorials would be beneficial reference tools.

Future Automated Training Projects

In order to give valid recommendations to TC2100 about future training, we asked for the examiners’ opinions of computer-based training and if they would like to see more

tutorials like the ones for IEEE Xplore and ACM. Seven of eight examiners responded that yes, they would like to see more automated training tutorials. Common reasons for this decision included that the tutorials were more hands on and more interesting than a class. The tutorials allow users to move at their own pace and not be held back or rushed because of others in the class. The tutorials should be available when you need them. One of the eight examiners stated that he would not be interested in seeing more automated tutorials because after reviewing the tutorials, examiners would have questions and need someone to go to for further instruction. Examiners need a resource they can communicate with. For this, we believe the EIC staff would be sufficient, since they provide examiner training already. Eighty-eight percent of examiners interviewed would like to see more automated tutorials.

Examiners were asked which applications should be automated. Three examiners suggested MPEP Insight. The project group created an unrefined automated tutorial for MPEP. Other suggestions included EAST, WEST, other NPL applications, and classification tools. A reasonable suggestion was to run an EAST/WEST class in conjunction with an automated tutorial for the applications and gear the content towards specific art groups to teach people how to refine a search. In this way, examiners will have someone available to ask questions as well as have the tutorial readily available on their desktop for when it is needed. One examiner noted that EAST is covered thoroughly in current training, but WEST is “glossed over”. He would like to see a tutorial for WEST. There is a tutorial for EAST available on the Patent Examiner’s Toolkit, but it does not contain audio narration. These ideas have been taken into consideration to make recommendations to TC2100 for future training.

Question Analysis

Examiners interpreted four of six interview questions as intended. However, while reviewing responses, we realized that question number 3 (Do you think additional examples would be significantly beneficial? If so, which feature or function of the tool do you think would have been better illustrated by an example?) and question number 5 (Do you think additional examples would be significantly beneficial? If so, which feature or function of the tool do you think would have been better illustrated by an example?) produced similar responses. These two questions could have been worded differently to avoid being interpreted in two different ways. One way examiners responded was by suggesting that content which was already included in the tutorials be expanded upon, or that more examples of this content be included. The other way examiners responded was by suggesting we add content that was not previously included in the tutorials. Responses overlapped between these two questions, and various answers were received. For this reason, it was difficult to classify responses according to question number. To correct this problem, responses are conveyed by category in the Interview Response section, instead of by question number.

Survey Analysis

Based upon Question Response and Validity Analysis a logical process may begin to determine which responses may most accurately correlate to the goals of this IQP. The validity and response of every question included in the survey was discussed in detail.

Survey Validity

Validity of the survey was one of the primary concerns during survey question formulation and presentation. Validity threats were taken into account when analyzing results to maximize the relevance of data. The content and display of each question was discussed in detail. The fact that nine participants took this survey affected the validity of the trends developed from these responses.

The purpose of Question 1, “Have you used a Computer-Based Training Tool before?” was included in the survey to determine whether the participants had any biases toward Computer-Based Training Tools. Questions 1.a, 1.b, and 1.c followed Question 1 in a similar method of reasoning. The presentation on December 9, 2005 was a brief demonstration of the capabilities of the Advanced Search Module of the ACM database, and the Introduction and Advanced Search Option 2 Modules of the IEEE Xplore database. Originally the project team did not know whether time would be available for students to review all the training tools at the time the survey was finalized, and did not want a limited demonstration to alter the analysis of survey questions. If participants responded positively to this question, it would further validate their responses to other open-ended questions on the survey that discuss improvements to Computer-Based Training Tools, such as Questions 7 and 8. Question 1 and its follow-up questions 1.a, 1.b, and 1.c were necessary to ensure the validity of survey results.

The purpose of Question 2, “Have you had prior experience with search engines?” like the purpose of Question 1, was to act as an overall validity check for the survey and focus group session. This question and follow-up Question 2.a determined whether participants had any biases toward search engines, specifically the IEEE Xplore and

ACM databases. If participants had prior experience with the IEEE Xplore and ACM databases, this would further validate their responses on questions that discuss the tool improvement, such as Question 8. It was important to know if participants have had experience with the general concept of search engines. While the IEEE Xplore and ACM database tutorials that the project team created were comprehensive and discuss the aspects of each database relevant to patent examiners, they also assumed that the user possessed a general knowledge of database searches. Questions 2 and 2.a were included to ensure the validity of participant responses.

The purpose of Question 3, “Do you think the IEEE Xplore and ACM tutorials provided you with enough information to use each database, at least at a basic level?” posed certain risks to validity, in that the term “basic level” was not clearly defined. To one participant the term, “basic level” may have meant a brief introduction to each database. To another participant the term, “basic level” may have meant to include each search option of each database. The term “basic level” was the interpretation of the participant. Since a training class was randomly selected and prior skills of each examiner unknown, the project group felt that the self-interpretation of “basic level” by each participant was allowable, and would be clarified in other open ended question responses.

Question 4, “Do the IEEE Xplore and ACM tutorials provide enough training such that a class is not necessary for these topics?” appeared to be a straightforward question that could either have a “yes” or “no” answer. This was an exact question that the team was interested in. This question was meant to prime the participants’ minds for focus group discussion questions. It did not allow for any response in between “yes” and “no”, such as “these tools would allow a condensed class”. This was taken into account,

and to base conclusions on the responses to this question, other responses were incorporated to corroborate its validity, such as Questions 5 and 8 and focus group discussion.

Question 5, “When learning how to search with IEEE Xplore and ACM, would you prefer classroom training or CBT?” was a follow-up question to Question 4. This question limited itself to the IEEE Xplore and ACM databases, and was a question that the project team was directly interested in. The answers supplied to this question posed similar validity threats as Question 4. This question did not allow for any response besides “yes or “no”. The combined responses of Questions 4 and 5 helped validate the responses of both questions. Question 5 was used to introduce topics for students to be aware of and was further addressed during focus groups.

The purpose of Question 6, “Do you think that these tutorials would be useful as reference tools?” had similar validity threats as Question 3. The project team was not sure that the term, “reference tools” would be understood to mean “reference tools when unsure how to use a certain aspect of the database during a prior art search”. The focus group allayed this notion, since most participants understood the implied meaning. Another minor validity threat was the change of terms from “Computer-Based Training Tools”, which was used until Question 5, to “tutorials” in Question 6. This term change may have affected validity.

Question 7, “Would you consider using automated tutorials to learn other aspects of training?” and its follow-up questions were used to determine future recommendations for Computer-Based Training Tools in TC2100. Validity may have been threatened on this branching question because participants may not have understood the implied

meaning of the word “training”. If a participant chose “no” for this question, the computer-based survey would not have branched to questions 7.a or 7.b. These questions asked specifically about commonly and uncommonly used forms. The focus group was crucial in ensuring the validity of Question 7 responses.

Question 8, “Are there any other considerations or concerns about the automated tools that you would like to mention?” is the final question of the survey. It was meant to be an open-ended question that would lend insight into other survey responses. This question validated responses to the potentially ambiguous questions, such as Questions 3, 4, and 5.

Survey Responses

Survey responses were simple yes/no answers, and were supported by open-ended questions. Trends in responses were noted, and the confidence of each trend was discussed. Nine examiners participated in this survey, so trends were not noted from the survey unless they were absolutely unanimous, or corroborated with data from other methods.

Seven out of nine participants answered “yes” to Question 1. Of these seven, five answered “yes” to Question 1.b and two answered “no” to Question 1.b. Question 1.b asked “Did this Computer-Based Training Tool have audio narration?”. All seven also answered “Positive” to Question 1.c. This question asked, “Overall was it [Computer-Based Training] a positive or negative experience?” These results illustrated that Computer-Based Training Tools were known training aspects and that the participants’ may be receptive to these tools if presented with them in the future. The factor of audio narration had a limited impact upon this positive experience when information is

presented clearly. The one participant who had not used Computer-Based Training Tools represented the potential opinions of this demographic on the remaining survey results.

All nine participants answered, “Yes” to Question 2. Six of these participants said that they had used IEEE Xplore or ACM before. These results showed that the material presented is relevant to the audience and that the participants represented a computer-literate demographic. Since more than half of the participants have used IEEE Xplore and ACM databases, the “training tool improvement” responses of these members on Question 8 were more relevant than other participants.

Nine participants answered “yes” to Question 3. These responses, combined with other research methods, helped to provide a solid trend that the Computer-Based Training Tools were relevant means of instruction. These responses helped support the opinions of Questions 4 and 5. The responses to this question did not necessarily prove that the Computer-Based Training Tools were feasible as a course on their own. It also did not determine an absolute conclusion on whether it will replace a class.

Eight out of nine participants answered “yes” to Question 4. One out of nine answered “no” to this question. A majority felt that a class would not be necessary, but this question’s validity concerns meant that these responses may be inaccurate. Questions 5, 7, and 8 validated the responses to Question 4, however. Since one participant thought that a class was necessary to teach the content of IEEE Xplore and ACM databases, conclusions could not be made about this topic from this question’s responses alone. These responses illustrated that Computer-Based Training Tools may replace a class on the specific content of each database, but did not address the manner in which this content might be presented.

Question 5 received nine “Computer-Based Training” responses. This may mean that students preferred enough of the positive aspects of Computer-Based Training to decide that this would be superior to classroom training. Some of these aspects may have included the ability to choose which lessons to learn based upon student need, the ability to rewind or fast-forward each presentation, or the ability to review these tools from any location. Classroom training lacked these qualities, but it did have several characteristics that were beneficial in certain situations. Students may have felt that the content presented for IEEE Xplore and ACM databases was too simple to require a class with a professor who had the ability to answer questions. These responses were determined through follow-up questions during the focus group discussion.

Eight out of nine participants answered “yes” to Question 6. One out of eight answered “no” to this question. It was important to note that this participant has not had prior experience with Computer-Based Training, and also answered “no” to Question 4. This participant may have had predispositions against automated training, since the presentation of these tools was abridged. They may not have received a full understanding of automated training. Although a majority of participants felt that automated tools would be a valuable reference, the one participant who felt that these tools would not allow an absolute conclusion to be made on this matter from this question alone. Responses to Question 8 and during the focus group discussion corroborated responses to this question.

Question 7 and follow up questions 7.a and 7.b focused upon new aspects of training to automate. Eight out of nine participants felt that automated training would be beneficial for other aspects of training. Of those eight, six felt that training on commonly

used forms would benefit from automation. All eight agreed that training on uncommonly used forms would benefit from automation. Due to lack of unanimity on question 7.a, it was not possible to conclude whether to automate training on commonly used forms. However, due to the unanimity of responses to question 7.b , it was possible to consider automation of uncommon forms. These results were further confirmed and clarified during the focus group discussion.

Question 8 was an open ended question that asked for additional concerns, and acted to corroborate many of the other questions in this survey. Three of the eight responses to this question were comments of encouragement and praise for creating automated tools for the IEEE Xplore and ACM databases. Three of these responses were neutral comments, either left blank or “nope” to indicate that participants had any outstanding concerns with the automated tutorials. These may be translated into positive comments, for a total of five out of eight participants with no negative concerns. Two responses to this question concerned the improvement of these tools, which was welcomed for future additions or modifications. One participant responded that they would rather have a print-out on how to use each database, instead of an automated tutorial. However, this person also felt that automated training tools would be useful as a reference. As a counter argument, automated tools would save office space, copy paper, and the time it would take to look for these tutorials. All of the responses for Question 8 helped to verify responses from Question 3, Question 4, Question 5, and Question 6. In general, participants felt that classroom training moved too slowly and that automated training tools that were demonstrated would save training time.

Focus Group Analysis

Focus group analysis discusses the potential validity threats of the focus group and group consensus responses. A logical analysis determines the degree to which the data may be used to make recommendations and conclusions for the USPTO on the topic of automated training. The focus group was offered in conjunction with the survey as a means to clarify survey responses.

Focus Group Validity

Validity of the focus group was one of the primary concerns during question formulation. Validity threats were taken into account when analyzing results to maximize the relevance of data. The focus group followed the survey on December 9, 2005 and these means of data collection acted to validate each other. The focus group questions were designed to allow participants to further clarify their responses to survey questions. Due to the limited number of participants, direct conclusions were not be made from the focus group alone.

The survey and focus group were conducted after the automated training tools were demonstrated to the entire group of participants. The presentation of materials did not necessarily give the participants a complete understanding of each tool, and this may have affected this method's validity. The focus group was also conducted under a time constraint, since the demonstration had run beyond the allotted time. Each question was asked briefly and only a few responses were taken before moving on to the next question. We did not move on to the next question until we felt that everyone's opinion had been expressed however, and felt that the validity of the focus group was maintained. A tape

recorder was not available to record responses for analysis later, so two members of the project team took notes while one asked questions and led the discussion. This was done to ensure that responses were recorded in proper context.

Focus Group Responses

The purpose of the focus group was to receive information on how to improve aspects of automated training, as well as determine the viability of automated training instead of classroom training. Focus group responses were broken down into four categories. Each category was based upon the issues that received a general consensus from participants of the focus group. These categories were educational benefits, tool distribution, course content, and future automated training projects.

Educational benefits

The participants of the focus group agreed that the automated training tools were a beneficial form of training, for both new and experienced examiners. The focus group emphasized that new examiners would benefit more than experienced examiners who would already have training in the course material. New examiners could use these tools for their initial training on Non-Patent Literature, and experienced examiners could use these tools as a reference. In this respect, the feedback was positive and encouraged the use of Computer-Based Training Tools in as many aspects of examiner training that were viable.

Tutorial Distribution

Examiners noted that the automated training tools that we created might be optimally delivered throughout the department, either within the Patent Examiner's Toolkit located

on each examiner's desktop or on a server that the entire department could access. These methods of delivery were both viable, yet subtly distinct.

In the case of placing these tools in the Patent Examiner's Toolkit, the tools would be available to everyone within the department and stored locally on each office computer. Training tools for programs such as OACS and eDAN were already stored in this way. There was enough space on each computer to accommodate these tools, however, distributing the tools would require that basic computer configurations were altered specifically for the examiners in TC2100. This process could waste examiners' time during every installation and update of new tools.

To place these tools on a department server would require file space and additional maintenance. TC2100 was in the process of acquiring a server expressly for training, although figures on available file space were not available at the time of the publication of this report. An employee would be assigned to update and maintain files on this server, which may divert time away from patent examination or reduce productivity.

Course Content

Examiners agreed that training time could be reduced with the automated tools that were created. Some examiners even suggested removing the NPL class entirely, reasoning that these tools were sufficiently educational. The minimum consensus of the focus group, however, was that training time could ultimately be reduced. A class took more time out of the examiner's workday than an automated training tool. A class also cost more money in this respect, since examiners were paid for training time. A well-composed automated

training curriculum could cover most of the concepts that examiners required to search each database, but a few participants brought up alternatives to these two extremes.

Two individuals suggested that automated tools form the basis of a class on Non-Patent Literature. The purpose of the classroom experience would be to train examiners the strengths and weaknesses of the content in each database as it relates to their prior art search. The tools may be used on the examiner's own time or as reference outside of class to learn how to search each database. It would be difficult to design an automated training tool that can accurately and completely teach these informal aspects of the prior art search. For this aspect of training a teacher would be necessary. This class would also combine other Non-Patent Literature classes into one condensed class, and streamline this aspect of the training process. Ultimately such a class would be ideal, and this feedback was one of the most specifically beneficial solutions.

Future Automated Training Projects

One examiner suggested that tools should be created to instruct examiners throughout the USPTO how to conduct basic office tasks, such as "how to fill out time sheets". Many other members of the focus group agreed with this individual. For a task like this, a new examiner would have to spend time to figure out how to fill out this time card properly, or ask another examiner for help. This could potentially lead to incorrectly completed forms and waste additional time.

Although this did not relate specifically to TC2100, this response was relevant to the goals of this project. Examiners' feedback helped address other aspects of training that we may not have covered during brainstorming. We had not considered this particular aspect of patent office employee training. One of the goals of this IQP was to

determine specific tasks to streamline with automated training. The feasibility of automating this task was high. It was highly formalized, and computer oriented, which made it ideal for recording screen captures. Any additional research by the USPTO into these forms of training would be highly recommended.

Cost Analysis

The project team conducted an analysis of the amount of money that the USPTO spends on an average training class, per year. The team chose to use a two-hour class model in this analysis because a two hour class on IEEE Xplore, ACM, and Citeseer databases will be used as part of the SEED program. The content and presentation of the material presented in this class is very similar to the material presented in the IEEE Xplore and ACM Computer Based Training. The computer based training may be compared, more accurately than any other class, to this two hour classroom training course. Two other scenarios were modeled in Table 4 - Cost Analysis. The second scenario was a one-hour class that incorporated automated training. This class modeled the potential time-saving benefits of reducing the overall time of the IEEE Xplore, ACM, and Citeseer databases class. The third scenario was one-hour of self-guided learning time, without instructor, that incorporated a well-designed automated training tool.

The figures presented in Table 4 - Cost Analysis were derived from information attained from Gail Hayes and Anne Hendrickson. The information received was:

- There are 16 students per class
- The length of the IEEE, ACM, and CiteSeer NPL class is 2 hours
- Approximately 256 new hires that will require training this year

- The average Grade 7 new hire salary is \$54,207 per year
- The average instructor wage is \$40 per hour

The student wage, the average instructor wage, the number of classes offered per year, class cost, and cost reduction were computed from this raw data. To compute the student hourly wage, divide the Grade 7 new hire salary by the average number of work-hours per week (40) and the number of weeks per year (52). By these calculations, the average student wage was approximately \$26 per hour. To compute the number of classes per year, divide the number of new hires by the number of students per class. The number of classes per year was 16 by this math.

Table 4 - Cost Analysis

Class Type	Student Wage	Students /Class	Instructor Wage	Class Length(hrs)	Classes /Yr	Class Cost	Cost Reduction
2 Hour Class	\$26	16	\$40	2	16	\$14592	\$0
1 Hour Class	\$26	16	\$40	1	16	\$7296	\$7296
1 Hour Self	\$26	16	N/A	1	16	\$6656	\$7936

Using these figures, the team was able to discern the approximate cost of a 2 hour class with an instructor, a one hour class with an instructor and automated tutorials, and one hour of automated training. These costs were determined by multiplying the student hourly wage by the number of students per class and adding the instructor wage to get the cost per one hour class. The cost of a one hour class was then multiplied by the number of hours of a class (1 or 2) and multiplied by the number of classes per year. This became the class cost per year. The cost reduction statistics of Table 4 - Cost Analysis were determined by subtracting the class costs from the 2 hour class cost. This was the amount of money per year that the USPTO would save under each scenario, compared to the two hour class scenario.

Recommendations

Recommendations were based on the results of our research, mainly from analysis of examiners' responses to interview, survey, and focus group discussion questions.

Implementation of IEEE Xplore and ACM Tutorials

The SEED program's 2 hour NPL class should be modified and a more efficient training program that incorporates automated training tools should be implemented. After analyzing examiner feedback and conducting a Cost Analysis, we recommend an NPL training plan that combines the IEEE Xplore and ACM automated training tools with instructor training into a one hour NPL class. The recommended NPL training plan is financially beneficial to TC2100. The amount of time and money that may be saved is outlined in the Cost Analysis. Although the greater efficiency of the tutorials is an advantage for TC2100, the three main reasons for this recommendation are that the examiners of TC2100 are technologically inclined, automated training allows classes to focus on more abstract topics, and examiners responded positively to the automated tools.

Thirty percent of examiners currently working in TC2100 are recent college graduates. This amount is likely to increase with the hiring planned through fiscal year 2008. This generation of examiners is likely to be competent searching databases similar to IEEE Xplore and ACM. One hundred percent of examiners that participated in the focus group and survey were familiar with search engines, and could navigate them effectively. Automated training allows these examiners to skip sections that they feel are too basic for their current search knowledge. This type of examiner would not become bored using the automated tools we created because they would be able to choose the

speed at which they work and jump ahead to sections where instruction is needed.

Furthermore, if their attention is still captivated, they may focus more clearly on later concepts taught during the class.

Analysis has shown that examiners do not require basic search instruction as much as they require assistance relating examining to searching. Responses to interview questions revealed that examiners require more assistance in choosing the best keywords to search, and how to modify a search to obtain the best results. Examiners also require assistance with advanced search options and with search operators. As thorough as an automated training program may be, it cannot completely answer all variations of student questions. Automated training is best suited to replace the basic search instruction, which allows the instructor to focus on more abstract search topics.

The overall response from examiners was that they would prefer the automated tutorials to a class, and that the tools were sufficient for teaching basic search instructions. Examiners believe they are educationally beneficial, easy to navigate, and thoroughly present information in a clear and concise manner. The PowerPoint presentation created by Anne Hendrickson for the 2 hour NPL class as part of the SEED program was the basis for the content of the IEEE Xplore and ACM tutorials. All of the content related to searching with IEEE Xplore and ACM from the planned NPL class was included in the automated tutorials, making the tutorials a thorough and valid tool for teaching basic search instruction.

One-Hour NPL Class/Tutorial Combination

From this reasoning, we recommend the best way to incorporate the tutorials into the SEED program is to run a one-hour NPL class in conjunction with the automated training

tools. The IEEE Xplore and ACM tutorials explain NPL searching procedures in detail, which may be more useful for the approximately seventy percent of TC2100 examiners who are not recent college graduates familiar with searching techniques. The tutorials contain detailed instruction for the different search options available and search operators. However, the tutorials do not tailor to the needs of specific art groups. The focus of the classroom curriculum should be on teaching how to identify key terms to search. Instructions for refining a search should be included. To do this, it would be best to run classes for examiners of the same or similar art group. In addition, a handout that explains the uses of each database would assist examiners in choosing one NPL database over another, depending on the search topic. This recommended training curriculum will be less costly for TC2100 since the classroom time is halved, in comparison to the two-hour NPL class originally planned. Examiners may be able to use this extra hour performing production tasks.

Availability to All Examiners

The tutorials should be available to all examiners so they can additionally serve as reference tools. The aspect of the tutorials that we expect to be used most frequently for reference is the instruction module covering Boolean, proximity, and other search operators and syntax. Half of the interviewed examiners requested additional examples with these operators. To address these needs, a module was added to the IEEE Xplore tutorial to explain these operators in greater detail with audio narration and examples. Feedback from examiners also revealed that searching NPL is not conducted as often as searching with EAST and WEST. Those who search NPL infrequently will be able to refer to the IEEE Xplore and ACM tutorials when the need to search NPL arises and

instruction is needed in this area. This will be especially helpful if the work-from-home program begins. Eighty-nine percent of examiners surveyed responded that if the IEEE Xplore and ACM tutorials were available, that an NPL class would be unnecessary. For this reason, we believe that if the tutorials are available to all examiners, those who have not yet attended NPL training will be able to review these tutorials independently for search instruction. There are no educational disadvantages to making the tutorials available to all examiners.

Finalizing the Tutorials

Before the IEEE Xplore and ACM tutorials are made available to examiners, final modifications should be made. Additional instruction for modifying and narrowing down a search should be included. Specific examples for the different art groups may be useful.

TC2100 must decide how to make the tutorials available to examiners. The project team set up a web server housing all tutorials and the survey, making them accessible not only to the examiners, but also to the public. The patent office has two options as to how they would make these tools available to their employees. The first option is through a web-server, with a similar setup as they are now, except within a USPTO web or intranet server. The other option is to publish and install the files as executables on each computer and make them accessible through the Patent Examiner's Toolkit. Both of these methods have benefits and drawbacks. To make the files accessible over the intranet or a web-server, the USPTO would have to allow TC2100 the web-space required to house all of these files. Similarly, making the files accessible through the Patent Examiner's Toolkit may require an install for each examiner's machine. This may be a time consuming task, however, network services may have an accelerated

means to mass install applications on every computer automatically, significantly reducing the time that this process would require. Making the tools available in this fashion would not take up web-space for TC2100, allowing more space for other purposes.

Complete MPEP Insight Training Tutorial

MPEP Insight is one of examiners' most used programs. The tutorial created for MPEP Insight has been completed through the recording and initial editing phases. Our recommendation is to complete the editing and publishing phases for this tutorial. The aspects in the editing phase that are still in need of completion are the addition of audio narration and the editing of the timing within the demonstration. Caption and highlight box insertion was completed. We were unable to record audio narration, and thus were unable to set the timing of the appearances of these captions and highlight boxes so that they match recorded audio. Once these steps are completed, and additional content is added and edited as required to the specifications of the EIC, the MPEP Insight Training tutorial is ready for publishing. In the publishing stages, the user needs to set the output to Flash for each module. Another feature needs to be set that will bring the student back to the menu page when each module finishes. The menu page can be created through Captivate MenuBuilder or it can be built through basic HTML links.

Future Training and Projects

The positive response received from examiners of TC2100 encouraged this recommendation for the increased use of computer-based automated training tools in future examiner training. The examiners who participated in the interviews, survey, and

focus group were all recent college graduates. This generation of examiners, as described by TC2100 Director Peter Wong, is competent with computers and new technology, and as our data concludes, they respond well to computer-based training. Overall, these examiners prefer computer-based training to classroom training. They are comfortable with computer applications. Computer-based tools such as the ones we created allow students to learn at their own pace. In addition, these tools are better than a class in the way that they double as reference material. With the massive hiring planned through fiscal year 2008, the number of “new generation” examiners is only going to increase. We suspect that computer-based training will be an adequate training tool for these examiners, and will save time and money for TC2100.

If the IEEE Xplore and ACM tutorials live up to our expectations of adequate and efficient training and reference tools, then TC2100 should delegate resources to creating further computer-based training projects in the same way as these tutorials were designed. The tools should be assessed after they are implemented to determine any changes or improvements that can be made, both in the IEEE Xplore and ACM tutorials, and in future projects. When using Macromedia Captivate to create future projects, the quizzing feature is a valuable training option available. Other programs that should be considered for future computer-based automation projects include EAST and WEST, as suggested by examiners, and of course finishing and implementing the MPEP Insight tutorial. These projects should be further researched by TC2100 staff, as well as other programs and applications used by examiners.

This type of computer-based training should not just be considered by TC2100, but by the other TC’s of the USPTO. Many of the other TC’s are hiring “new generation”

examiners straight from college. These TC's may want to consider creating tutorials for their most widely used search databases, similar to the IEEE Xplore and ACM search tutorials created for TC2100. The USPTO currently owns five user licenses for Macromedia Captivate, which can be used by staff in any TC to create tutorials similar to the ones we created. More licenses can be purchased if needed. In addition, these various projects may be grounds for future IQP's.

Conclusions

The overall positive feedback we have received regarding the automated training tools we created makes us believe that our project is a success! The five objectives to solving our problem statement have been completed. We have effectively created automated training tools for patent examiners of TC2100. Examiners believe that the tutorials will be beneficial training tools as part of the new SEED training program, in addition to serving as reference tools for examiners at any level. We are proud of the IEEE Xplore and ACM tutorials and pleased with the examiners' positive response to them.

The IEEE Xplore and ACM tutorials will be beneficial to TC2100. The tutorials are useful for all examiners as initial NPL training, and as reference tools thereafter. The recommended one-hour class in conjunction with the IEEE Xplore and ACM tutorials will prove efficient for TC2100 because higher productivity levels will be achieved while reducing costs. Implementing the tutorials as recommended will result in an accelerated NPL training program. This will reduce training time of new examiners, while upholding the quality of training. The accelerated training will allow TC2100 to redirect funds from training hours to production hours. A more productive department will result in a decrease in patent application backlog that lead to global social impact.

Efficient Training Method

If implemented as recommended, the IEEE Xplore and ACM tutorials we produced will allow TC2100 to reduce the cost of NPL training for new examiners by decreasing the training time by half of the originally planned time. By reducing training time by one hour, the estimated savings of NPL training for new examiners during the 2006 fiscal

year is \$7,296, as shown by the Cost Analysis. As of December 14, 2005, the estimated number of new examiners partaking in this training is 256. So, TC2100 will potentially cut back 256 training hours, allowing for 256 additional production hours. Higher production levels will decrease patent application backlog, lead to greater profitability, and will increase the efficiency of TC2100. These tools allow TC2100 to decrease the time and cost of NPL training, and increase productivity.

Maintain Quality of Training

The quality of NPL training is maintained in the IEEE Xplore and ACM tutorials created with this IQP. The content of the computer-based tutorials is based on the PowerPoint slides for the NPL class planned for January 2006. This class will cover IEEE Xplore, ACM, and CiteSeer. All information regarding IEEE Xplore and ACM from these slides was included in the tutorials. In addition, the instructor notes shown below each slide within the PowerPoint presentation were also taken into consideration during the creation of the tutorials. Audio narration replaces an instructor's presentation of the material. The tutorials cover the same information as the class was designed to cover and more, such as instructions for using search operators and how to obtain the search session history.

A concern of computer-based training tools is that they lack the ability to answer students' specific questions. The solution to this is easy. If a 1 hour NPL class is run in conjunction with the tutorials as recommended, students' questions can be answered by the instructor. However, if the USPTO decides to implement a 1 hour self-guided session for learning to search these NPL databases, answers to students' questions can be found by contacting a SPE, another examiner, or the EIC staff. Each module menu provides a link to the EIC homepage where examiners can find the assistance they need.

The automated tools allow each examiner to move at their own pace. For searching instructions, these tutorials are more useful than a class because a window with the tutorial can be open on the desktop while a second window for actual searching is open. In this way, an examiner can perform a search while the corresponding instructions are explained in an adjacent window. In a class, examiners would not be performing an actual search for a patent application they were examining.

Effective Reference Tools

An additional benefit of the IEEE Xplore and ACM tutorials is that they can be made permanently available to all examiners, in order to serve as reference material at any time. Eighty one percent of the examiners interviewed and surveyed replied they would prefer these tools as a reference over a paper version. The tutorials are laid out to make them easy for an examiner to navigate. This allows examiners to find the topic of NPL searching where instruction is needed. We believe the Search Operators & Syntax module in the IEEE Xplore tutorial will be frequently referred to for help with Boolean, Proximity, and other search operators. This is evident because 50% of the examiners interviewed revealed that they were not comfortable with use of these operators, and requested additional examples of these operators.

Social Impact

The fields of Computer Architecture, Software and Information Security have grown increasingly entwined with the American way of life and the global economy. These fields change at a rapid pace due to the dynamic nature of their subject matter and the high public demand for newer and better software security and processors. TC2100 will

hire 256 new examiners in 2006, 200 to 250 in 2007, and 200 to 250 in 2008 in an effort to process more applications in these fields per year and keep up with their developments. This hiring reflects the public demand for intellectual property protection of computer technology.

The automated training tools of this project, created expressly for these examiners, have provided a model for automated training at the USPTO. This automated training saves both patent examiner time and agency money. The benefits of automated training are outlined monetarily through Cost Analysis. This analysis has revealed that reduced training time will reduce the monetary cost of some training by half, or more. This money may be appropriated elsewhere throughout the USPTO to further improve efficiency. Examiners may also use this time and energy to efficiently review more applications, in turn ensuring that intellectual property is protected more rapidly, and the pursuit of knowledge encouraged across the globe.

One of the primary goals of the USPTO is to provide economic incentive for ingenuity in the fields of science and technology. The protection of these rights is critical for the stability of the global economy. New inventions and ideas may develop more quickly if advances in these fields are protected faster and thus economically viable sooner. These ideas or inventions may then be improved upon by new inventors who are enticed by economic incentives. This mode of thought ultimately benefits society at large, because it encourages the pursuit of new knowledge and ideas. These ideas and knowledge may be shared with the rest of society and are what fuels the global economy. Increasing the efficiency of patent examiner training ultimately improves the quality of life for all.

Appendix A – USPTO Mission

The purpose of the United States Patent and Trademark Office (USPTO) is to provide a set of laws and regulations that protect an individual's intellectual property as reward for providing new and ingenious ideas or inventions to society. This exclusive right to an idea or invention is called a patent. The United States Patent and Trademark Office is the definitive authority on what is patentable in the United States, and determine the rights associated with a patent of an idea or invention. The United States Patent and Trademark Office humbly began as a clause in The United States Constitution in 1790, and has grown from a three-person council to a modern, centralized complex of over 7000 employees.

Appendix B – Interview Questions

1. Was this tutorial educationally beneficial? If so, how?
2. Do you feel that this tutorial would be a beneficial reference tool?
3. Is any important information missing from the tutorials?
4. Is there any information that is not presented clearly? How can we clarify the presentation?
5. Do you think additional examples would be significantly beneficial? If so, which feature or function of the tool do you think would have been better illustrated by an example?
6. Would you like to see more applications taught in this manner in the future? If so do you have any suggestions?

Are there any general considerations or concerns that you would like to mention?

Appendix C – Survey Questionnaire

Survey Questionnaire – IEEE Xplore and ACM Tutorials 12/9/05

1. Have you used a Computer-based Training Tool before? (Yes / No)
 - a. If so, what tool did you use and how did you use it?

 - b. Did this Computer-based Training Tool have audio narration? (Yes / No)
 - c. Overall, was it a positive or negative experience? (Positive / Negative)
2. Have you had prior experience with search engines? (Yes / No)
 - a. If so, which search engines have you used?

3. Do you think the IEEE Xplore and ACM tutorials provided you with enough information to use each database, at least at a basic level? (Yes / No)
4. Do the IEEE Xplore and ACM tutorials provide enough training such that a class is not necessary for these topics? (Yes / No)
5. When learning how to search with IEEE Xplore (Classroom / Computer-based) and ACM, would you prefer classroom training or computer-based tutorials?
6. Do you think that these tutorials would be useful as reference tools? (Yes / No)
7. Would you consider using automated tutorials to learn other aspects of training? (Yes / No)
 - a. Do you think that Computer-based Training would have been useful for learning how to complete forms, such as #892 and #1449? (Yes / No)
 - b. Do you think that Computer-based Training would have been useful to learn how to complete other forms that are used less often, such as PCT? (Yes / No)
8. Are there any other considerations or concerns about the automated tools that you would like to mention?

Appendix D – Focus Group Discussion Questions/Comments

Now we would like to lead a discussion to discover some of your opinions of our automated training tutorials.

Does anyone think that the information provided in these two tutorials is **not** enough for you to be able to comfortably search NPL using IEEE and ACM?

What should be changed, added, etc? What was missing? How can we improve the tools?

Does anyone think that if you had access to these tutorials, a class on searching NPL **would** still be needed? Why?

What do you need to get from the class? Is there another way to get this help, i.e. EIC staff?

Or would you **prefer** a class?

There are aspects of classroom training that are not covered by computer-based training tools. You do not have a teacher to ask questions or explain things you do not understand. Do you think this will be a problem if a class for NPL was cut and new examiners had access to these tutorials instead?

(Keep in mind there is EIC staff and teachers from other classes).

Are there other concerns you have about cutting classroom training and replacing it with this type of CBT? For NPL? For other aspects of training?

If these tutorials were available on your computer, do you think that they **would** or would **not** be used as a reference, when someone needed to search NPL?

Also, do you think they would be used only by new examiners or also by more experienced examiners who do not search NPL often and need a quick refresher?

Do you have any other questions/comments?

Appendix E – Computer-Based Training Modules

Computer Based Training Homepage*

IEEE Xplore Database Modules

- Module 1 – Introduction
- Module 2 – Finding & Viewing a Journal Article
- Module 3 – Finding & Viewing a Conference Proceeding
- Module 4 – Finding an IEEE Standard
- Module 5 – Performing an Author Search
- Module 6 – Performing a Basic Search
- Module 7 – Performing an Advanced Search – Option 1
- Module 8 – Performing an Advanced Search – Option 2
- Module 9 – Search Operators & Syntax

ACM Database Modules

- Module 1 – Introduction
- Module 2 – Finding & Viewing a Journal Article
- Module 3 – Finding & Viewing a Magazine
- Module 4 – Finding a Transaction
- Module 5 – Finding & Viewing a Conference Proceeding
- Module 6 – Finding an Author
- Module 7 – Conducting a Basic Search
- Module 8 – Conducting an Advanced Search

*These links may or may not work, as they are hosted on a student’s web space, and are subject to change. To view the webpage layout, refer to Figure 7 - CBT Webpage, Figure 8 - IEEE Xplore Tutorials Menu, and Figure 9 - ACM Tutorials Menu.

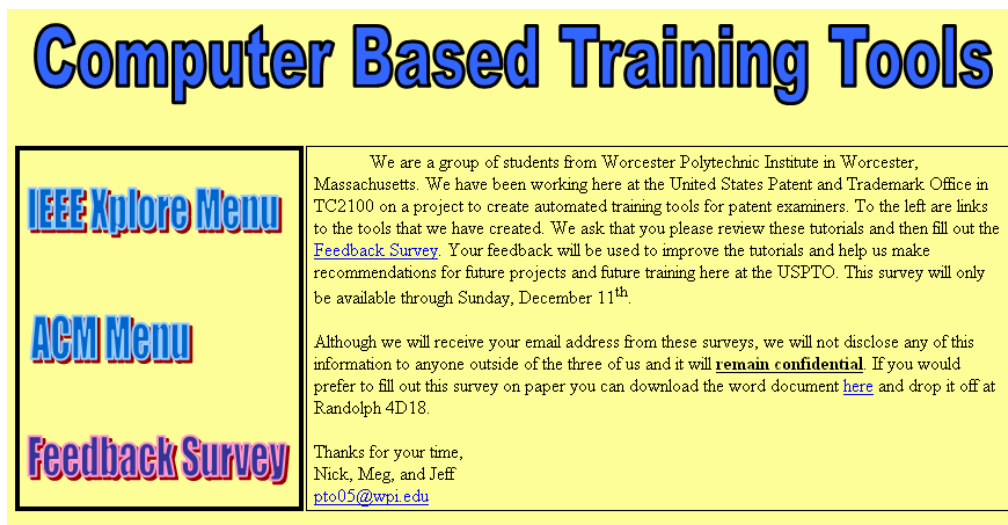


Figure 7 - CBT Webpage

IEEE Xplore Database

[Module 1 - Introduction](#)

[Module 2 - Finding & Viewing a Journal Article](#)

[Module 3 - Finding & Viewing a Conference Proceeding](#)

[Module 4 - Finding an IEEE Standard](#)

[Module 5 - Performing an Author Search](#)

[Module 6 - Performing a Basic Search](#)

[Module 7 - Performing an Advanced Search - Option 1](#)

[Module 8 - Performing an Advanced Search - Option 2](#)

[Module 9 - Search Operators & Syntax](#)

Contact the [TC2100 EIC](#) for additional training or assistance.

[Menu Home](#)

Figure 8 - IEEE Xplore Tutorials Menu

ACM Database

[Module 1 - The Introduction](#)

[Module 2 - Finding & Viewing a Journal Article](#)

[Module 3 - Finding & Viewing a Magazine](#)

[Module 4 - Finding a Transaction](#)

[Module 5 - Finding & Viewing a Conference Proceeding](#)

[Module 6 - Finding an Author](#)

[Module 7 - Conducting a Basic Search](#)

[Module 8 - Conducting an Advanced Search](#)

Contact the [TC2100 EIC](#) for additional training or assistance.

[Menu Home](#)

Figure 9 - ACM Tutorials Menu

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