

"Uncovering Emerging Information Trends in Information Technology: An Industry Survey"

Eric M. Pastore

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Abstract

Given the importance of information technology and software in every area of modern life, this Capstone Project will identify and address one unknown issue, which may be either a technical or human factors issue, discovered through field research that is facing professionals in this sphere. The primary field work will involve interviews with 8-15 software engineers in diverse fields and the design of training and/or documentation to address one of the issues discovered. This project will result in a tangible solution to a key issue discovered in the analysis phase that will take the form of a training plan for either IT workers or end users, or a technical document template.

Capstone Project Consultant: Mark Seymour

Problem Background

Modern IT professionals and users face a range of opportunities and challenges arising from advancing technology such as open source software, platforms, and innovation. The most difficult problems, however, are those involving human interactions with technology. Cybersecurity, usability, and technology adoption rank among the most difficult challenges faced by the IT industry. Discovering and overcoming these various challenges will result in a more robust IT industry, and a more skilled and savvy user base.

The industry opinion on open-source software and its developers is polarized. Some industry experts believe that open source is a waste of time and is unprofitable. Others say that open-source is better and cheaper overall than proprietary software that uses a predatory strategy to exploit copyright law (Kologlugil 2012). A more balanced view suggests that the costs and benefits of open-source software are case-specific requiring a Total Cost of Ownership (TCO) analysis (Samuelson 2012).

Cost aside, open source projects contribute to innovation which is another important trend. Developers are always looking for ways to develop new software with fewer bugs and for less cost. A more competitive environment requires developers to innovate at a much faster pace. This has resulted in the use of more diverse metrics to measure and drive innovation (Edison 2013).

Cloud technology is a growing factor in IT and in the wider business world. As companies seek to process growing data sets, cloud storage of data becomes a more popular solution than local servers. More than half of businesses choose a 'private' cloud, which is cloud computing for a single business (Business Wire 2012).

Another equally important set of issues is the human factor. Such issues include cybersecurity, gamification, and platform adoption.

Of the many human issues affecting IT, few are as important as cybersecurity. With so many transactions and interactions now occurring online, it is important to IT professionals, as well as to users that these connections be secure. Clinton (Clinton 2012) argues that security can be enhanced if government would incentivize the private sector to make the necessary improvements. This type of debate illustrates the human and political aspects of cybersecurity.

Cooperation among developers is also important to software development. One example of cooperation is the use of cocreation platforms to create added value for developers and third-parties. A platform is a common set of components that third-parties can then extend through their own applications (Ceccagnoli 2012). Another example is crowdsourcing, where individual developers give their time to compete in software development challenges, often for a cash prize. Cloudspokes, a software development company that thrives on the crowdsource model, has over 75,000 participating developers (Bird 2013).

Beyond its incentives for developers, gamification can be useful in driving adoption and use of applications. Sales staff, for example, may be more willing to use Customer Relationship Management (CRM) tools if a gaming-style incentive is built-in (Pombriant 2013). Towards this end, developers of business applications are building game-like elements, such as badges and user encouragement into their systems (Pombriant 2013). This demonstrates the growing use of these elements to drive human engagement in enterprise software.

Project Description

The purpose of this capstone project is to discover emerging issues in the software industry, and design a training or documentation plan to address one particular issue selected from the key issues identified which may or may not include the examples used in the Problem Background. This solution is intended to be provided remotely, but may require onsite work with a customer. For this reason, no special resources will be needed.

As such, the project will have the following phases, modeled after the Analysis, Design, Develop, Implement and Evaluate (ADDIE) method of instructional design.

Analysis

This is an exploratory research phase to discover emerging issues in the software industry, and isolate one issue to develop into a training or documentation plan.

The primary research method will be through interviewing IT professionals with a focus on software engineers. Interviews will be conducted with at least 8-15 software engineers to identify a number of issues in the industry. Research will be complete when saturation occurs, i.e. the same issues continue to be identified. Appendix A contains the questionnaire which will be used to collect both quantitative and qualitative data.

Design

In this phase, one of the key and repeated issues identified in the Analysis phase will be chosen as the primary issue to solve. The project objectives and plan will be laid out. The issue will be chosen based on a balance of impact and ease of completion. The goal is to solve an important issue using available time, resources, and skills.

The challenge in this phase will be to create a clearly defined project. In order to prevent scope and cost overruns, the project objectives and deliverable(s) will be clearly defined. This definition will be based on solving the well-defined issue identified and selected in the Analysis phase.

Develop

In this phase, the project (either documentation or training plans) will be written as per the project specifications. The intended goal will be to create workable plan that could be used to develop final materials such as a manual or training course. If an e-learning course is proposed as a solution, then the final deliverable could include a preliminary storyboard. The success of this phase will depend on having strong Analysis and Design phases.

One pitfall that may emerge is the complexity of the deliverable to be developed. The design of a specific training course, for example, may require extra time for the author of this project to become familiar with the knowledge and/or tools being covered. This will be addressed in the project plan by allowing extra time for a possible learning curve.

Project Description (Cont.)

Implement

In this phase, the final deliverable will be submitted back to original interviewees for feedback. This submission could be performed by email or as a web page with comment functionality provided to capture feedback.

Evaluate

In this phase, the results of the project will be analyzed and documented, and any lessons learned will be recorded in the final Capstone Project Report. Results data will be taken from feedback given by all responding interviewees who reviewed the final materials.

Capstone Project Consultant

Mark Seymour is currently a Technical Training Developer with Alstom Signaling Inc. in Rochester. In this position, Mark provides training to North American railroad engineering & maintenance staff operating Alstom's Automatic Control System solutions. Alstom's ATC systems are microprocessor-based real-time control & data acquisition systems, performing safety-critical functions. Mark provides training to instruct engineering and maintenance staff on the criticality of the various systems, the operations and maintenance of these systems, and how to perform diagnostics and troubleshooting procedures.

Mark joined Alstom after an extensive career in the aerospace industry, most recently at COM DEV of Ontario, Canada and MDA of British Columbia, Canada. Specifically, Mark was a Mission Operations Engineer for various spacecraft and their associated Ground Segments in Europe, the US and Canada. In these roles, Mark was responsible for developing complex hardware and software systems for a number of large and small space missions, and as a Flight Director, was responsible for training and leading large teams of engineers and operators in the day-to-day nominal and sometimes contingency operations of these space missions.

In other roles, Mark has been responsible for the management of multi-million dollar internal projects and external software and systems development subcontracts, with direct responsibility for budget and schedule success. Mark has held roles as a Project Manager and as a Technical Lead.

Mark holds a Bachelor's Degree in Physics with Space Science, and a Master's degree in Spacecraft Technology and Satellite Telecommunications, both from University College London, United Kingdom. Mark is also a graduate of the International Space University's Space Studies Program.

Mark can be reached care of Alstom Signaling at 1025 John Street, West Henrietta NY 14586 and during business hours at 585-279-1748; by email at mark.seymour@transport.alstom.com

Anticipated Results

Mission Statement

This capstone project will develop an innovative training or documentation solution to a problem in the software industry. The problem will be identified through interviews with industry stakeholders such as software engineers. Once the problem is identified, a training course or set of documents will be designed and documented in the form of a training or documentation plan. This plan will then be subjected to an expert evaluation by the same stakeholders interviewed at the beginning of the project.

Project Benefits

While the project will perform a practical analysis of a real-world problem with the goal of a real-world solution, there is the potential for new trends and solutions to be discovered. These new discoveries could lead to advancements in the fields of training and documentation, especially where these disciplines intersect with the software industry. These additional benefits will be documented in the Capstone Project report, along with any supporting data gathered during the project.

Directly, the training and/or documentation developed could build the skills and knowledge of the end users in the customer organization. This could result in a better ability to seize opportunities, lower costs, innovate, and generally improve profitability. These benefits will be measured by the feedback of the interviewees.

Project Risks

IT, both hardware and software, is notoriously difficult for some to learn. Moreover, there is a stigma around learning anything new, especially new technology. A failure of newly-developed training or documentation could reinforce this view.

Entrenching this view could convince possible stakeholders that there is no viable way to build knowledge or skills in this area, leading to a reduction in training and documentation opportunities. This could also discourage future participants or users from attempting to develop their technical skills. The proliferation of either of these views would result in a decrease in technical knowledge and skill, resulting in a less skilled industry and user base.

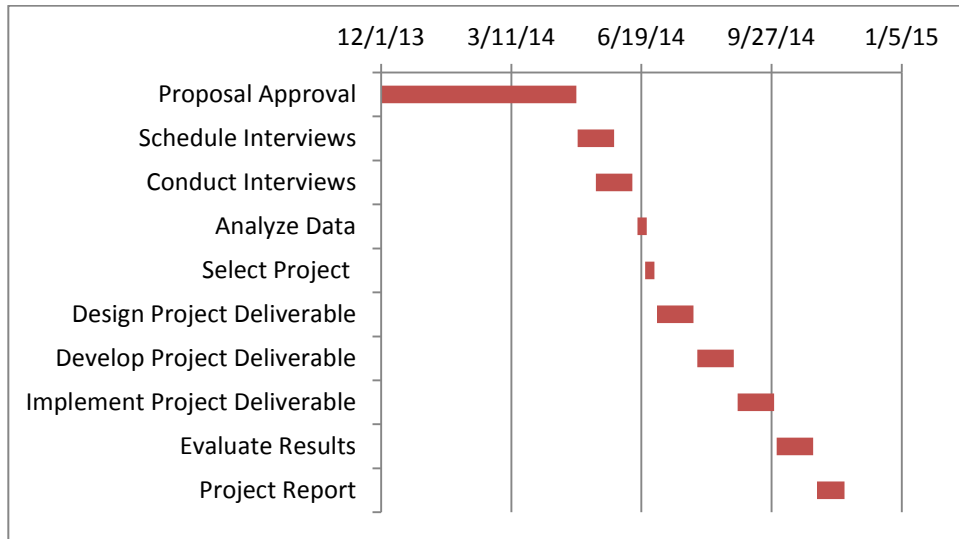
Plan of Work, Timeline and Budget

Plan of Work

The following sections constitute the Plan of Work. The timeline provides an overview of the major milestones and their durations. The budget provides an estimate of project costs. Both the timeline and budget depend on the results of the analysis phase, and are therefore subject to update depending on the intended project deliverable.

Timeline

The Gantt chart below summarizes all project milestones and their timeline in weeks. The project is expected to begin in December of 2013 and end in November of 2014.



Budget

No special budget will be required, since interviews will be conducted remotely. The only potential cost will be for a new computer, estimated at \$1200.00.

List of References

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Appendix A: Interview Questionnaire

Interviewee Data

Use this questionnaire to capture data about the interviewee, including professional and biographical data.

Name: _____
Company: _____
Number of years with company: _____
Position: _____
Number of years in position: _____
Number of years in current career: _____
Professional Interests: _____
Education: _____
Reason for responding to interview request: _____

Interviewee Responses

Use this questionnaire to capture the interviewee's responses to the questions.

In your opinion, what is the most critical issue facing the software industry at large? Please explain.

What is the most critical issue facing your organization? Please explain.

What suggestions would you have for any professional attempting to devise a training and/or documentation solution to these issues?

Which types of issues are the most difficult to solve: purely technical issues or those involving human factors? Why?

Rank the following IT trends in order of importance, either in terms of impact or degree of difficulty to solve. If you believe that another trend or issue is more important, rank **Other** as number one and write the trend or issue in the blank provided.

- _____ Cybersecurity
- _____ Gamification
- _____ Cloud technology
- _____ Development Cooperation
- _____ Platform Cocreation
- _____ Platform Adoption
- _____ Innovation Measurement
- _____ Open-Source Software
- _____ Crowdsourcing
- _____ Other: _____

Please explain why/how you chose your number one response.

What resources would you recommend to any professional attempting to find a solution to these issues (books, web sites, courses, etc.)?

Who else should I speak with, either within your organization or within your professional network? What is your contact's area of expertise?
