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Regis University
School for Professional Studies Graduate Programs
Final Project/Thesis

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Implementation of Survey and Evaluation System

Srinivas Maddali

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Master of Science in Computer Information Technology

Abstract

The goal of this project was to evaluate technologies for a survey solution for HopeHouseOfColorado website and implement the best solution. Thus allow the website administrators the ability to create surveys and manage the collected data. The implemented solution allowed the administrators to present the survey information in an organized and graphical manner. The implemented survey tool improved the survey process at HopeHouse and standardized the data collection format.

Revision History

Edition	Date	Additions/Modifications	Comments
1	07/28/2006	Initial Release	
2	08/17/2006	Updated the document for the required format.	
3	08/31/2006	Added references and appendices	

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I am grateful to my project advisor Mr. Wolf Thompson for the care with which he reviewed the original scripts; and for project conversations that clarified my thinking on this and other matters. Finally, I must thank my wife, Sirisha, for her patience and forbearance whilst I have spent hundreds of hours working on this thesis.

Table of Contents

CERTIFICATION OF AUTHORSHIP OF PROFESSIONAL PROJECT WORK **2**

AUTHORIZATION TO PUBLISH STUDENT WORK **3**

RELEASOR AUTHORIZATION TO PUBLISH STUDENT WORK WWWERROR! BOOKMARK NOT DEFINED.

ADVISOR/PROFESSIONAL PROJECT FACULTY APPROVAL FORM **4**

DISCLAIMER **5**

ABSTRACT **6**

REVISION HISTORY **7**

ACKNOWLEDGEMENTS **8**

TABLE OF CONTENTS **9**

LIST OF TABLES **11**

LIST OF ABBREVIATIONS AND SYMBOLS **12**

CHAPTER ONE – INTRODUCTION **13**

1.1 STATEMENT OF THE PROBLEM TO BE INVESTIGATED AND GOAL TO BE ACHIEVED **13**
LIKERT-SCALE TESTS USED BY HOPE HOUSE **14**
A SAMPLE LYKERT-SCALE TEST AT HOPE HOUSE **15**
1.2 THESIS STATEMENT: HYPOTHESIS, THEORIES, OR QUESTIONS **16**
1.3 RELEVANCE, SIGNIFICANCE OR NEED FOR THE PROJECT; HOW THE PROJECT BEGAN **16**
1.4 DISCUSSION OF THE ORGANIZATION OF THE SUBSEQUENT CHAPTERS IN THE PAPER AND HOW THEY SUPPORT THE THESIS OF THIS PROJECT **19**
1.5 BARRIERS AND/OR LIMITATIONS **19**
1.6 LIMITATIONS/SCOPE OF THE PROJECT **20**

CHAPTER TWO – REVIEW OF LITERATURE AND RESEARCH **21**

2.1 DEFINITION OF TERMS **21**
2.2 OVERVIEW OF ALL LITERATURE AND RESEARCH SOURCES ON THE PROJECT **22**
2.2.1 Interviews/Questions *22*
2.3 RESEARCH METHODS TO BE USED IN INVESTIGATING THE PROBLEM **22**
2.4 LITERATURE AND RESEARCH THAT IS SPECIFIC/RELEVANT TO THE PROJECT **23**
Open Source Model *25*
Choosing the right open source solution *28*
2.5 SUMMARY OF WHAT IS KNOWN AND UNKNOWN ABOUT THE PROJECT TOPIC **31**
2.6 THE CONTRIBUTION THIS PROJECT WILL MAKE TO THE FIELD **32**

CHAPTER THREE – METHODOLOGY **34**

3.1 FORMATS FOR PRESENTING RESULTS/DELIVERABLES **34**
LIFE-CYCLE MODELS TO BE FOLLOWED **34**
RESOURCE REQUIREMENTS **38**
REVIEW OF DELIVERABLES **38**
SPECIFIC PROCEDURES **39**
OUTCOMES **39**

CHAPTER FOUR – PROJECT HISTORY **42**

How the project began **42**
How the project was managed **42**
4.2.2 Resource Requirements *44*
4.3 Significant events/milestones in the project **45**
Changes to the project plan **45**

CHAPTER FIVE – FINDINGS AND ANALYSIS **46**

Analysis of results **46**
Evaluation of whether or not the project met project goals **46**
5.3 Discussion of what went right and what went wrong in the project **47**
Discussion of project variables and their impact on the project **47**
Findings/analysis results **48**

CONCLUSIONS **48**

What you learned from the project experience **48**
What you would have done differently in the project **48**
Summary of the project **49**
Summary of whether or not the project met initial project expectations **51**
What the next stage of evolution for the project would be if it continued **51**
Conclusions/recommendations **51**

EXHIBITS/ADDENDA **53**

REFERENCES **58**

ANNOTATED BIBLIOGRAPHY **60**

List of Tables

1 Feature comparison in various contemporary technologies.
2 Characteristics and results comparison for Survey solutions.

List of Abbreviations and Symbols

PHP	PHP Hypertext Preprocessor is a programming language that allows web developers to create dynamic content for the web.
HTML	Hypertext Markup Language is the authoring software language used on the Internet's World Wide Web.
XML	Extensible Markup Language is a W3C initiative that allows information and services to be encoded with meaningful structure and semantics that computers and humans can understand.
Open Source	Open source software is similar in idea to ‘free software’ but less rigid than the free software movement. Users of open source software are able to view the source code, alter and re-distribute open source software.
DB	Database
ROI	Return On Investment.
Web Host	A Web host is in the business of providing server space, web services and file maintenance for Web sites controlled by individuals or companies that do not have their own web servers.

Chapter One – Introduction

1.1 Statement of the problem to be investigated and goal to be achieved

This project addressed an ongoing problem at Hope House, a residential facility for teen moms, involving the lack of surveying and monitoring system. This project setup a system that implemented an online survey system and integrated it with the existing website. Historically, the Hope House organization conducted paper based surveys and manually analyzed the data.

Paper-based surveys are a thing of the past, considering the excessive amount of time and money involved in creating, printing, distributing, receiving, and manually processing endless sheets of easy-to-misread scribbles. The data entry is not free from being error prone. Even optical scanning is tedious, enormously expensive and prone to error.

Hope House had a staff of 20 including part-time staff and volunteers. They were establishing a new permanent house for 5-6 residents (teen moms). Within a few years from the time of this project, they would be expanding more opening more such houses. The system before this project began involved each staff member submitting weekly evaluations of each resident of the home. Each evaluation was composed of 10-20 smaller Likert-scale tests. The evaluation tests measure the progress of each resident in key areas such as financial responsibility, school work and working with in the Hope House Community.

It was expected that they stored 100-200 pages of survey results every week. It was clearly evident that this would be come a maintenance nightmare if Hope House continued this manual process for long. At the time this project began, survey

administration was done on a weekly basis and recorded by hand. Imagine finding a mistake in final published questionnaires after it was printed and stuffed them all. Computer-based systems solve all of that and more with point-and-click simplicity and sophisticated data automation.

One of the issues Hope House was facing was that of staffing issue. Currently the person responsible for recording the tests is squandering half of her time, devoting herself to completing the task by hand. Another issue was, once the results are recorded, it was almost impossible to make sense of. In other words, Hope House has a lot of data and very limited ability to analyze it. Also staff members had to be at Hope House personally to submit their surveys. Since much of the staff is either part time or volunteer staff, there were frequent problems in organizing the whole effort.

Adding new parts to the survey packets or revising parts would be easy enough but trying to alter reports from the data might be daunting. Staff members would need to design and use another survey if all they wanted was to evaluate each other.

All these facts presented an opportunity to implement a better solution for Hope House's survey system. To overcome the issues described above, this project sought to remedy the problem by implementing an online solution through a secure area of the organization's website.

All the issues related survey data collection, new survey creation and analysis were sought to be eliminated by the online survey solution.

Likert-scale tests used by Hope House

A Likert scale measures the extent to which a person agrees or disagrees with the question. A Likert scale is a rating scale used to measure the strength of agreement

with a clear statement. Each degree of agreement is given a numerical value (for instance, from one to five), so a total value can be calculated from all the responses, and other statistics can be computed.

Using a series of Likert scale tests, the questionnaire presents a set of attitude statements, and respondents are asked to express agreement or disagreement with each statement on a scale.

A sample Lykert-Scale test at Hope House

Q: Regarding low prices, how would you rate each of these brands of fast food restaurant, using the scale below?

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Wendy's has fast service	☐	☐	☐	☐	☐
McDonald's has fast service	☐	☐	☐	☐	☐
Taco Bell has fast service	☐	☐	☐	☐	☐
Subway has fast service	☐	☐	☐	☐	☐

1.2 Thesis statement: hypothesis, theories, or questions

The problems and issues associated in meeting Hope House's requirements, evaluation of technologies and off-the-shelf products, implementation, support and customization were numerous. Hope House wanted to use the website infrastructure that it currently had to support the survey solution. The project sponsors, Hope House, believed that its existing Web server could be supplemented with a reliable online solution that could integrate with the existing website without affecting the performance adversely. Most notably, the cost effective, low maintenance solution with strong analysis and reporting capabilities was required. The question was there an off-the-shelf solution that could be implemented with no dedicated technical staff to support with the existing resources and with the current budgetary constraints? Or would an in the house built solution be a better option for Hope House?

1.3 Relevance, significance or need for the project; how the project began

The original background of this project is as follows. Before looking at the project's background, the author felt it is important to understand what a Hope House is and what they do, to get a perspective on the project.

Hope House of Colorado is a non-profit organization for parenting teenage mothers, offering a two-year self-sufficiency program. Residents of Hope House must be between

the ages of 16 and 20 and the parent of one or more children. Hope House is unique in the fact that most homes in the Denver area are maternity homes and will only take in women who are pregnant—not women who are already a parent. (Source: http://www.hopehouseofcolorado.org)

It has a staff of 20 including part-time staff and volunteers. They are establishing a new permanent house for 5-6 residents (teen moms). With in a few years, they will be expanding more opening more such houses.

Every week each staff member submits an evaluation of each resident of the home. Each evaluation is composed of 10-20 smaller Lykert-scale tests. The evaluation tests measure the progress of each resident in key areas such as financial responsibility, school work and working with in the Hope House Community.

On average, Hope House needed to store 100-200 pages of survey results every week, a process that was becoming a maintenance nightmare. It also was a disaster waiting to happen. Imagine finding a mistake in final published questionnaires after it was printed and distributed, or wanting to change one of the questions at the last minute. A computer-based system would solve all of that and more with point-and-click simplicity and sophisticated data automation.

One of the key issues increasing the urgency of this project was staffing at Hope House. At the time of this project, the person responsible for recording the tests was squandering half of her time, devoting herself to completing the task by hand. Since she was the Program Manager of the agency – second only to the Executive Director – it was a terrible misuse of her limited time. Another issue was, once the results are recorded, it was almost impossible to make sense of them or to analyze them for trends.

Also problematic was the issue that staff members had to be at Hope House personally to submit their surveys. Since much of the staff was either part time or volunteer staff, there were frequent problems in organizing the whole effort.

Also, adding new parts to the survey packets or revising parts would be easy enough but trying to alter reports from the data might be daunting. Staff members would need to design and use another survey if they wanted to evaluate each other.

All the information pertaining to the current state of affairs at Hope House were gathered by the author of this paper from his project advisor, a volunteer at Hope House who knew the current state of the organization. The author and advisor worked as a team to analyze the situation and propose a solution.

During the analysis, the team realized that the infrastructure and timelines at Hope House would not support building a custom survey solution from scratch. The organization needed a generic solution with minimum maintenance and ease of use by even non-technical staff members. During analysis the team also found that there is a need to use the existing website infrastructure at Hope House.

The need for such a survey tool that could be deployed to the current server and be used and administered by non-technical staff was critical to the project. Furthermore, the ability to use the system for data analysis and presentation was paramount for the success of the project. For these reasons, the project had to provide an effective survey tool that could fit in the client's existing web infrastructure, was easy to use, and which could yield results suitable for analysis and presentation.

1.4 Discussion of the organization of the subsequent chapters in the paper and how they support the thesis of this project

The following chapters are presented in a systematic orientation to provide a comprehensive and understandable narration of the project. These chapters also conform to the suggested standards of thesis organization by Regis University. It was organized to provide a readable and logical series of related events and groupings of research that supports the thesis.

1.5 Barriers and/or limitations

With Hope House being a non-profit organization with many of its staff being part-time or volunteers, there was no budget allocation for this survey project. This restriction very much limited the options for an elaborated custom built solution. There is no full-time system administrator at Hope House. So, for the implementation of the system, and testing were going to be challenging. This project's advisor had the information on the website administrator and the author depended on it. There were much better and proven solutions out there in the market but they all come with a hefty price.

Another constraint is that the solution that was going to be chosen had to fit Hope House's existing website framework which was hosted by Energized Hosting. Energized Hosting was a web hosting solution and hosts and supports open source solutions like

MySQL, PHP for free. So, the solution should also be supported by the website host too. See the Research section of this paper for more information.

1.6 Limitations/Scope of the project

Keeping the requirements and the constraints in the view, the scope of this project work was set to the following:

- Determining the requirements for the Survey module
- Evaluate available technologies (off-the-shelf)
- Choose right technology solution
- Development or customization
- Deployment of the solution to the web servers.
- Testing

At the beginning of the project, the idea was to get evaluation done. Depending on the outcome, then decide the scope of this thesis. If the evaluation result was to develop an in-house solution, then the work would be split up across a few system developers.

Chapter Two – Review of Literature and Research

2.1 Definition of terms

PHP	Programming language for Hypertext Preprocessor
DB	Database
MySQL	Open source database and is freely available as download.
HTML	Hypertext Markup Language
Web Host	Organization that maintains the web site
Web Site	Collection of connected web pages stored on a web server
Open Source	Open source refers to any program whose source code is made available for use or modification as users or other developers see fit
PHPSurveyor	A PHP based open source solution for on line survey problem.
phpESP	A PHP based open source solution for on line survey problem.
PHPSurveyor	A PHP based open source solution for on line survey problem.
.Net	Microsoft's framework for web based application development.
Java	An multi-platform, object-oriented programming language from Sun Microsystems

2.2 Overview of all literature and research sources on the project

The main component in the research was open source and examining solutions in open source. The internet was the major resource to understand the essential features of survey software, to download them and to evaluate them. The samples of paper based surveys used by Hope House were a source of information to understand the requirements.

2.2.1 Interviews/Questions

During the initial phases of the project all most all of the information including requirements was gathered from the advisor. Since advisor was already familiar with Hop House's activities he was comfortably able to provide all the answers for the questions. Advisor was the liaison between the author and the client and the questions were answered through advisor. For requests like samples for paper surveys, advisor was the contact person.

2.3 Research methods to be used in investigating the problem

Major part of the project is the market survey for the right solution for the client's requirements. The internet was used as a way to verify and research tools and technologies. The writer of this paper also used the Regis University Library and the knowledge he had gained during his class work at Regis. The advisor held informal meetings with the author and reviewed the technologies for the evaluated solutions. To

understand the latest trends and ideas on the survey software, the author subscribed to a membership to the development team that contributes to a survey solution. That solution was phpSurveyor. This helped the author understand the technologies behind solutions and understand the intricacies of a survey software development.

Each solution that pre-qualifies the technology requirements and client's requirements would be downloaded and evaluated for various criteria described in the previous sections of this thesis. Evaluation results would be tabulated and submitted for advisor's review. These would be discussed at every given opportunity in the meetings between the advisor and the author of this paper.

Once a right solution was found, the author would provide all the instructions and notes to deploy this solution into Hope House's web server. These instructions would also include instructions for deployment of any DB changes.

2.4 Literature and research that is specific/relevant to the project

The solution must be web based and easy to maintain. With several excellent and proven solutions available in the market today, in-house development of a customized solution is impractical for several reasons:

1. Costs – people have to be hired with the necessary skills to develop a solution.
2. Technology analysis – Some analysis is still required to decide what technology to use.
3. Time-to-market may well take few months.
4. Off-the-shelf software comes with documentation and user manual.
5. Technical support or user forum is always available for any reference or support.

This chapter examines the open source solutions as well as commercial. Due to the nature of the project, it is not required to integrate this solution with the rest of the website. In a situation like this, an off-the-shelf solution was thought to be the best option.

There are quite a few commercial survey solutions available namely SurveyGold, Zoomerang etc.., But they were found to cost quite a lot of money. But the author's further research revealed that there are open source solutions which are free in cost. Since the client preferred a cost effective solution, the open source solution was found to be a good choice.

Choosing the right technology plays a big part with keeping Hope House's requirements in mind.

Hope House's requirements include the following:

- A pluggable software component is required for Survey module to made part of Hope House's existing website
- Should not affect the way Hope House functions now
- Cost-effective solution for Lykert-scale tests.
- Easy to configure new surveys with minimal effort
- Easy to maintain as there are no full time system administrator at Hope House
- Survey data repository
- Automated analysis of the gathered data
- Effective display of analyzed data in form of graphs and charts.

The concept of Open Source has already proven to be a successful one in the software development field. There are many success stories in Open Source arena that it has become a reliable source for companies' world wide.

Examples of very successful open source products include

- Linux – an operating system competing with Microsoft
- JBoss – an web application server competing with industry's big names like IBM.
- Compiere – a full fledged ERP solution as well as CRM solution.
- MySQL – a popular Relational DBMS solution

The author has some experience with the open source tools and a contributor to one open source project himself.

Open Source Model

The open source model can allow for the concurrent use of different agendas and approaches, in contrast with more centralized models of development such as those typically used in commercial companies (Wikipedia http://en.wikipedia.org/wiki/Open_source)

There are many advantages of open source

- The availability of the source code and the right to modify it.

It enables the unlimited tuning and improvement of a software product. It also makes it possible to port the code to new hardware, to adapt it to changing conditions, and to reach a detailed understanding of how the system works

- The right to use the software in any way they wish.

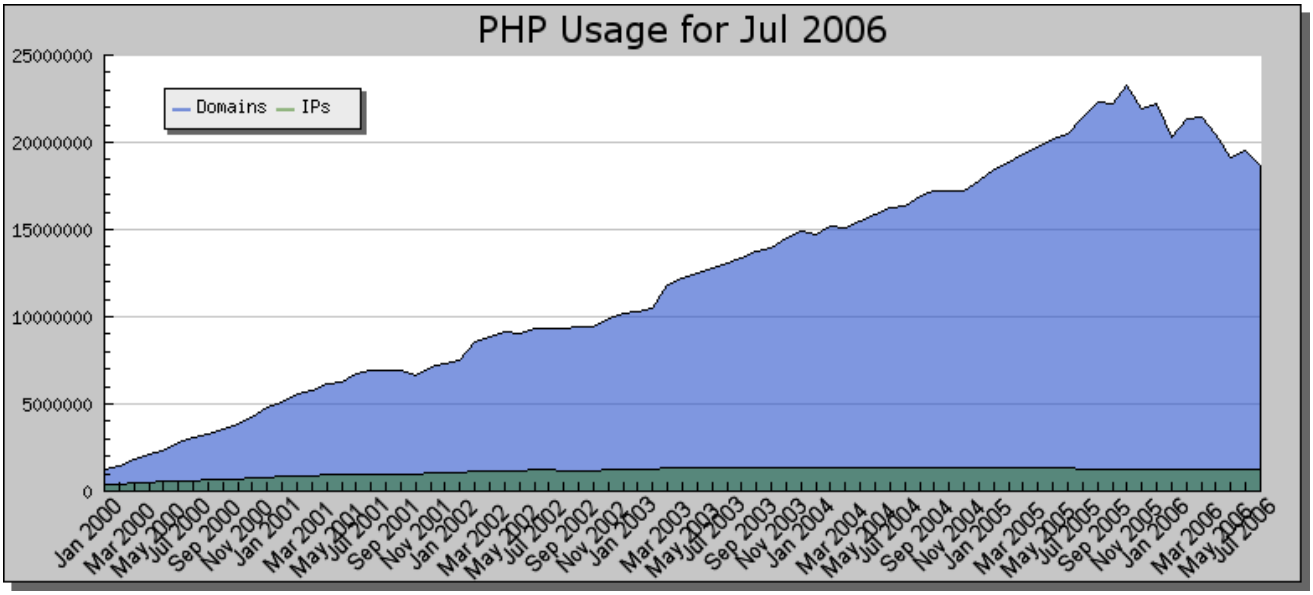
No per-copy fees can be asked for modified versions, and anyone can use the current code base to start new projects. Working knowledge can be gathered at a minimal cost.

- No black boxes are possible. This point is so important that open source is now considered by many experts as one of the necessary conditions for dependable applications.

An important criterion for the product selection is the technology used in the product. This is important because it determines the ease of maintenance. PHP is one technology which is not only widely used but also very much suitable for web development.

PHP is an open source Web development language. PHP is among the most widely deployed and used pieces of open source software. According to NetCraft, a webserver survey organization, PHP has surpassed Microsoft ASP, making it the most popular Web development language and is being utilized on over 18 million Websites today. The following graph is courtesy Netcraft. http://www.php.net/

PHP has proven itself across a range of large enterprise deployments at companies (http://www.php.net/usage.php)



Here are some advantages of PHP which are relevant in the wake of current project.

- It is an open source Language and so it is free of cost.
- The data types and structures of PHP are easy to use and understand, and convert types automatically. It is loosely typed language. It means that it's variable types does not have to be fixed.
- One does not have to know everything there is to know about PHP to start writing useful programs. This feature helps in product maintenance and any one with a little programming knowledge would be able to understand the code pretty easily.

For the Survey problem we are trying find solution to, PHP can be an excellent solution as PHP can run as a stand alone executable or a module under a variety of web servers. Also PHP supports a variety of databases including open source databases like MySQL. Should there be any need to extend the solution at later time PHP is extensible via its powerful API. It is actively developed and supported by a committed team.

The other comparable platforms are J2EE and ASP.NET both are good platforms as well but for the survey project point view, they are not found to be viable options.

Please see the following table for various feature comparison.

Feature	J2EE	PHP	ASP.NET
Software price	$$	free	$$
Platform price	Free	free	$$
Speed	Strong	strong	weak
Efficiency	Moderate	strong	weak
Security	strong	strong	strong
Platform	J2EE servers only	strong	weak (IIS only)
Platform	Any	any	win32 (IIS only)
Source available	Yes	yes	no
Exceptions	No	yes	yes

All the research about the technology above was driven by the user's requirements.

Choosing the right open source solution

At the time this project began there were several open source solutions created in PHP available in the software market. A search in internet provided the author with many solutions with the desired combination of technologies.

Choosing an open source solution out of many was not an easy process. One has to formulate a plan to evaluate each product and cross check with the functional requirements. Functional requirements included the following:

- Should be a standalone executable
- Should be able to run as a module under different web servers
- Provide query branching

With the above requirements, three open-source solutions were finalized.

They were PHPSurveyor, phpESP and Survey creator.

See the following table with characteristics and results for each of the above mentioned solutions.

Characteristics	**PHPSurveyor**	**phpESP**	**SurveyCreator**
Runs as stand alone executable?	Yes	Yes	Yes
Supports multiple webservers ?	Yes	Yes	Yes
Supports query branching ?	Yes	Yes	No
Supports multiple users at a time	Yes	Yes	Yes
Is licencing free?	Yes	Yes	Np
Number Of Participants to a survey (limit.capacity)	No limit	500	200
Popularity / Success (usage wise)	Most popular	Moderate	Moderate
Survey configuration capability	Yes	Yes but there are limitations	Yes, but there are limitations.
Back-office data entry possibility	Yes	Yes	Yes

Open Source?	Yes	Yes	Yes
Supports Open source Database?	Yes, supports MySQL	Yes,supports MySQL	Yes, supports MySQL
Does the supported database has data back up capability?	Yes	Yes	Yes

The author of this paper's recommendation was based on the above mentioned queries and facts. Several survey solutions have were excellent choices. Many can be customizable and would fit the needs of Hope House. Where PHPSurveyor stands out is the constant product support and the active user's forum. The product support includes frequent bug fix releases and a clear road map for next releases.

An active user's forum is important because that is a place where answers can be found for the questions. When the author posted a question about the database support, there was a flood of answers from all over the world and also from the product development team itself.

With the information gathered and analyzed, it was thought that an open-source solution with PHP technology would be the right way to go. And the product in the market that meets all the criteria was PHPSurveyor.

An option other than open source

To fairly cover the options Hope House had, the author of this paper also researched commercial, hosted survey solutions. The concept of a hosted survey solution is about buying an account from an online survey software vendor. Although it eliminates the maintenance issues, it also takes away the flexibility and the control of hosting an owned

solution. More over the service is based in the number of surveys created and usage. This can cause issues when the survey volume grows big. After researching hosted solutions, the developer of this project ruled them out as an option.

2.5 Summary of what is known and unknown about the project topic

In the beginning it was not clear who was going to be the technical contact person at the client's organization. Later it became clear that there was no full-time system administrator who could be a permanent contact person. Initially it was not clear on the usage levels of this application and how much bandwidth it required. Then it became clear that few surveys with few hundred responses per week were expected. So, the issue of bandwidth was not a concern anymore.

The infrastructure issue was the next issue to be addressed. It was important to know how the website was hosted, who was hosting it and what kind of control the development team would have over its administration. Another driving factor for a market study for a solution was the knowledge of the technologies supported by the website host. The website host would possibly support only a small set of technologies. It was very important that the technology that was going to be chosen need to be supported by web host. For example, any survey solution based on PHP needed to be supported by a web host that supported both PHP and the version of PHP in which the application was writer. PHP scripts would need a compatible PHP parser installed on the web server in order to successfully render survey web pages.

2.6 The contribution this project will make to the field

The methodology used and the study conducted for this project, to find the right survey solution for Hope House within the organization's website infrastructure, could be used as basis for any studies Hope House might conduct in future. At the time of this project, Hope House was already considering a content-management system, donor database, and email-list manager, so the groundwork laid by this project will undoubtedly be used again. There are many open-source solutions available on the Internet which are useful and easily pluggable like TimeControl management system. These solutions also use similar technologies and require a setup similar to the Survey solution adopted for this project. So, should Hope House needed any solutions, they now have an application to refer to as a precedent.

The automated survey system provided the greatest value in removing the complexity of manual survey and data analysis process. It also eliminated the potential errors caused by human intervention in analysis. Another contribution of this project was its relatively low maintenance which was welcomed by Hope House which has only part-time system administrators.

Although this project contributed little to new cutting edge developments in web technology development, it did offer the great learning experience in the complexity of working with web servers, web hosting companies and configuring web-based, database-driven applications. From a student's perspective, this project provided a great learning experience in project management and working with many technologies in the process of

tool evaluation. Most importantly for the client, this project provided an insight to using open source technologies which are free yet robust and well tested. For non-profit organizations like Hope House, the main focus would always be providing services with very low organization costs. This is where this project played an important role in opening new avenues for them to get software at relatively low cost, so that they can concentrate their resources on social welfare projects.

This project also stopped the debates over “does the open source work for us” that formerly plagued small organizations which do not want too much administrative overhead.

Chapter Three – Methodology

3.1 Formats for presenting results/deliverables

The tool survey results and requested information were presented to the project manager via e-mail. The summary and results were in the form of Microsoft Excel spread sheets and Microsoft Word documents. The preferred mode of communication was e-mail because there was always visual information exchange in the form of tables and screen shots.

The deliverables like the deployment instructions for system admin were in the form of Microsoft Word documents detailing each step.

The deliverables of survey tool research were in the form of a table detailing the feature that was being evaluated and the results from various tools being researched.

Life-cycle models to be followed

Several project methodologies have been examined for the management of this project. Also, other management methods are incorporated prior to beginning of the project. These include interviews and examination of current web solution deployment.

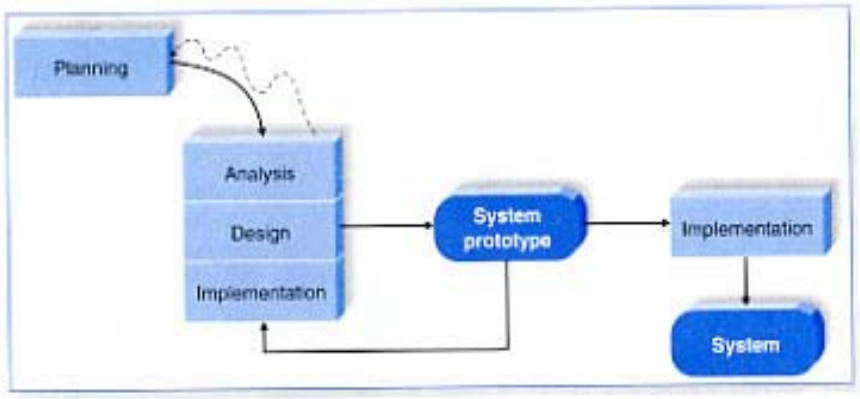
The methodology followed for this project is Rapid Application Development (RAD) methodology. The particular methodology in RAD followed was “prototyping.” Use of prototyping methodology allowed evaluating, analyzing, customizing and implementing various solutions in iterations.

The RAD methodology was followed because there were many technologies to be evaluated and each of the evaluation will have a cycle of analysis, design and implementation. Moreover, these technologies are unfamiliar and each has its own learning curve. For this the reason, the general rule of software development procedure was followed. The rule is "When faced with unfamiliar technology, the earlier to get to apply it in the SDLC the better." Risk increases with unfamiliar technology because the tools may not be capable of doing what is needed. Loss of time is the most concerning part of it. Prototyping is particularly appropriate for a lack of familiarity with technology because it explicitly encourages the developers to develop design prototypes for areas with high risks.

Phased development is good as well because it creates opportunities to investigate the technology in some depth before the design is complete.
Although prototyping would also be appropriate, sometimes it can backfire, because the early prototypes that are built usually only scratch the surface of the new technology. Usually, it is only after several prototypes the developers discover weaknesses or problems in the new technology.

Here the implementation has the meaning of prototype implementation, not the actual implementation.

See the following picture outlining the major phases of RAD development pattern followed.



There are seven phases in this project as defined below:

1. Planning

   This phase included client interviews, requirement gathering from project advisor and understanding existing client's website deployment environment. Getting a full understanding on client expectations on the tool as well as the deployments and the server set up were also part of in this phase.

2. Analysis

   In this phase client requirements were put together and both system and functional requirements are finalized and documented. This helped in the second step which involves software market analysis for the desired product that meets all the expectations.

Activities within the requirements phase also included an analysis and prioritization of the requirements. This was a complete feasibility study of the project. The feasibility study examines the operational, technical, schedule and economic practicalities of the project.

3. Design (Iterative)

   In this phase each of the technologies design was examined for the requirements and the implementation strategy was designed for each solution.

4. Implementation (Iterative)

   Each of the technology is implemented as a prototype and its behavior and features were studied in this phase. Here the implementation meant prototype implementation only.

5. System prototype (Iterative)

In this iterative phase, each prototype in integrated to the website and database and the system behavior was studied. It was important to conduct this phase carefully because not all the solutions work well in the integrated environment. In the final analysis, it was revealed that nearly 50% of the survey solutions failed in this test. The reasons for failure were mostly due to performance overhead and implementation complexities. A system with IIS installed in it as web server had been used through out to evaluate each of the solutions.

6. System Implementation

This phase is after the iterative tool evaluation phase was completed and the final solution that met all the criteria was identified. The implementation included deployment to the web server which was hosted by a company that uses the common web interface, Energized Hosting. See the appendix for the deployment instructions.

7. Maintenance and knowledge transfer

Deployment documentation was provided in this phase to the project advisor along with the information that how to maintain the tool.

Resource requirements

Project Management Resources: Estimated 96 hours.

IT Resources: Estimated 20 hours.

Database Administration Resources: Estimated 10 hours.

Technician (User- test and training) Resources: Estimated 16 hours.

Review of deliverables

After holding meetings and adjusting the deliverables to fit the requirements, the team agreed to these core deliverables:

- Technical document on the reviewed tools and results.
- Detailed deployment documentation for the preferred tool.
- Deploying the tools into Hope House's web site.

- User training and a document for troubleshooting the system.

Specific procedures

There was a specific procedure to be followed by the system admin to deploy the survey software tool. There are a number of configuration changes needed to be made to the system configuration files. The MySQL database creation was the prerequisite for the deployment. Another prerequisite was PHP software installation. But later it was found that MySQL and PHP were already installed on the Hope House's web server and were being supported by the website host. The PHPSurveyor software deployment needs to create multiple tables in MySQL database. That is why it is a specific procedure.

Outcomes

This project improved the survey data collection process, standardized the entry of data, and made the reporting of the data more efficient. In turn, the system got good at survey data management with back up and recovery techniques.

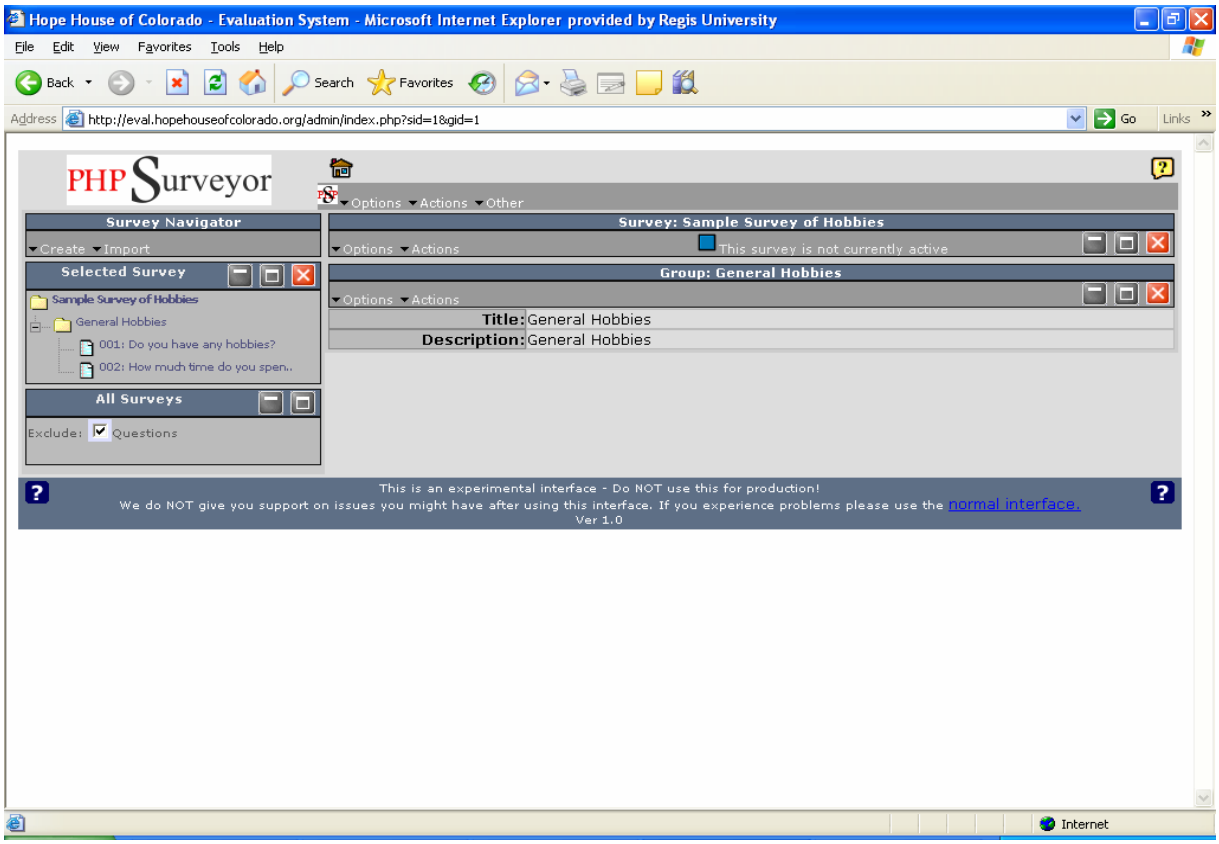
Originally the author of this paper thought the project would require a system be developed from scratch with client's requirements. But after initial research, it was evident that there are multiple tools out there in the market that meet client's requirements completely. Author and the project advisor realized that it would be good idea to explore off-the-shelf solutions and evaluate them. This was essentially what was

followed throughout the life cycle of the project. A standard tool evaluation process and solid implementation process were the most notable outcomes.

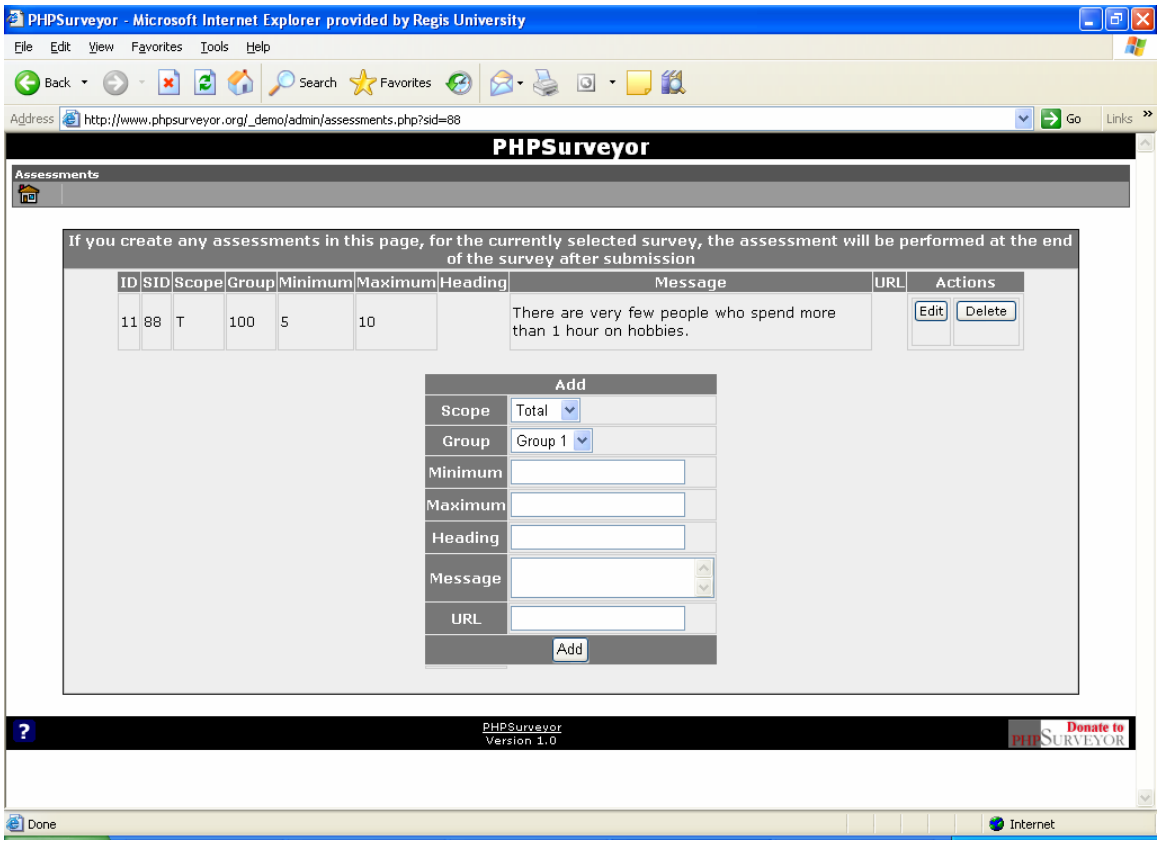
Requirements:

- A database in MySQL needed to be created.
- An admin user needed to be used by the PHPSurveyor.
- Scheduled DB Backup procedures need to be created.
- Changes need to be made in PHPSurveyor configuration files so that it finds the database to create files.

Administrators were provided with an admin tool to create surveys and maintain them. along with PHPSurveyor.



The assessment of the results can be set up using the vendor provided features. The following screen shot shows how rules for assessment can be setup.



The assessment results get updated after every survey submit happens. The statistical information gets updated based on the rules that were set at the time of survey creation. So the admin would have the latest statistical information at any given point of time. This would eliminate any possibility of not capturing some results in the final survey result analysis.

Chapter Four – Project History

How the project began

The project was initially brought about by the need to get better system for survey system maintenance at that Hope House of Colorado organization. The current system was completely paper based and manual. The organization needed to record and store 100-200 pages of survey results every week. It was clearly evident that this would become unbearable if continued for much longer. The survey administration was done on weekly basis and results and survey assessments were recorded by hand.

Specifically, the author of this paper's project advisor initiated a project to conduct an analysis and implement an automated solution for Hope House's survey problem. The author's original thoughts were to implement a custom solution for Hope House given that they have no budget allocated. But after initial research on Internet revealed that three were multiple "open source" solutions available for download and customization. In the end it presented the author with a potential project that culminated in the beginning of this survey tool evaluation and implementation project.

How the project was managed

The RAD methodology of Systems Design and Analysis was utilized to provide the most complete tool evaluation procedures and documentation possible with limited resources and capital expenditures.

The particular methodology in RAD followed was, prototyping. Use of prototyping methodology allowed tool evaluation, analysis, customization and implementation of various solutions in iterations.

The tool analysis results were presented to project advisor after analyzing every few tools. The set of evaluation criteria was finalized and agreed up on initially and that was used in evaluating each solution. The format of the result presentation was in Microsoft Word or Excel spread sheet format. When the author of this paper decided that PHPSurveyor was the best of the lot and presented the facts and figures about it, it was analyzed and had been accepted as the final solution by the project advisor. The marching orders were given to implement PHPSurveyor for Hope House.

The project was planned, executed and documented over a period of roughly 26 weeks. The RAD methodology of system analysis and design was utilized and each of the phases below was documented in a summarized format.

Phase I – Planning

Project need, problem statement, benefits, and set priorities. Document problems and constraints. Define scope of the project.

Phase II – Analysis

Define system objectives, review scope. Review technological alternatives for the problem and decide the course of action.

Prepare and review list of deliverables,

Phase III – Design

This is iterative phase – to design a solution (to evaluate). Prepare design documentation.

Phase IV – Implementation

This is iterative phase. Implement a solution (to evaluate). Prepare results. Document the results.

Phase V – System proto type

Integrate prototype to the website and database and study system behavior. Compare performance against the requirements.

Phase VI– System Integration

Deploy and integrate the final solution in the client's web environment. Document the procedure.

Phase VII – Maintenance and knowledge transfer

Provide Deployment documentation. Hand over necessary information for maintenance.

4.2.2 Resource Requirements

Most of the infrastructure was available at Hope House already, including the a web server running PHP and MySQL within a Linux and Apache environment. The web site was up and running and administration tools were available to maintain the site.

PHPSurveyor software needed to be downloaded. It was free of cost. One person from the volunteer technology staff at Hope House – consisting of both a network specialist and a web developer – will need to learn the system from the author of this paper and take over the maintenance responsibilities.

4.3 Significant events/milestones in the project

Each RAD methodology phase was a milestone for the project but, the major milestones were the end of the iterative implementation process. Identifying the right technology and off-the-shelf solution was the main mile stone. From the author's perspective this was the most significant milestone.

Coming up with the documentation for the implementation of the final solution was another major mile stone in the author's view.

Changes to the project plan

Once the author found that there were no budget resources allocated, changes to the project plan occurred to find a ready to use solution and configure it to use in a cost effective manner. This was the biggest change from the original plan.

Chapter Five – Findings and Analysis

Analysis of results

The survey application that passed all the requirements test had been deployed with the help of this project's advisor. The author of this paper created a few sample surveys to demonstrate the capabilities of the system. The surveys were found to function normally.

As of this writing, there are issues with locking down the system, specifically limiting survey creation to only an administrator. The version deployed for this project, however, was strictly for evaluation and testing purposes. Once system administrators feel comfortable with the tool, they will download the latest version from http://www.phpsurveyor.org website, install it to a secure directory within the Hope House web domain, and use it for production purposes.

Evaluation of whether or not the project met project goals

The Project met all the goals of the project and the deliverables. It automated the current manual surveying process at Hope House. It provided the evaluation process for any open source projects that Hope House might undertake in future. Uniform and standardized survey data entry and its online access via Hope House's main website helps Hope House to streamline their internal processes. The final solution provided was free of cost and easy to maintain, which are client's primary requirements.

The data analysis is an integral part of the PHPSurveyor solution. There were provisions in the tool where assessment criteria can be defined for every survey that Hope House creates. For every survey submit, this assessment will be performed according to the criteria provided. This eliminates any need for Hope House to analyze the data. Administrators can see the results real time with analysis of the data collected so far.

For these reasons, the project was quite successful and met project goals.

5.3 Discussion of what went right and what went wrong in the project

There was a break for six weeks after the right tool was evaluated. The author of this paper did not complete the tasks and phases as presented in a timely manner and that may be perceived as what went wrong.

The author did complete the entire project but it would have been done in much less time had the author not taken a break in between and spent time on it continuously.

Discussion of project variables and their impact on the project

As there was no full-time system administrator at Hope House, it was often found to be time taking to find what works and what doesn't work with their infrastructure. It was the project advisor who took all the pains to get the information from the right people. Things would have been much quicker had there been a direct contact person at Hope House. But that was understandable as information systems was not the main business at Hope House, charity work was.

Findings/analysis results

The most important findings from the project were that of how easy it was to implement open source solutions for small businesses. Truly, open source has evolved and its solutions proved to be quite useful. Many of these open sources have own websites and encourage clients to exchange ideas about implementations. One can gain lot of knowledge by participating in these forums. Depending on the technology these solutions were implemented with, they could easily be plugged into the existing websites. The technologies like PHP make this integration really easy as PHP is not specific to any one particular language or technology.

Conclusions

What you learned from the project experience

This has been a great learning experience dealing with many solutions and different implementations. Having to install to each of them and evaluating against an established criteria gave the author of this paper a great perspective of the contemporary technologies. Also, working with an experienced person as project guide also was a great learning experience.

What you would have done differently in the project

The author would have explored the shared hosting solution for surveying in depth. This would have been the difference if the project was done again. This option is about buying an account from an online survey solution and all the maintenance would be taken care of by the solution provider. This not only eliminates any maintenance or staffing issue which was main concern for Hope House. It might cost some money but this option could have been explored any way as some of the vendors might have given heavy concessions as Hope House was a non-profit charity organization. At the same time, shared solution takes away the control on the data. Also there might be restrictions on the number of surveys can be created and bandwidth usage levels.

The graphical display of survey analysis results would have been a good addition for this project. The PHPSurveyor promised it in the upcoming versions but one can never be sure about promises on the features by open source projects. This is mainly because of any of their organizational issues or funding issues. Instead of depending on their promises, another solution for graphic display should have been tried. The realization came late in the project and after PHPSurveyor missed out on the delivery date of solution's next release.

Summary of the project

The project was originally planned to evaluate and find the right technological solution for the Survey data maintenance problem Hope House was having. During the initial discussion and investigation of the project needs, it became evident that the goal needed to be modified. The modification was that not only to evaluate but to implement

a solution. This modification came about after knowing the fact that there were multiple solutions out there in the market that fits client's needs.

The initial challenge was to understand the client's website infrastructure and finalizing the technology going to be used. Once that part was done using client interviews and project advisor's input , next step was to search internet and evaluate technologies that fit the technology requirements . This phase was the most critical one and where the RAD methodology was used to evaluate various solutions. That phase of the project went fast and results were updated to advisor. Once the decision was reached on the final solution, the documenting and actual implementation of the solution at the client's place took place. Evaluation version was used to test the software. Few surveys were created as part of this effort.

The documentation for actual implementation in the form of a Word document was presented to the project advisor. This was another mile stone because the documentation plays major role for system administrators going forward. The actual production of this solution has not begun and is in testing phase now. In the end, the project met all the initially set goals except that it did not go live fully. It was matter of changing the website setup to make it available for clients.

The writer or this paper would recommend this type of process for any similar evaluation projects in the future. It was effective in narrowing down and zeroing in on a solution and its implementation.

Summary of whether or not the project met initial project expectations

The project met initial project expectations. The project set precedence for future projects which would need evaluation of tools and implementing open source solutions for small organizations. The project helped Hope House understand the need for a standard procedure for survey data entry and analysis of the results.

What the next stage of evolution for the project would be if it continued

The production version deployment would have taken place if the project continued. Performance evaluation and performance tuning (if needed) would have happened.

In the long term, evolution would be to come up with a plan for automated data backup procedures. MySQL is a good and reliable database, but not as good as frontline databases like Oracle. Current version of PHPSurveyor support only MySQL. But PHPSurveyor has plans to release a version that supports Oracle and other RDBMS in the market. The stage of evolution would be to port that application on to more reliable databases.

Another evolution would be to add a feature to display survey results in graphic manner. This would help in understanding the results much quicker.

Conclusions/recommendations

There was lot of scope and opportunities during this project to learn new technologies. Open source technology has really evolved in the past few years and there are many solutions available online. While open source paradigm might not suite every organization, they are pretty good for small scale businesses. It may take time for this

open source concept to sink in for many, but certainly this is the direction the software development industry is moving towards. Considering the successful open source stories like JBoss and Tomcat, which are now deployed by many reputed and big companies, one can safely say that open source technologies are here to stay.

One recommendation from author of this paper is that, should there be any issues in production environment in the long run, the shared hosting solution of survey option can be explored.

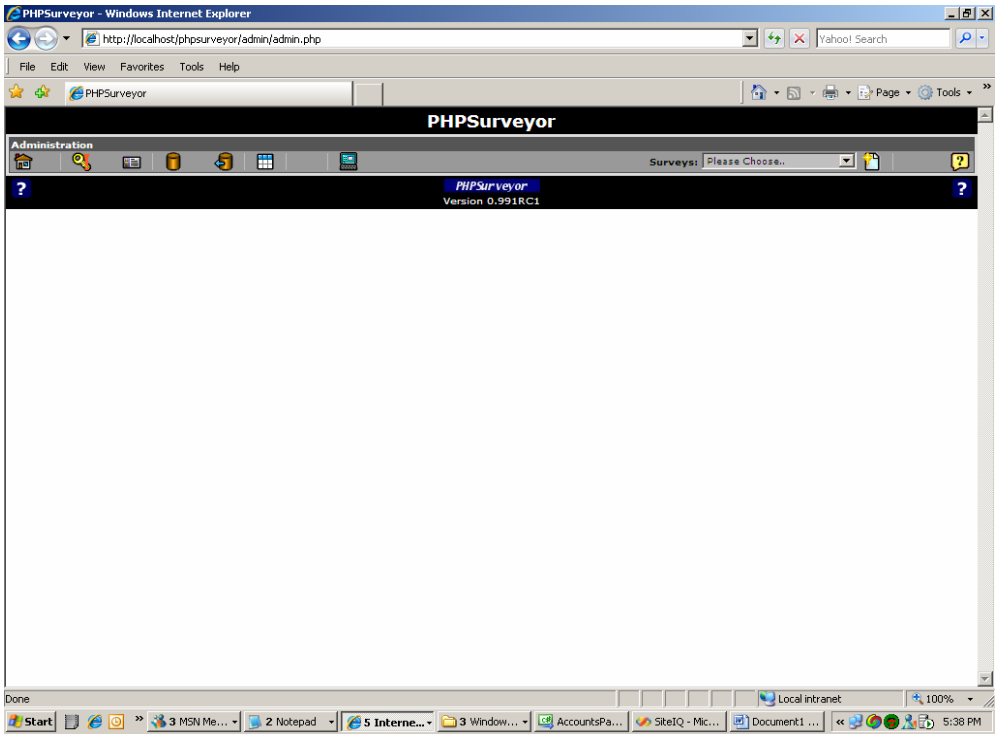
The author of this paper also recommends that system administrators should watch out for any future versions of PHPSurveyor and get them with out much delay.

Exhibits/Addenda

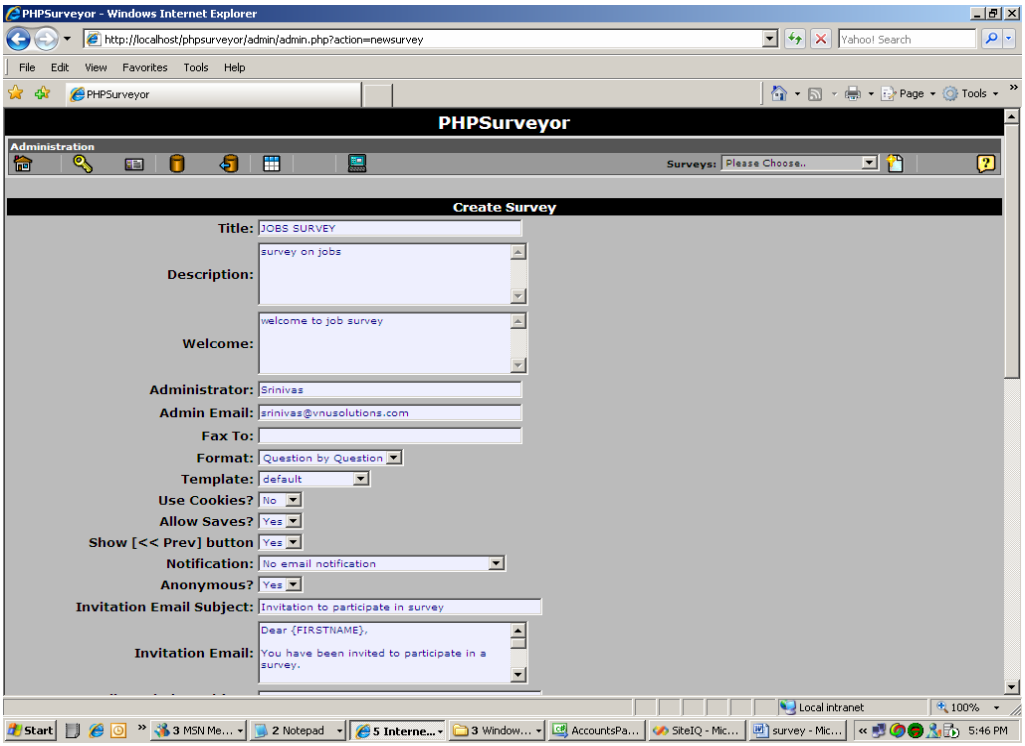
A tour of implemented survey solution - PHPSurveyor

Author of this paper took an example of a sample survey here created using the PHPSurveyor. To demonstrate the tool's survey creation and data analysis, the author took the aid of screen shots. The sample survey in this exhibit was about people's preferences on part time jobs. There 3 questions for the user to answer. The sampled data was analyzed at the end of this tour.

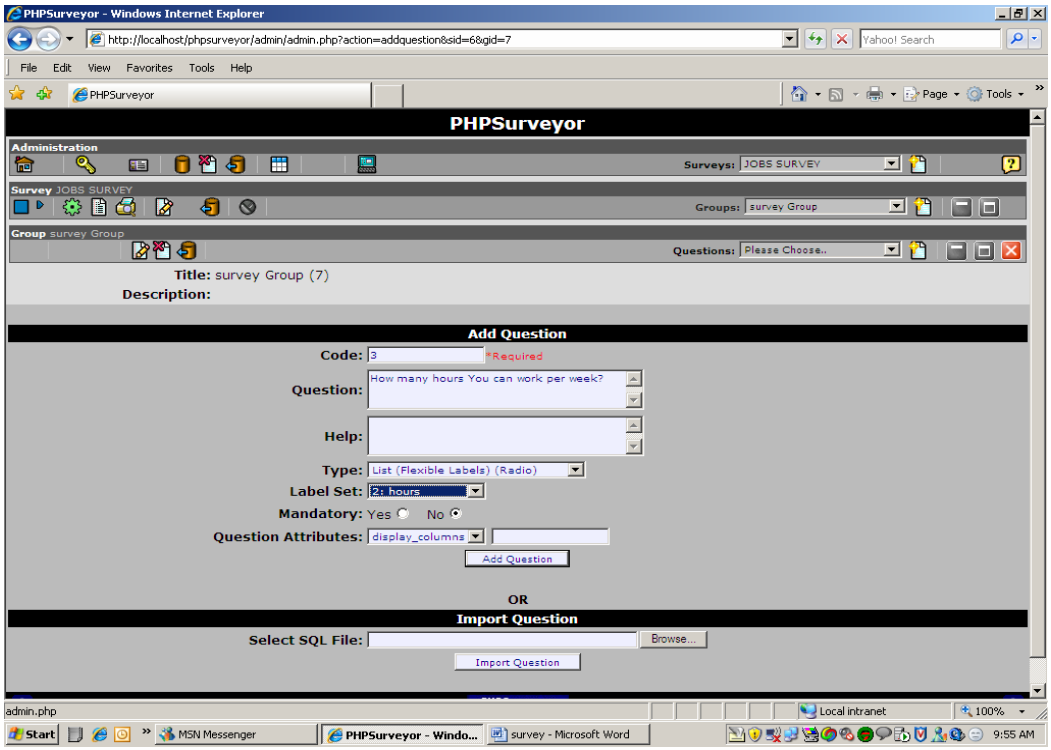
The following was the home page for PHP Surveyor for system admin who was trying to create the job survey.



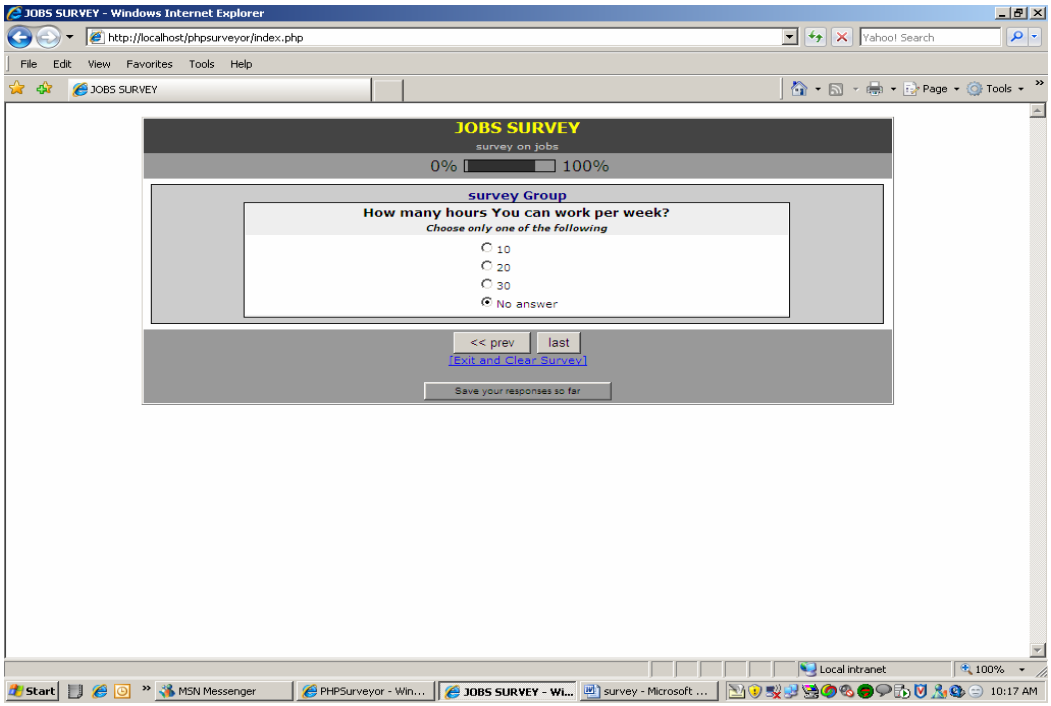
Create Survey page utility. The survey admin has to fill all the details accordingly.



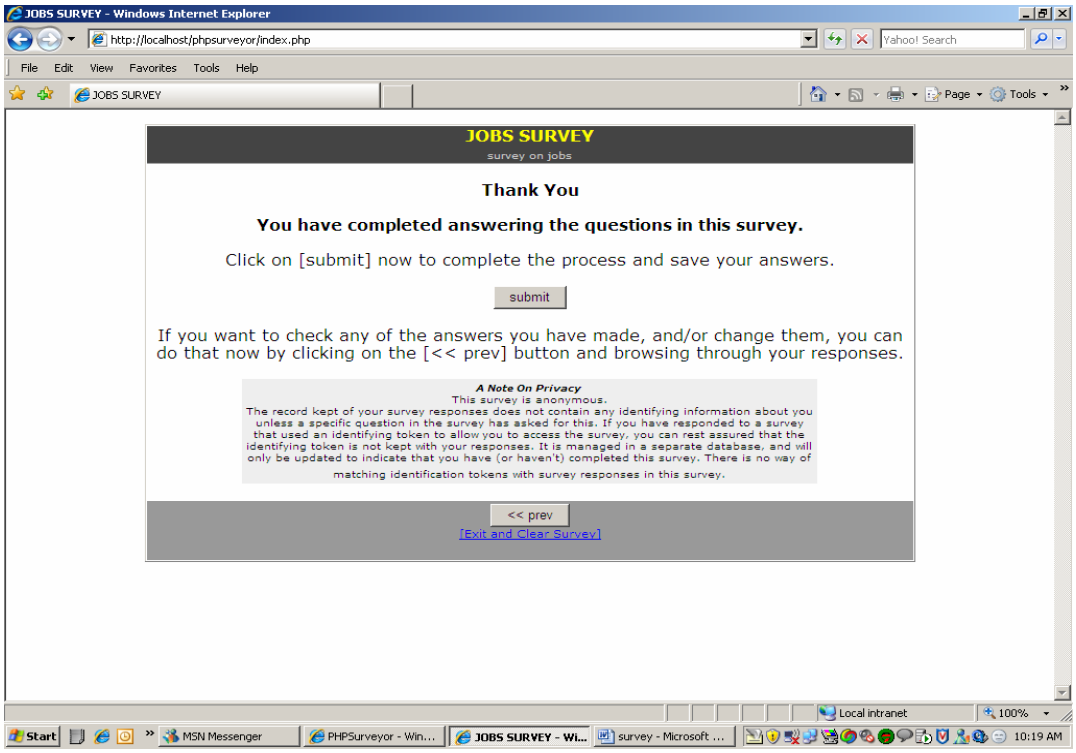
When the admin wishes to create the survey questions, he/she could do so by using following utility provided by PHPSurveyor. Admin has to enter Code, Question, and Type. There are flexible question types available in the tool.



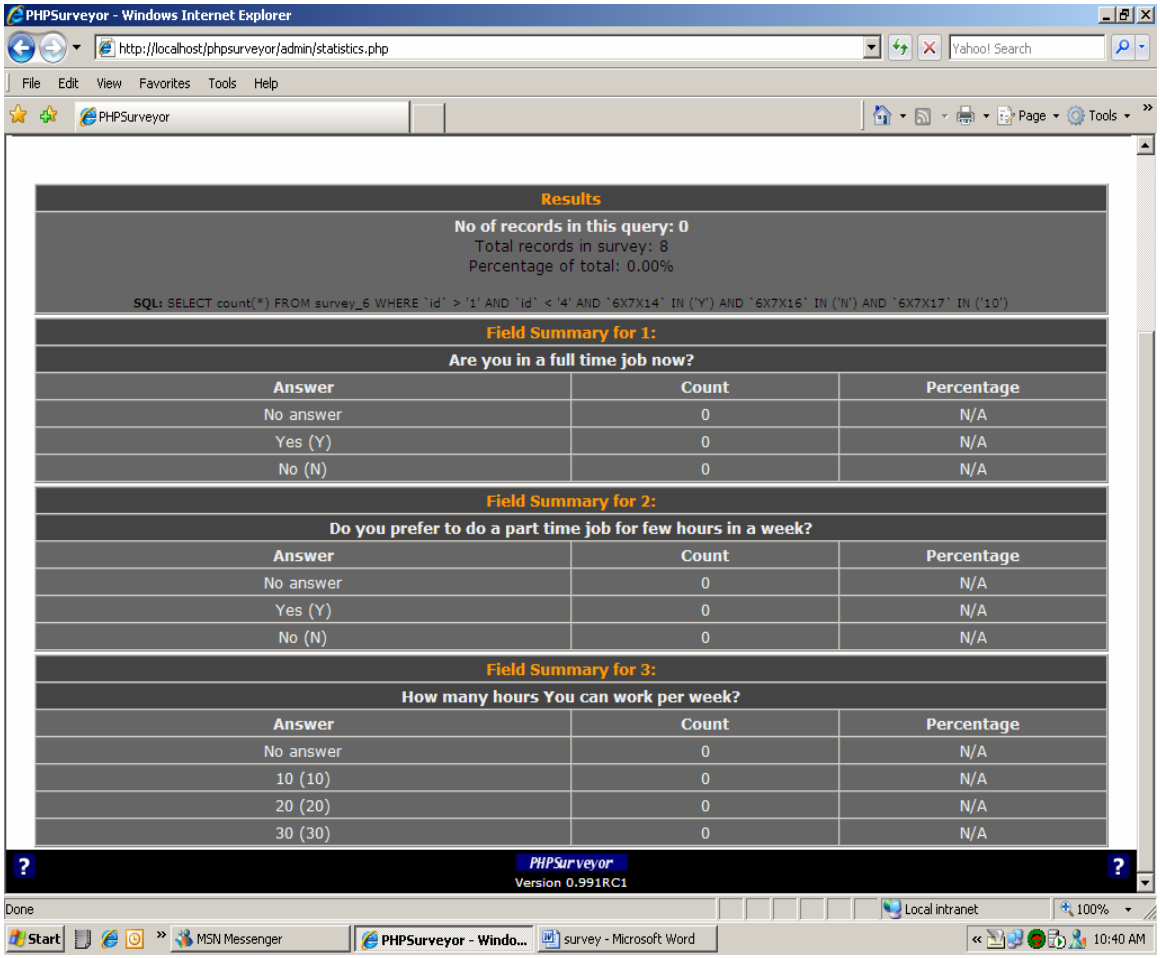
When the survey had been published and activated, the users can access it using the URL provided by the tool. The following screen is an example of how the survey would look like when accessed by users.



The following screen is the thank you note to the user after completing the survey. The matter on this page is configured in the initial survey setup.



Survey administrators could view the survey statistics at any time. The following page shows the summary of survey statistics. There were 3 questions in the sample survey created.



With this statistical information on the published survey, the result analysis could be done easily. The tool lets administrators to correct a question on the fly if some thing wrong was noticed with the questions.

The statistical information gets updated based on the rules, with every user submit so that the admin would have the latest statistical information at any given point of time.

References

Books/Articles/Online resources:

1. Alred, Gerald J., Brusaw, Charles T., Oliu, Walter E. (2005). Handbook of Technical Writing 8th edition. Bedford/St. Martin's.

2. Futrell, Robert T., Shafer, Donald F., Shafer, Linda Isabell (2002). Quality Software Project Management. Prentice Hall Publishing Company. ISBN: 0130912972

3. Kendall, Kenneth E., Kendall, Julie E (2004). Systems Analysis And Design, (6th ed.) Boston: Prentice Hall. ISBN: 0131454552

4. DuBois, Paul., (1999). MySQL, Other New Riders, New Riders Publishing; 1st edition..

5. Duncan, W.R., (1996). A Guide To The Project Management Body of Knowledge, Newton Square: Project Management Institute. ISBN: 1-880410-12-5

6. Sklar, David, Trachtenberg, Adam., (2002). PHP Cookbook (1st ed.) O'Reilly publishers. ISBN: 1-56592-681-1

Websites:

1. Regis University Professional Projects Page. http://www.regis.edu/regis.asp?sctn=apg&p1=gp&p2=mscit&p3=pp
2. Regis University Library website. http://lumen.regis.edu/
3. Purdue APA Format website. http://owl.english.purdue.edu/owl/resource/560/01/
4. MySQL website. http://www.MySQL.com
5. Microsoft Corporation website. http://www.Microsoft.com
6. Open Source http://www.opensource.org/
7. PHP Technologies http://www.php.net/
8. PHP Surveyor http://www.phpsurveyor.org/
9. Open source projects http://sourceforge.net/

Annotated Bibliography

1. Alred, Gerald J., Brusaw, Charles T., Oliu, Walter E. (2005). Handbook of Technical Writing 8th edition. Bedford/St. Martin's.

   This text book provided good technical writing examples and covered many basics of technical writing. This is an important for any academician, not just for thesis writing.

2. Futrell, Robert T., Shafer, Donald F., Shafer, Linda Isabell (2002). Quality Software Project Management. Prentice Hall Publishing Company. ISBN: 0130912972

   Quality Software Project Management is the practical, start-to-finish project management resource for every software professional-experienced managers and developers with intention to move into leadership roles.

3. Kendall, Kenneth E., Kendall, Julie E (2004). Systems Analysis And Design, (6th ed.) Boston: Prentice Hall. ISBN: 0131454552

   This book provided a comprehensive presentation with a variety of review questions and problems, case studies, and an Internet-based case study offering readers. It provided an understandable and motivating look at systems analysis and design.

4. DuBois, Paul., (1999). MySQL, Other New Riders, New Riders Publishing; 1st edition.

This was one of the earliest books published on MySQL and provided much needed insight to original ideas and design of this software.

5. Scott Berkun., (2005). The Art of Project Management., O'Reilly Media. ISBN: 0596007868

In this book Scott offered dozens of practical tools and techniques to ensure projects succeed. His personal experiences with projects and examples help understanding the problem in the proper context.

6. Sklar, David, Trachtenberg, Adam., (2002). PHP Cookbook (1st ed.) O'Reilly publishers. ISBN: 1-56592-681-1

This book contained a large collection of useful code examples for PHP programmers, from novices to advanced practitioners.