

April 11, 2005

## Americorps service-based project

Kerri Beiswenger  
*Northeastern University*

Jean S. David  
*Northeastern University*

Jeremy Labonte  
*Northeastern University*

Kristin Poole  
*Northeastern University*

Berkin Unan  
*Northeastern University*

---

### Recommended Citation

Beiswenger, Kerri; David, Jean S.; Labonte, Jeremy; Poole, Kristin; and Unan, Berkin, "Americorps service-based project" (2005). *Industrial Engineering Undergraduate Capstone Projects*. Paper 3. <http://hdl.handle.net/2047/d10011298>

# **AMERICORPS SERVICE BASED PROJECT**

**MIE 702**

## **Technical Design Report**

**AmeriCorps Service Based Project**

**Final Report**

**Design Advisor:** Professor Thomas Cullinane

**Sponsor Contact:** Walt Horner

**Design Team**

Kerri Beiswenger, Jean Sebastien David,  
Jeremy Labonte, Kristin Poole, Berkin Unan

**April 11, 2005**

Department of Mechanical and Industrial Engineering  
College of Engineering, Northeastern University  
Boston, MA 02115

# TABLE OF CONTENTS

- ACKNOWLEDGMENTS ..... 3**
- COPYRIGHT ..... 4**
- SECTION I: INTRODUCTION..... 6**
  - A. NEEDS ASSESSMENT ..... 6
  - B. PROBLEM SUMMARY ..... 6
  - C. PROJECT REQUIREMENTS ..... 7
  - D. GOAL STATEMENT ..... 7
- SECTION II: BACKGROUND ..... 8**
  - A. MASSACHUSETTS PROMISE FELLOWSHIP PROGRAM ..... 8
  - B. PERFORMANCE MEASURES LOGIC MODEL ..... 8
  - C. CURRENT REPORTING SYSTEM ..... 9
- SECTION III: LITERATURE SEARCH ..... 15**
  - A. VARIOUS REPORTING SYSTEMS ..... 15
  - B. EXISTING REPORTING SYSTEMS USED IN INDUSTRY ..... 18
- SECTION IV: INITIAL DESIGN CONCEPTS ..... 20**
  - A. COMPONENTS OF THE REPORTING SYSTEM ..... 20
  - B. FACTOR ANALYSIS OF SYSTEM OPTIONS ..... 21
  - C. EVALUATING FEASIBILITY ..... 26
- SECTION V: CHOSEN DESIGN ..... 29**
  - A. SURVEY TOOL SETUP AND DEPLOYMENT ..... 29
  - B. FUNCTIONAL SPECIFICATION ..... 32
  - C. MEASURES OF PERFORMANCE FOR OUR DESIGN ..... 39
  - D. COST SAVINGS ..... 39**
- SECTION VI: CONCLUSION ..... 43**
- REFERENCES ..... 44**
- APPENDIX A: MASSACHUSETTS PROMISE FELLOWSHIP PROGRAM DOCUMENTS ..... 45**
- APPENDIX B: REPORTING SYSTEM QUESTION CRITERIA ..... 46**
- APPENDIX C: PERFORMANCE MEASURES ..... 47**
- APPENDIX D: FACTOR ANALYSIS MATRIX ..... 48**
- APPENDIX E: SELECTSURVEYASP ADVANCED USER MANUAL INDEX ..... 49**
- APPENDIX F: FACILITATORS ..... 50**
- APPENDIX G: GANTT CHART ..... 51**
- APPENDIX H: RESPONSIBILITIES MATRIX ..... 52**

Deleted: 4/11/2005

## ACKNOWLEDGMENTS

We would like to acknowledge the Department of Mechanical and Industrial Engineering for their help and contribution to this project. In addition, we would like to give a special thanks to our faculty project advisor, Professor Thomas Cullinane, course coordinator, Professor Gregory Kowalski, and MIE Department staff members, LeBaron Briggs, Jeff Doughty, Noah Japhet and Nishit Shah, for their guidance and support throughout this course.

Finally we would like to extend our gratitude to Walt Horner and Kori Redepenning from the Massachusetts Promise Fellowship Program for including us in their efforts to increase program funding for improving community programs throughout the state of Massachusetts.

## Copyright

“We the team members,

---

Kerri Beiswenger

Jean Sebastien David

Jeremy Labonte

---

Kristin Poole

Berkin Unan

---

Professor Thomas Cullinane

Hereby assign our copyright of this report and of the corresponding Executive Summary to the Department of Mechanical and Industrial Engineering (MIE) Northeastern University.” We also hereby agree that the video of our Oral Presentations is the full property of the MIE Department.

**Publication of this report does not constitute approval by Northeastern University, the MIE Department or its faculty members of the findings or conclusions contained herein. It is published for the exchange and stimulation of ideas.**

## AMERICORPS SERVICE BASED PROJECT

### *Design Team*

**Kerri Beiswenger, Jean Sebastien David  
Jeremy Labonte, Kristin Poole, Berkin Unan**

### *Design Advisor*

**Professor Thomas Cullinane**

### **Abstract**

The main objectives of this project are: (1) to facilitate a more efficient manner to collect, store, and retrieve needed information on performance measures for the Massachusetts Promise Fellowship Program; (2) to understand, analyze, and finalize at least three performance measures that effectively evaluate the need and impact of programs for the Fellowship Program; (3) to provide the Fellowship Program with a reporting system that reduces the time it takes to report performance measures back to their funding organization. The Massachusetts Promise Fellowship Program serves youth throughout various communities of Massachusetts. In order to receive funding from their parent organization, it must develop performance measures and a comprehensive reporting system that collects, organizes, and reports performance data on an ongoing basis. The recommended design solution for this project is a web-based computer reporting system that was developed using the survey software tool, SelectSurveyASP. The design includes online performance surveys required by the Fellowship Program, which were all created and customized using SelectSurveyASP based on given design requirements. Fellows can access the reporting system from any computer with an internet connection to complete these surveys. The reporting system then compiles the survey results in a data summary file. The Fellowship Coordinator can access the system to view real-time results or to export the data to Excel. Finally, the Fellowship Coordinator can incorporate the needed information into the Fellowship Program's report to request funding.

## SECTION I: INTRODUCTION

The Massachusetts Promise Fellowship Program is a non-profit organization that serves communities throughout the state of Massachusetts. It is one of two thousand programs run by AmeriCorps, which is a network of national service programs. Currently the Program has twenty-five AmeriCorps Promise Fellows coordinating outreach efforts for young people at host sites located throughout Massachusetts. The Fellowship Program Coordinator oversees programming, interacts with host-site supervisors, facilitates training, and seeks funding for the program. This funding is largely based upon the self-developed measures of performance (MOPs) that are required by the primary funding organization, the Corporation for National and Community Service (CNCS). Performance measures are used to define the community need each program addresses and the impact it will have satisfying that need. The CNCS uses these MOPs to determine the effectiveness of the Fellows in carrying out various activities in their programs. Each AmeriCorps Program must develop at least three performance measures as well as a reporting system that will help the program meet its desired goals.

### A. NEEDS ASSESSMENT

In order to receive funding from the CNCS, the Massachusetts Promise Fellowship Program must develop at least three performance measures and a comprehensive reporting system that collects, organizes, and reports this performance data on an ongoing basis. The Fellowship Program currently uses a paper-based reporting system that (1) host sites use to evaluate their Fellow's performance, (2) Fellows use to evaluate their own performance, and (3) the Fellowship Coordinator uses to create progress reports for the CNCS. The current system consists of five reports that contain an assortment of information on the Fellows' performance and activities. The Fellowship Coordinator must review these reports for each of the twenty-five Fellows and then extract the important information to report back to the CNCS. This amounts to an overwhelming load of paperwork for the Fellowship Coordinator. This system needs to be improved so that the Fellowship Coordinator spends less time searching these reports for the performance measures requested by the CNCS. The reporting system must also be designed to capture the Fellowship Program's perpetual progress towards meeting the program objectives.

### B. PROBLEM SUMMARY

To meet the Fellowship Program's requirements, we collaborated with our sponsor to develop performance measures that reflect each of its program's goals. Once these MOPs were established, we designed a comprehensive computer-based reporting system that the Fellows can use to submit their performance reports on a periodic basis. This system then compiles this performance data for the Fellowship Coordinator to include in the reports submitted to the CNCS for funding.

Deleted: 4/11/2005

### C. PROJECT REQUIREMENTS

Both the CNCS and the Fellowship Program presented certain requirements that had to be met in order to fulfill the needs of this project. First, the CNCS required that at least three MOPs be developed in the following categories: Needs and Service Activities, Participant Development, and Community Strengthening. At least one of these performance measures had to reflect the Fellowship Program's goal related to managing and recruiting volunteers for its programs. The MOPs needed to be clear, concise, and measurable according to the CNCS guidelines. The Fellowship Program specified additional requirements for their reporting system, including (1) the ability to be updated and expanded in the future, (2) generate an easy to read report, (3) be compatible with Microsoft Office, (4) easy to learn and use, and (5) cost less than \$1,000 a year to maintain. The final MOPs and developed reporting system successfully meet these requirements.

### D. GOAL STATEMENT

The purpose of this project was to provide the Massachusetts Promise Fellowship Program with a computer-based reporting system that substantially reduces the time it takes to collect, organize, and report performance measures to the CNCS. Our goal in accomplishing this was to minimize the effort needed to develop effective reports for the Fellowship Program. In order to be successful, it is critical that our reporting system reduces paperwork and the time to report, enhances the satisfaction of the Fellowship Coordinator, and generates an easy to comprehend data output summary. These critical success factors will enable the Fellowship Coordinator to better utilize the reporting system and develop a stronger Fellowship Program for the Fellows. In turn, the Coordinator will be able to effectively apply information from the performance measures to strengthen the community programs affected by the Fellowship Program throughout the state of Massachusetts.

## SECTION II: BACKGROUND

### A. MASSACHUSETTS PROMISE FELLOWSHIP PROGRAM

In 1998, the Massachusetts Promise Fellowship Program created a partnership with the Corporation for National and Community Service and America's Promise, an organization that provides training and support. Northeastern University's Office of Government Relations and Community Affairs then agreed to house the Fellowship Program in the year 2000. In addition to the CNCS, the Fellowship Program also works with its state commission of community service, the Massachusetts Service Alliance.

Massachusetts Promise Fellows deliver the resources that young people up to twenty-four years old need to be successful in life by organizing community activities, establishing influential programs, and recruiting volunteers. Currently, the Fellowship Program accomplishes this with twenty-five Fellows, who work statewide in twenty-three non-profit organizations, schools, and state/local government agencies. These Fellows serve in five key areas: mentoring, after-school programming, health insurance outreach, marketable skills development, and youth services. Fellows are typically graduate students, between twenty-two to twenty-five years old, who work full time for a stipend. During the past five years, Fellows have provided over 150,000 hours of service to the youth of Massachusetts communities in Adams, Boston (Charlestown, Dorchester, Hyde Park, Roxbury), Brockton, Cambridge, Lawrence, Malden, Pittsfield, Springfield, Waltham, and Woburn.

### B. PERFORMANCE MEASURES LOGIC MODEL

To assist in developing effective measures of performance, the CNCS has provided AmeriCorps programs with its "Performance Measurement Toolkit." This guide introduces a logic model that provides a visual representation of each step towards achieving the desired result for a program. The logic model consists of the five components displayed below in FIGURE 1:

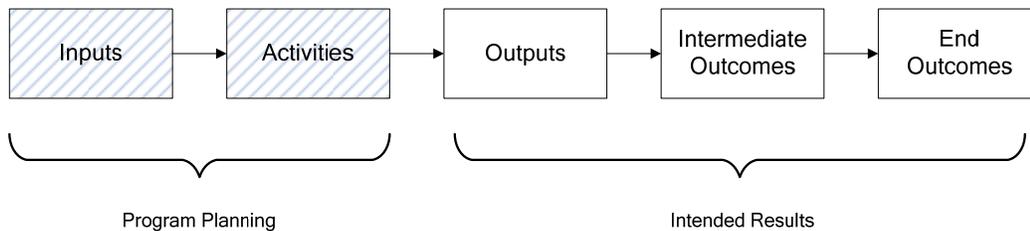


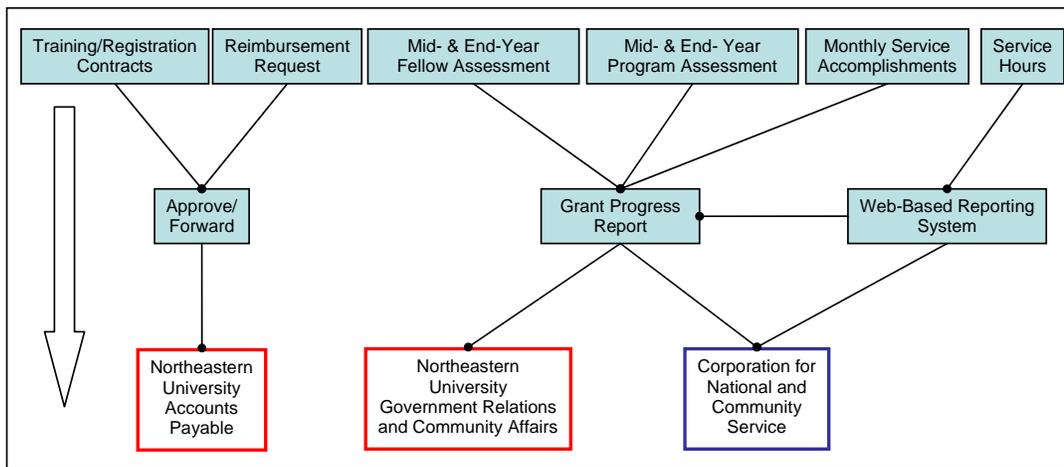
FIGURE 1: Performance Measures Logic Model

Deleted: 4/11/2005

The “inputs” of this model are the resources used to produce outputs and outcomes. The “activities” are what the program does with the inputs. The inputs and activities help develop the program’s plans [1]. The last three components of the model are the intended results of the program plan. In short, the “outputs” are the products and services delivered, the “intermediate outcomes” are the short-term effects of the outputs, and the “end outcomes” are the long-term effects of the outputs. The logic model helps the Fellows: (1) communicate their programs’ potential impact, (2) clarify the desired results, (3) identify program elements that need to be tracked, and (4) improve program planning and performance by identifying ways to measure success and areas for improvement.

**C. CURRENT REPORTING SYSTEM**

The Massachusetts Promise Fellowship Program submits two fundamental reports to the CNCS during their project year, including their Service Hours Report and Grant Progress Report (GPR). Information for the GPR is collected from various reports completed by Fellows and their host-site supervisors throughout the year. These reports include: Service Hour Reports, Monthly Service Accomplishment Reports, Mid- and End-Year Self Assessments, and Mid- and End-Year Program Assessments (see APPENDIX A for copies of each report). Once the Fellowship Coordinator receives the required reports from the Fellows and their host-site supervisors, he enters the necessary information into one of two online systems provided by CNCS: eGrants or Web-Based Reporting System (WBRS). Both eGrants and WBRS were developed specifically for the CNCS by outside Oracle developers to help maintain detailed information on how well each of their AmeriCorps programs is performing. FIGURE 2 illustrates the current system’s process flow. The section following this diagram provides more details about each Fellowship Program report.



**FIGURE 2:** Flow of Reports for Massachusetts Promise Fellowship Program

Deleted: 4/11/2005

**1. Service Hours**

Each week Fellows track the number of service hours and associating tasks they have completed on a standard Service Hour Report form provided the Fellowship Coordinator. At the end of the month, each Fellow is responsible to either fax or mail their signed forms to the Fellowship Coordinator. The Fellowship Coordinator then approves the report, enters the information into WBRs, and submits it to CNCS (see FIGURE 3). The original, signed Service Hour Report must be kept on file, as dictated by law, at the Fellowship Program Office at Northeastern University. Each Fellow spends approximately 20 to 30 minutes every month to complete and submit this form to the Fellowship Coordinator. It then takes approximately 60 minutes for the Fellowship Coordinator to input each Fellow’s Service Hour Report into WBRs, and file the hard copy of the form in each Fellow’s file.

Americorps MEMBER TIME LOG				
Agnes, Marita LOG YEAR: 2004 MONTH: November				
Enrollment Type: Full-time (1700 hrs./yr.) Start Date: 06/15/2004 End Date: 06/15/2004				
	Training Hours	Service Hours	Weekly Total	
Week 1				
Week 2				
Week 3				
Week 4				
Week 5				
Total Hours for Month:				
Totals from previous Time Logs:		501	501	
Total Hours to Date:		501	501	
Type	% of Hours	YTD	% of Hours	Weeks

FIGURE 3: Screenshot of WBRs Time Entry Page

**2. Monthly Service Accomplishments**

Fellows fill out a Monthly Service Accomplishments Report that can be either completed by hand or inputted into a Word document. This report helps the Fellowship Coordinator to monitor the Fellows’ progress towards their respective program goals. It also provides Fellows with the opportunity to request assistance for their programs. At the end of the month, Fellows are responsible to either fax or mail their signed form back to the Fellowship Coordinator. Each Fellow spends approximately 60 to 90 minutes every month to complete and submit this form. The Fellowship Coordinator inputs information from these reports into the Grant Progress Report.

**3. Mid-Year and End-Year Self Assessment**

Fellows complete Mid-Year and End-Year Self Assessments and submit them to the Fellowship Coordinator by December 1<sup>st</sup> and June 1<sup>st</sup>, respectively. In these reports, the Fellows rate themselves, their host site, and the Fellowship Program overall. These evaluations also assess the goals Fellows set at the beginning of their Fellowship. Supervisors at the Fellows’ sites also provide feedback in these reports. Upon completion of the assessment, Fellows are responsible to either fax or mail their signed form to the Fellowship Coordinator. Each

Deleted: 4/11/2005

Fellow spends approximately 30 to 60 minutes to complete and submit this form. Information from these reports is also included in the Grant Progress Report.

**4. Mid-Year and End-Year Program Evaluation**

Fellows complete Mid-Year and End-Year Program Evaluations in order to evaluate their particular service program. Each Fellow fills out the report at the Program Office at Northeastern University, and has approximately 30 minutes to complete the report under the supervision of the Fellowship Coordinator. These reports are used to help the Fellowship Coordinator fill out the Grant Progress Report sent to the CNCS.

**5. Grant Progress Report (GPR)**

The Grant Progress Report is the means of communication between the Fellowship Coordinator and the CNCS. The Fellowship Coordinator extracts and interprets data received from Fellows in their Monthly Service Accomplishments Reports, Mid- and End-Year Self Assessments, and Mid- and End-Year Program Assessments. He then enters the necessary information from these reports into the GPR through eGrants (see FIGURE 4). Once information is entered into the system, eGrants tracks the statistics and hours of the varying Fellows’ programs, including personalized stories on particular projects (see FIGURE 5). The system also tracks the Fellowship Program’s performance measures and provides entry fields for explanations if they do not meet goals. This report takes approximately 40 hours for the Fellowship Coordinator to complete and is submitted twice a year to the CNCS and Northeastern University. Approximately 24 of these hours are spent compiling data from each of the various reports Fellows submit throughout the year, while the remaining 16 hours is spent typing, cutting, and pasting information into the entry fields of eGrants.

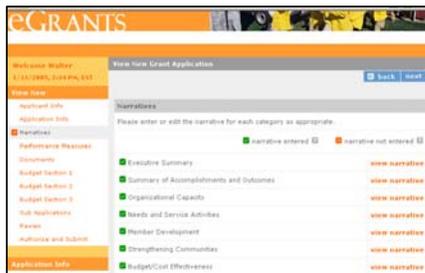


FIGURE 4: Screenshot of eGrants Web-based



FIGURE 5: Screenshot of eGrants Project

Deleted: 4/11/2005

**6. Reimbursement Requests**

Reimbursement Requests are Northeastern University forms that are due on the first Wednesday of the month. Fellows complete their individual request and mail or fax it to the Fellowship Coordinator for approval and possible form corrections. The Fellowship Coordinator then submits the forms to Northeastern University’s Accounts Receivable Department, and files a copy of the Fellow’s request in their respective file. Reimbursements for Fellows typically involve travel costs for MBTA passes or travel expenses for Fellows who are not located in the Metropolitan Boston area. Completion time for each Fellow is about 3 minutes per request.

**7. Contract & Training Registration**

Contract and Training Registration forms are completed by Fellows and the Fellowship Coordinator on an as-needed basis. Most of these forms only require the signature of the Fellow. Forms falling under this category include AmeriCorps contracts for becoming a Fellow and forms for training courses that need to be signed and kept on file.

**8. Bar Chart and Pareto Analysis**

Time for the Fellows and the Fellowship Coordinator to complete the reports of the current system are summarized in the TABLE 1 below.

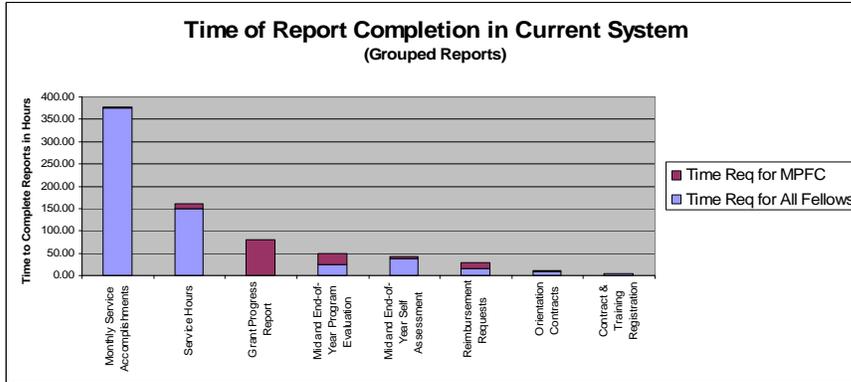
TABLE 1: Summary of Reporting Time Requirements

Report Name	Time Required for 1 Fellow (hrs)	Time Required for All Fellows (hrs)	Time Required for MPFC (hrs)
Monthly Service Accomplishments	15.0	375	12.0
Service Hours	6.0	150	12.0
Grant Progress Report	0.0	0	80.0
End-of-Year Program Evaluation	0.5	12.5	12.5
Mid-Year Program Evaluation	0.5	12.5	12.5
End-of-Year Self Assessment	0.8	18.75	2.1
Mid-Year Self Assessment	0.8	18.75	2.1

<b>Total Time (hrs)</b>	<b>587.5</b>	<b>133.2</b>
	<b>Fellows</b>	<b>Coordinator</b>

This data was used to perform a Pareto Analysis of the current system, which determines what part of the system requires the most time to complete. The results of this analysis are shown in the following bar charts and Pareto diagrams (FIGURE 6 and 7).

Deleted: 4/11/2005



**FIGURE 6:** Bar Chart of Times to Complete Reports for 25 Fellows and 1 Coordinator

FIGURE 6 shows the breakdown of time to complete reports for the twenty-five Fellows compared to the Program Coordinator (denoted as MPFC in the key for FIGURE 6). The greatest time requirement for the Fellows, and overall in the program, are the Monthly Service Accomplishment Reports. These reports are generated once a month by each of the Fellows and then submitted to the Program Coordinator where they are filed. The greatest time requirement for the Program Coordinator is the Grant Progress Report. This report is completed semiannually from data extracted from the Fellows’ Monthly Service Accomplishments Reports and the Mid- and End-Year Self and Program Assessments.

Deleted: 4/11/2005

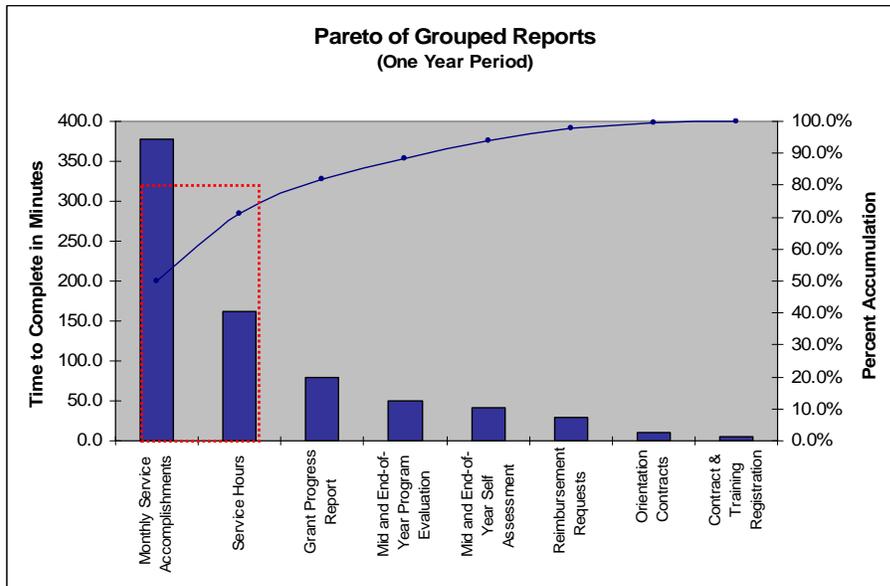


FIGURE 7: Pareto Diagram of Time to Complete Reports for System of 25 Fellows and 1 Coordinator

FIGURE 7 is a Pareto Diagram of the current reporting system that includes the twenty-five Fellows and Program Coordinator. This diagram demonstrates the classic 20-80 rule, which states that 20% of a process causes 80% of the problem. The 20-80 region is indicated by a red, dashed rectangle. This analysis shows that the time required for completing Monthly Service Accomplishment and Service Hour Reports are 80% of the total reporting time required for the Fellows. Finally, the Pareto shows that the Grant Progress Report is the third most time consuming reporting task. The main inputs for the GPR are the Monthly Service Accomplishments received from the Fellows. The Pareto Analysis supports our team’s goal of creating a more efficient method and system for completing and compiling these reports for entry into the Grant Progress Report.

Deleted: 4/11/2005

## SECTION III: LITERATURE SEARCH

### A. VARIOUS REPORTING SYSTEMS

Several different reporting systems were investigated to determine the most effective option for the Fellowship Program based on the project requirements. The primary three systems considered for the solution include (1) a simplified paper-based reporting system, (2) developing an in-house reporting system, and (3) acquiring a web-based survey software tool to assist in developing a reporting system. Each system is explained below.

#### 1. Paper-Based Reporting vs. Computer-Based Reporting

The two main options for improving the current reporting system are paper-based and computer-based. Although the current paper-based system used by the Fellowship Program is ineffective, it can be simplified to reduce the time needed to compile information. On the other hand, implementing a computer-based reporting system would offer a new process and means of data entry for the Fellows. It would also enable the Fellowship Coordinator to manipulate data and present completed reports in a manner that is not possible with a paper-based reporting system. This section presents the findings from an investigation of different attributes associated with both paper-based and computer-based survey systems.

When comparing a paper-based system to a computer-based system, questions arise regarding whether users will give biased answers when completing a survey on a computer-based system. Studies have shown that this is not the case so long as confidentiality is promised. Statistically, there is little or no response bias involving a computer-based survey method [6]. Additional research shows that there is no difference in survey completion content between individuals, which implies that demographics have no effect [3].

A feature available through both a computer-based system and a paper-based system is the ability to monitor progress towards completing reports. Knowing what percent of a report has been completed provides users with a sense of accomplishment and additional drive to finish the survey. Users can determine the percent completed in paper-based surveys by simply counting the remaining pages. On the other hand, a computer-based system must incorporate some kind of visual aid on the user interface, such as a moving status bar, to indicate the percent completed. Another sense of completion feature for a computer-based survey system is knowing that no more work is required for completing the survey once the submit button has been selected [6]. The data uploaded from the Fellow will automatically upload to the server for the database. A paper-based system, however, requires administrative tasks to complete the reporting process, such as faxing and filing the report.

Deleted: 4/11/2005

## 2. In-House Reporting Systems

One option for a computer-based reporting system is developing the system in-house. Since our team does not have a background in programming, we consulted with the Teacher Assistant (TA) for the Computer Information Systems (CIS) course in the Mechanical and Industrial Engineering Department at Northeastern University. In doing so, the team realized that in order to effectively develop an in-house system, several important design considerations must be taken into account.

First, all of the paper reports currently used to collect data must be gathered. Information concerning the front-end and back-end pieces of the application would then be collected through research and interviews. This would help the team to better understand what data the Fellowship Coordinator wanted to capture in the system. Next, the front-end of the system must be designed. The developed web pages contain a form and an HTML-embedded scripting language, such as common gateway interface (cgi) or active server pages (asp). The HTML code tells the form how to process the information inputted into the front-end by the users. While designing the front-end, the back-end must be developed simultaneously.

The back-end piece of the application can be designed using database software such as Microsoft Access or FileMaker Pro. Tables must first be created to include the desired fields and their specifications (i.e. numeric, text, time, date, etc). It is crucial to name these tables and fields correctly so they match the names assigned in the front-end of the system. Relationships must also be setup between the tables as one-to-one, one-to-many, or many-to-many. Finally, the front-end must be linked to the back-end of the system. FIGURE 8 summarizes this process.

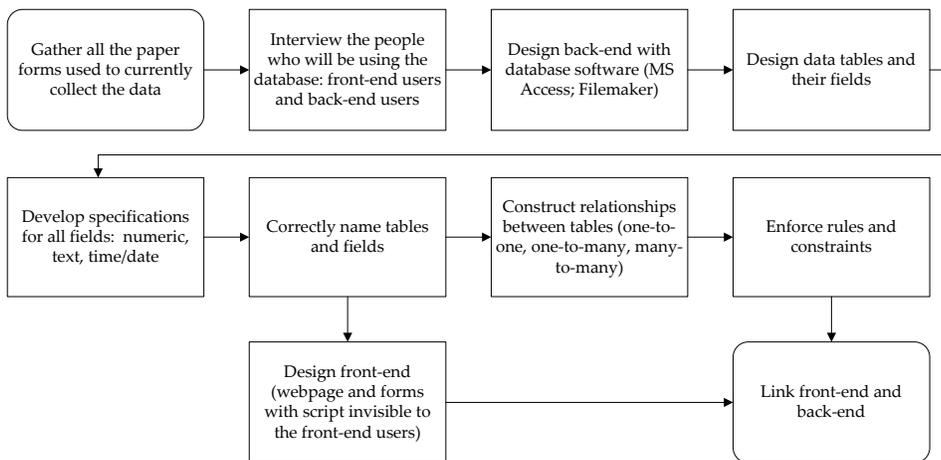


FIGURE 8: Design Considerations for Designing Databases for the Web

Deleted: 4/11/2005

### **3. Software Tools to Develop Reporting System**

Another approach to develop a computer-based system is acquiring a software tool package that assists in the process. There are many survey software packages on the market that may be considered over the option of developing an in-house system. The software tool would help develop the necessary surveys for Fellows to access and complete from a link on the Fellowship Program web page. Once all the surveys are completed, the software compiles the data for analysis. This minimizes the time currently consumed in compiling and reporting data for funding. The accessibility of a web page from any computer with an internet connection would facilitate an efficient use of the Fellows' time.

One drawback using a software package compared to developing an in-house system is the higher cost of purchasing the tool. However, this is offset by the benefit of buying a product that provides technical support and updates from the developer company. This is especially important since the Fellowship Program would like to a system that can be used and updated to their needs for years to come. Different software tools that were researched and found to be applicable for this project are detailed in the below section.

#### ***SelectSurveyASP***

SelectSurveyASP allows users to quickly and easily create web-based surveys using only web browsers. The administrative user simply deploys surveys and view real-time results as responses are received. SelectSurveyASP includes a diverse set of features, including unlimited question libraries for reusable questions, the ability to limit the number of responses per user, as well as the ability to view all individual responses. A one-time fee, which ranges between \$100 and \$300, entitles users to one year of free upgrades; however, the software does not expire after one year. [10]

#### ***QuestionPro Survey Software***

QuestionPro is web-based software tool that creates and distributes surveys. It consists of an intuitive wizard interface for creating survey questions, tools for distributing the survey via email or a website, as well as tools for analyzing and viewing the results. The administrator simply builds the survey and emails it to a list of potential respondents. QuestionPro collects and records the responses, providing results in real time. Some of the features include access to hundreds of industry standard survey templates, unlimited length essay responses, and rank answer choices with validation. A subscription is required and varies in price between \$49 and \$300 per month. [8]

#### ***Zoomerang***

Zoomerang is an online survey software which creates customized surveys on the web. It is very easy to use and does not require special training to learn. Zoomerang offers more than one hundred samples that users can choose from to create their own surveys. The admin can also build a survey from scratch to meet their specific needs by creating new questions, and using or modifying the sample questions provided by Zoomerang. A survey can be sent directly to a potential user's email address, but cannot be posted on a centrally located website. This may pose a

Deleted: 4/11/2005

problem if users accidentally delete the link sent to them via email. The responses are compiled in real time charts and tables so that results can be viewed immediately after deploying the survey. The pros of this software are the ease of use and simplicity. However, it is based on a twelve-month subscription and the responses are limited to 10,000 for all the deployed surveys. [14]

### ***Quask FormArtist Professional***

FormArtist offers web-based forms and surveys. It is a software package that provides the ability of creating forms and surveys offline, and then publishing them on a website or sending through emails. It also offers the option of creating customized forms and surveys in PDF format. Users can modify the appearance, questions, number of pages, and type of forms. FormArtist supports question types using text input, numeric input, drop-down selection, list selection, and tick boxes. Users do not need technical knowledge to build surveys. Forms can be viewed by any browser without plug-ins and completed offline or online. FormArtist Professional collects the responses and the data in a database - which can be located on a PC or on server - that is created automatically when a form is built. There is no need for additional software or database server. Data can be accessed anytime and is added to the database on the PC. FormArtist also automatically generates reports in MS-Excel (i.e. bar charts, tables and statistics), HTML, MS-Access and SQL-Server. Users prefer FormArtist because it is fully customizable, does not need a database server, and compiles all the data automatically. Quask also offers updates and an online support service for its users. [7]

### ***Explorance Blue 360***

Blue 360 is a software tool that allows users to gather data quickly and easily. Typical features of Blue 360 include feedback surveys, performance development, multi-rater reviews, and training needs. The application automatically captures email contact information from the computer. Users can create evaluations, invite precise respondents, monitor the survey process, and generate reports easily. Training is not required to create forms because it is as easy as using an internet browser. Blue 360 provides gathering and analysis processes without using IT resources. It also automates the process of creating and managing the results through the web, which helps to analyze results quickly and view clear data. Blue 360 helps to improve performance management for companies and organizations. The collection of data and the results analysis are fast and reliable. It is 100% web based and can create a report automatically according to the main user's specifications. [2]

## **B. EXISTING REPORTING SYSTEMS USED IN INDUSTRY**

In order to understand the benefits of using a computer-based reporting system for the Massachusetts Promise Fellowship Program, it is important to research existing systems that help nonprofit organizations secure grants from donors and grantors. These reporting systems help them manage the heavy reporting demands, respond to detailed information requests, and present accurate financial information. They also allow organizations to reduce reporting time, leading them to perform more activities and monitor employee-participant relations to measure their

Deleted: 4/11/2005

performances on the programs. There are several types of reporting systems in the industry, such as web-based systems and reporting software. The leading systems and software include UltiPro, GuideStar, and The Raiser's Edge.

### ***GuideStar***

GuideStar is a national database for nonprofit organizations. Nonprofit organizations create reports about their activities and financial information on the website which can be viewed by grantors. It facilitates access to information about the operations and finances of nonprofit organization, helping them to work more effectively and efficiently. GuideStar is one of the primary online public research libraries for the entire nonprofit sector. It offers services like salary search for foundation and public charity compensation, grant activity research, data services, report analysis, and charity check for grantors, donors and nonprofit organizations. [4]

### ***UltiPro***

Ultimate Software is a leading provider of web-based payroll management solutions that offers the award-winning UltiPro as licensed software. UltiPro includes: human resources, payroll, benefits management, comprehensive reporting, a web workforce portal with employee and manager self-service, benefits enrollment, employee work events and staff administration, built-in workflow, recruitment and staffing and training management. With UltiPro, users can complete daily employee administration tasks, process payroll, administer benefits, manage staff, and access reporting in real-time, from one central location, can access commonly requested reports and analyze statistics. It reduces operating costs by eliminating the need to print and distribute paper communications. With its customization option, users also can easily extend it into other areas of the organization. Ultimate Software customers represent diverse industries and include such organizations as Benihana Restaurants, the Container Store, Elizabeth Arden, the Florida Marlins Baseball Team, the New York Yankees Baseball Team, Omni Hotels, Ruth's Chris Steak House, SkyWest Airlines, and Trammell Crow Residential. [13]

### ***The Raiser's Edge***

The Raiser's Edge is a fundraising system that helps nonprofit organizations make better decisions through segmentation, analysis, and powerful reporting capabilities. There are more than 12,000 nonprofit organizations that currently use The Raiser's Edge. It is more than a storage place for user information. With The Raiser's Edge, users can get instant information about the performances of their activities, analyze data with Microsoft Excel, access extensive information for any organization, see all the relationships of donors, and organize and manage volunteer and staff solicitors. It provides more than one hundred standard reports that give information to support the decision-making process. The software also comes with a versatile report writer, Crystal Reports. Crystal Reports allows users to create reports containing the data from any field within The Raiser's Edge. Reports can be sophisticated or simple in order to meet the organization's needs. [9]

Deleted: 4/11/2005

## SECTION IV: INITIAL DESIGN CONCEPTS

### A. COMPONENTS OF THE REPORTING SYSTEM

The reporting system developed consists of online surveys that are simply electronic versions of the reports and evaluations currently used by the Fellowship Program. The current paper-based reports were modified so that responses to each question are limited. The measures of performance are tracked through questions that are included in the Monthly Service Report. A copy of both of these questions can be found in APPENDIX B.

#### 1. Developing Measures of Performance

In order to develop performance measures that encompass the Fellowship Program's main goals and objectives, it is important to understand what the Fellows do. Samples of Fellows from various programs were interviewed while information was gathered for each of their programs. It was then determined that four areas encompass their work: education, health care, career and employment, and young woman's development. Performance measures were developed for each category, using the logic model format. In addition, MOPs that can easily be related to all of the areas were developed.

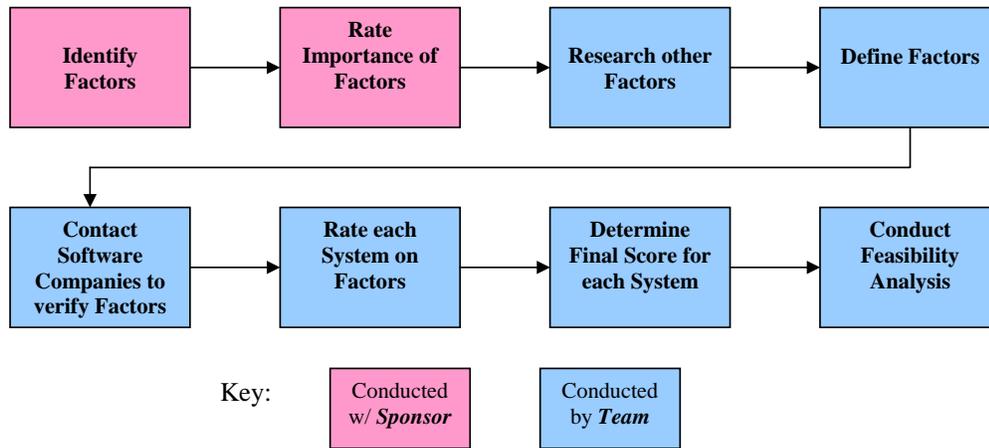
Each measure of performance consists of three levels: an output, an intermediate outcome and an end outcome. A measure of performance developed in this style aims to reach beyond what is happening in the present state, and looks to predict how it might affect the program and/or its participants in the future. At the output level, a performance measure states a count of the amount of service members have completed, but does not provide information on benefits or other changes in the lives of members and/or beneficiaries. The intermediate outcome specifies a change that has occurred in the lives of beneficiaries and/or members, but is still short of a significant, lasting benefit to them. Finally, the end outcome identifies a change that has occurred in the lives of the beneficiaries and/or members that is *significant* and *lasting*. [1]

Using the standard template as a guide, the team developed seven initial performance measures for the Fellowship Program, which can be found in APPENDIX C. The team presented these measures to the Fellowship Program Coordinator for review and then worked with the project sponsor to modify the measures as needed. Although the Fellowship Program will not be using the initial measures developed by the team this year, it plans on implementing them in the future. Through collaboration with the Coordinator, the team was able to finalize the measures of performance that will be submitted to the CNCS this year. Please see APPENDIX C for the finalized MOPs.

Deleted: 4/11/2005

## B. FACTOR ANALYSIS OF SYSTEM OPTIONS

In order to determine the optimal reporting system for the Fellowship Program, we conducted a Factor Analysis. The steps to this process are outlined in the flow chart below (FIGURE 9).



**FIGURE 9:** Factor Analysis Steps

The Factor Analysis compares each system based on a set of factors the Coordinator identified as the capabilities he is looking for in the reporting system. Each factor is rated on a scale of 1-5 according to its importance to the system, where 5 reflects the most important factor and 1 is not important at all. In addition to the factors determined by the Fellowship Program, the team researched and added a few other factors that should be considered when evaluating web databases [5]. Most of these factors were applied when developing the back-end of the reporting system later in the process. The list of factors and their importance ratings can be found in the TABLE 2 below, which is color-coded to help distinguish the different rating levels:

Deleted: 4/11/2005

**TABLE 2:** List of Factors and Importance Ratings

Factor	Rating
Expandability	5
Generates an Easy to Read Report	5
Easy to Navigate/Use	4
Ability to Provide Technical Support	4
Ability to Print Report	4
Compatible with Microsoft Office	4
Security	3
Ability to Save Surveys when Partially Completed	3
Cost (Under \$1000 a Year)	2
Ability for Coordinator to Monitor Progress	2
Ability to Send Automatic Email Reminders	1

Once all of the factors were identified, the team generated a list of questions to ask each software company to determine how each software tool rates on the factors, as shown below:

***Questions for Software Tool Selection:***

- We need a login and registration page; can this be done through the software?
- We need a page with a list of all the surveys you can take; can this page be automatically updated when new surveys are added, or old surveys are changed?
- How do I create surveys? Is the tool web-based or does it need to be installed on a PC?
- How do I run the survey off my server? How easy will it be to create/update the survey and then link it to where we want it to run?
- Will users be able to save form when partially completed?
- Will the administrator have the ability to extract data per survey and per user?
  - Can the administrator see the combined results of everyone that takes the survey? Or will the administrator see the results of just one user?
- Will the administrator be able to easily add users to the system? Do you have the option of designing the registration page that a user can register with (so that Admin doesn't always have to do it)?
- How many users are able to access the survey at one time?
- Is there a limit to the number of questions you may create on each form?

Deleted: 4/11/2005

**1. Factor and Rating Definitions**

Next, the team defined each factor and their rating levels to ensure that each system be evaluated on the same considerations. Below is a summary of these definitions:

**Expandability**

- What does the software offer to enable the Coordinator to expand the reporting system (i.e. add or update reports) in the future?

5	Software package offers survey templates, tutorials, the ability to copy existing surveys, and the ability to upload surveys automatically once survey is developed
4	Software package offers all but one of the items mentioned in 5
3	Software package offers some of the items mentioned in 5 but does not update survey automatically
2	Coordinator would require technical support from software company to update surveys
1	Software package offers no update capabilities for surveys once they have been created

**Generates an Easy to Read Report**

- What kind of report does the software generate in order for the Coordinator to submit data to the CNCS?

5	Data is clearly defined with labels and requires no modification of data before entering information into CNCS form
4	Data clearly defined but requires minimal manipulation before entering data into CNCS form
3	Coordinator needs to perform some data analysis before entering into CNCS form
2	Data does not match up to labels and needs to be sorted, interpreted, and analyzed
1	Data is in a code that needs to be translated into another form

**Easy to Use/Navigate**

- How easy is it for the Coordinator to use the software after introduction training?

5	Coordinator finds the software to be as easy as surfing on the web and need no training
4	Coordinator can use with ease after brief introduction training
3	Coordinator still needs supplemented material after introduction training
2	Coordinator needs technical support from software company after introduction training
1	Coordinator finds the software too difficult to use, even with resources mentioned above

**Ability to Provide Technical Support:**

- What technical support does the software company offer for its consumers?

5	Software offers 24/7 support for an unlimited time via their website, email, and toll-free phone #
4	Software offers support that is only available during business hours
3	Software offers support for a limited time only
2	Software only offers technical support via telephone through a voice recording
1	Software offers no technical support

Deleted: 4/11/2005

**Ability to Print Report**

- How much formatting of the data is required to print compiled reports?

5	Data requires no formatting to print output report
4	Data clearly defined but requires minimal manipulation before printing
3	Data not totaled, and needs to do data analysis before printing
2	Data not clearly labeled and needs to be sorted, interpreted, and analyzed before printing
1	Data cannot be printed

**Compatible with Microsoft Office**

- Is the software compatible with all Microsoft Office programs?

5	Software is compatible with all MS products
3	Software needs plug-in(s) to convert
1	Software is not compatible is MS products

**Security**

- What provisions does the software offer to control group and user access?

5	Software is password protected, script protected, and offers security updates
3	Software is only password protected
1	Software does not offer any security provisions (links to software can be searched through internet); anyone can take surveys

**Ability to Save Surveys when Partially Completed**

- Will Fellows be able to save their survey and go back to it later to make changes before submitting?

5	Surveys can be saved at any point in time and accessed later to complete and submit
3	Surveys can only be saved by page; incomplete pages will not save
1	Surveys cannot be saved and must be completed on the first attempt

**Cost (Under \$1,000 a Year)**

- After the initial fee for the product, how much will it cost to maintain the software per year?

5	No cost per year
4	Less than \$300 per year
3	Less than \$600
2	Less than \$1000
1	Over \$1000 per year

**Ability for Coordinator to Monitor Progress:**

- Will the Coordinator be monitor progress of survey completion (i.e. view 5 out of 25 surveys already submitted)?

5	Yes, Coordinator can download output file to view results of completed surveys
1	No, Coordinator can only view results once all surveys have been completed

Deleted: 4/11/2005

**Ability to Send Automatic Email Reminders:**

- Can the software generate automatic email reminders for Fellows to complete reports?

5	Yes, software can set up automatic email reminders
1	No, software is not capable of automatic email reminders

**2. Determining System Scores**

Before a score could be determined for each system, the team first contacted each company to verify how each one rates on the factors. Once each question was answered, the team was ready to rate each reporting system option. To determine a system score, each Factor Rating is multiplied by the rating it received for each system, as shown below:

$$\begin{array}{rccccccc} \text{Factor Rating} & & \times & & \text{System Rating} & = & \text{Factor Score} \\ 5 & & \times & & 1 & = & 5 \end{array}$$

For example, since Expandability is one of the most important factors for the reporting system, its Factor Rating is 5. An in-house reporting system, however, only rates a 1 for this factor, because it does not offer any update capabilities. Therefore, this system only has a score of 5 for the Expandability factor.

A system could receive a perfect score if it received the highest possible rating of 5 for each factor. Therefore, the highest possible score each system could receive is 185, which is found by multiplying each factor rating by 5. The total score for a system is found by summing its factor scores. This score can then translated into another score out of 100 points, which is done with some simple algebra:

$$\frac{\text{System Score}}{\text{Total Possible Points}} = \frac{x}{100}$$

For example,

$$\frac{67}{185} = \frac{x}{100}$$

Solving for x gives the paper-based reporting system a score of 36. The results of this analysis can be found in the Factor Analysis Matrix of APPENDIX D. Below is a summary of each system’s score:

**TABLE 3: System Score Summary**

System	Score
Paper-Based System	36
In-House System	73
<b>Quask</b>	<b>90</b>
<b>SelectSurveyASP</b>	<b>90</b>
Zoomerang	86

From these results, there is a tie between Quask and SelectSurveyASP. In order to “break the tie” and determine the final selection of the reporting system, it was important to evaluate the feasibility of each option.

Deleted: 4/11/2005

## C. EVALUATING FEASIBILITY

While the Factor Analysis provides quantitative justification for selecting a reporting system, the feasibility of each option needed to be assessed. There are two main aspects of a system's feasibility. First, the team needed to feel comfortable with the chosen system design based on their given skills and resources. The other primary consideration is the time constraint for implementing the system. With these in mind, the team then reviewed each option.

### **1. Paper-Based Reporting System**

From the Factor Analysis, the paper-based reporting system scored 36 out of 100, which was the lowest of the options. The team concluded that this score accurately reflects the feasibility of this system. Even simplifying the current paper-based system would not significantly improve the time it takes to compile and report the information to the CNCS. Although the team possesses the skills and resources needed to implement this type of system, as well as have sufficient time to do so, it would not meet the criteria set forth by the Fellowship Program for the system. Therefore, this option is not an optimal feasible solution.

### **2. In-House Reporting System**

The second lowest score determined by the Factor Analysis is the 73 out of 100 for the in-house reporting system. While this system scored well on many of the factors, it scored poorly on two of the most important ones: expandability and the ability to provide technical support. If the team chose to develop its own reporting system, it would not be available to offer any assistance in the future once this project is completed. The team would have to conduct substantial training and create an extensive user's manual to help the Coordinator expand the system in the future. This would present another challenge because of the time constraint on the team. Furthermore, the team did not feel comfortable designing their own system because they are not programmers and therefore lack the expert skills required for this type of system. While they could solicit outside resources to assist them in the process, the team would still face a time constraint for completing the scope of this project. Therefore, developing an in-house reporting system is not an optimal feasible solution.

### **3. Software Tools to Develop Reporting System**

The final three options all involved purchasing a software tool that helps develop the surveys needed for the reporting system. The team feels the most comfortable with this option because they possess the skills and resources needed to implement this type of system. In addition, the team would not encounter any time constraint in doing so. All three tools – Quask, SelectSurveyASP, and Zoomerang – rated high for each factor. Although Quask and SelectSurveyASP tied for the highest score of 90 out of 100, Zoomerang was not far behind with its score of 86. The reason for this slight difference is Zoomerang does not protect the system with a password, which means

Deleted: 4/11/2005

anyone could access the surveys. Since this is an important factor to the Fellowship Coordinator, it is a major shortcoming of this system option. But it does not necessarily mean that Zoomerang would not be feasible. The only way to differentiate between the remaining software tools is to analyze their features.

#### D. SELECTION OF SOFTWARE TOOL

In order to make a final software tool selection, the team presented each option to the Coordinator. Trial surveys were developed so that the Coordinator could see exactly what each system would look like. First, each tool was described as summarized below:

TABLE 4: Tool Summary

Feature	Quask	SelectSurveyASP	Zoomerang
Access to Tool	<ul style="list-style-type: none"> <li>• Software application</li> <li>• Can only access tool on PC(s) it is installed on</li> </ul>	<ul style="list-style-type: none"> <li>• Web-based application</li> <li>• Can access tool from any PC with internet connection</li> </ul>	<ul style="list-style-type: none"> <li>• Web-based application</li> <li>• Can access tool from any PC with internet connection</li> </ul>
Access to Surveys	<ul style="list-style-type: none"> <li>• Must create Login page and summary of surveys</li> <li>• Must manually update survey links</li> </ul>	<ul style="list-style-type: none"> <li>• Can easily link to Login-Registration page from Fellowship Program website</li> <li>• Automatically updates survey links</li> </ul>	<ul style="list-style-type: none"> <li>• No Login/Registration Page</li> <li>• No central location to access surveys</li> <li>• Must email Fellows with link to surveys</li> </ul>
Output file	<ul style="list-style-type: none"> <li>• Output file summarizes data in tables and graphs</li> <li>• Must take surveys temporarily offline to access output files</li> </ul>	<ul style="list-style-type: none"> <li>• Plain output file summarizes data in tables</li> <li>• Can access output file without taking surveys offline</li> </ul>	<ul style="list-style-type: none"> <li>• Plain output file summarizes data in tables</li> <li>• Can access output file without taking surveys offline</li> </ul>
Cost	<ul style="list-style-type: none"> <li>• \$199 one time fee for Standard package</li> <li>• \$899 one time fee for Professional package</li> </ul>	<ul style="list-style-type: none"> <li>• \$199 one time fee</li> </ul>	<ul style="list-style-type: none"> <li>• \$350 per year</li> </ul>

First, the team explained some of the features that Zoomerang lacks, including password protection of the surveys, and, more importantly, a central location to access the surveys. A link to each survey would need to be emailed to the Fellows in order for the survey to be completed. The Coordinator agreed that it would be problematic if a Fellow accidentally deleted that email, they would not be able to complete the survey until another email was sent to them with the link. Therefore, Zoomerang would not be an optimal feasible solution.

Next, the team presented the trial surveys for Quask and SelectSurveyASP. After walking through how each tool is used, the Coordinator decided that SelectSurveyASP would be the optimal tool. The fundamental reasons for choosing this over Quask is that it is web-based and easier to access the surveys through the Fellowship Program’s web page. Although he preferred the more colorful output files generated by Quask, the Coordinator felt more comfortable with the layout and features of SelectSurveyASP.

Deleted: 4/11/2005

## **E. BACKUP DATABASE SYSTEM**

The AmeriCorps Capstone Group recommends that the Fellowship Program office install an external hard drive backup system. This backup hard drive will archive the database of output files produced by the survey system, ensuring no loss of data in the event of a computer or network failure. The server network discussed in the next section backs up their database nightly, but not all necessary files for Sponsor will be located on server. The server/hard drive combination will eliminate the need for Fellows to use excess hard drive space to store their reports at their respective sites and/or personal computers.

### **1. Cost Estimates for Backup Database System**

An external hard drive with an IEEE 1394 FireWire and/or USB 2.0/1.1 connection currently costs \$120 to \$210. Automated software is commonly included with the purchase but can also be downloaded from sites such as <http://www.downloads.com> at no cost, or for a fee up to \$70.00. Installation and operation instructions for all these products are provided by the manufacturer.

## SECTION V: CHOSEN DESIGN

### A. SURVEY TOOL SETUP AND DEPLOYMENT

#### **1. Purchase of Survey Software**

Through Factor Analysis, the software tool SelectSurveyASP was established as the optimal choice for the Fellowship Program's reporting system. The software was purchased through the Capstone budget for \$252.00. Following this purchase, it was found that Northeastern University could not provide a Windows-based server to the Fellowship Program for an extended period of time. The group then investigated server possibilities with the aid of Le Baron Briggs, the Information Systems Coordinator for the Mechanical and Industrial Engineering Department. Through comparison of the proposed servers, the group and Fellowship Coordinator chose iPowerWeb as the server to utilize for the proposed system. The deciding factors in this decision were the dependability of the server and the technical support that would be available to the Fellowship Coordinator following project completion.

#### **2. Server Selection Process**

Four server options were investigated for the proposed system. Each option was rated based on its disk space, memory transfer size, cost, and the availability of technical support. The table below describes each system and its pro's and con's. The server option selected was iPowerWeb, which is the yellow highlighted column in TABLE 5 below. iPowerWeb offers the largest disk space and memory at the lower cost. It also provides live technical support to its customers.

**TABLE 5: Server Comparisons**

	NU Conference Server	AmeriCorps Administrative Office	iPowerWeb	Active Host
<b>Basic Info</b>	Temporary server installed for conference on campus	Contact through Sponsor	Professional Web Server	Professional Web Server
<b>Cost per Year</b>	Free	Free	\$120 (Includes Domain Name)	\$180 (Plus \$25 Domain Name Registration)
<b>Disk Space</b>	NA	NA	1 Gigabyte	50 Megabytes
<b>Memory Transfer</b>	Unlimited	Unlimited	50 Gigabytes	1 Gigabytes
<b>Technical Help</b>	Some Business Hours	Contractor would have to be called in	24/7 Live	24/7 Email
<b>Pro's</b>	<ul style="list-style-type: none"> <li>• On campus</li> <li>• Free</li> </ul>	<ul style="list-style-type: none"> <li>• Free</li> <li>• Will keep database and server within AmeriCorps</li> </ul>	<ul style="list-style-type: none"> <li>• Professional Service</li> <li>• Large Disk Space</li> <li>• Own domain name</li> </ul>	<ul style="list-style-type: none"> <li>• Professional Service</li> <li>• Unlimited Email Accounts</li> <li>• Recommended by ClassApps</li> </ul>
<b>Con's</b>	<ul style="list-style-type: none"> <li>• Not available after end of semester</li> <li>• Finalized project handoff not possible</li> <li>• Group would be on own for technical assistance</li> </ul>	<ul style="list-style-type: none"> <li>• No full-time technicians for Server</li> <li>• Could not receive definite confirmation</li> </ul>	<ul style="list-style-type: none"> <li>• Not located on an affiliated server</li> <li>• Yearly cost</li> <li>• 24/7 Free Technical Support</li> </ul>	<ul style="list-style-type: none"> <li>• Not located on an affiliated server</li> <li>• Yearly cost</li> <li>• Length of company existence suspect</li> </ul>

**3. Transfer/Deploying System**

It was recommended that the Fellowship Program not rely on Capstone to provide the first year’s server fee because it would later have to transfer ownership to the Fellowship Program. This could result in a potential loss of data as well as additional paperwork. The Fellowship Sponsor contacted iPowerWeb and provided the necessary credit card information to purchase a year’s subscription to the server. The domain [www.masspromisefellows.org](http://www.masspromisefellows.org) was then ordered and installed as the main domain for the Fellowship Program server space. Once server access was granted, the necessary software files were extracted from the SelectSurvey CD provided. The survey software was then transferred onto the server via File Transfer Protocol (FTP). The FTP software used for the transfer was WS\_FTP LE 6.0. The survey software was placed in the *SelectSurveyASP Advanced* folder under *wwwRoot*, as recommended by the software manufacturer and hosting company.

By following the installation guide provided by ClassApps, the coding for the software was modified to allow functionality with the iPowerWeb server. The following modifications were made:

- Database type and collection method

Deleted: 4/11/2005

- Root folder where software is located
- Administrator access
- Administrator contact information
- Email Configuration
- Default home page of the software

Necessary changes were made in the *config.asp* file in order to be compatible with MS Access. The default page and root folder were then setup in order to run the software once the main web page was launched. Administrator access and contact information were configured so that the users' access is limited. In order to send emails through the software, an email configuration was done by changing the email variable and placing the SMTP server name into the required area.

#### **4. File Access/Privilege Problems**

While modifying the code for the software to link the server with a MS Access Database, file-privilege property was tested in order to examine the security of the system. After returning the access back to "full access," the survey software would not function properly. After consulting the installation manual, reinstalling the software, and experimenting with the source code, the error was found and corrected. The problem was an upper versus lower-case "C" in a code command line. Documentation of this error was noted and passed on to the Fellowship Coordinator to prevent future problems.

#### **5. Developing Surveys**

Following the installation of the software onto the server, the required surveys were entered into the system according to the criteria that the group previously in collaboration with the Fellowship Coordinator. These surveys were presented to the Fellowship Coordinator for feedback on any necessary changes. The surveys were then modified to accommodate the Coordinator's specifications and prepared for testing with Fellows. A template was created with the Massachusetts Promise Fellowship logo and particular colors. This template will be used for all of the Fellowship Program surveys.

## B. FUNCTIONAL SPECIFICATION

The functional specification of the reporting system provides a detailed overview of how the reporting system is setup, how users will interact with the reporting system, and how data will be processed through the system. The spec will also clearly define the technologies and server platforms for the system. The following section contains process flow diagrams, system context diagrams, and initial user-interface screen shots.

### 1. Process Overview

#### i. High Level As-Is Process Flow.

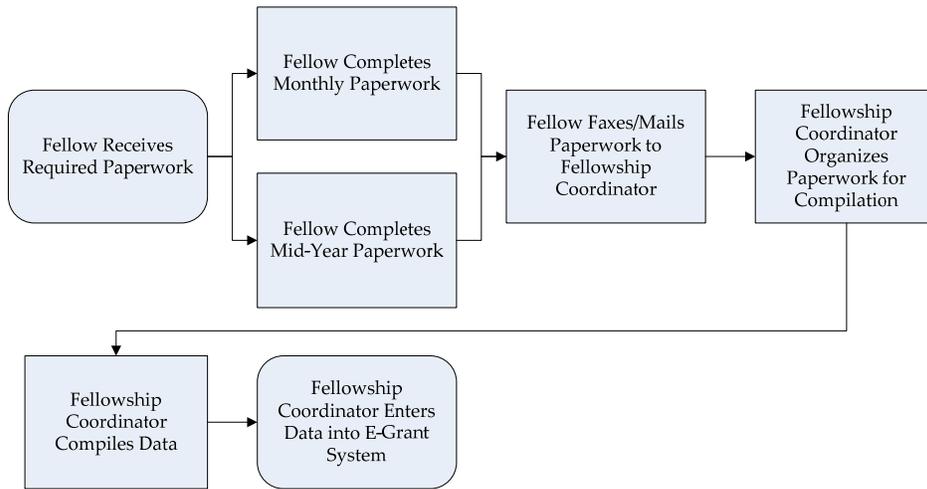


FIGURE 10: High Level As-Is Process Flow

Deleted: 4/11/2005

**ii. High Level To-Be (Developed) Process Flow.**

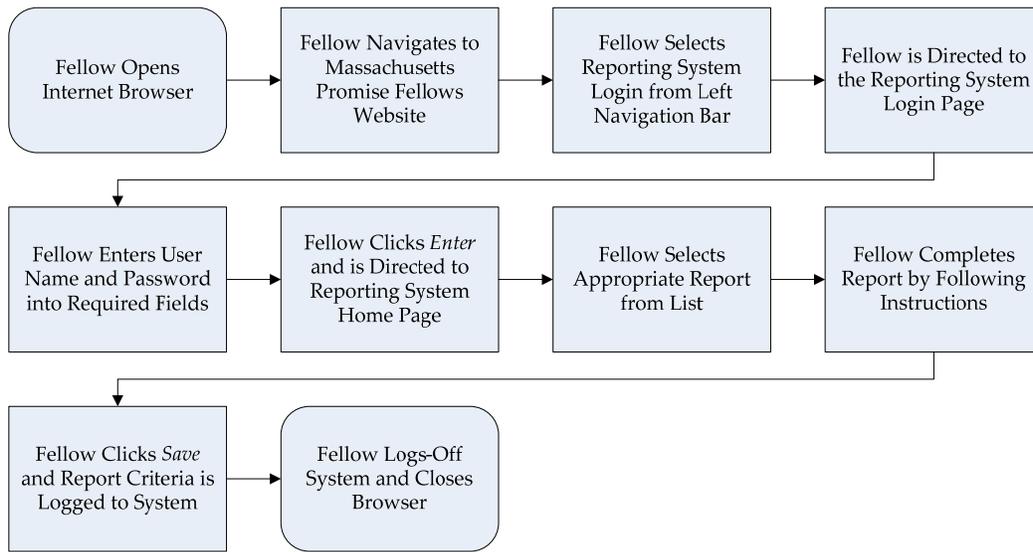


FIGURE 11: High Level To-Be Process Flow

**iii. High Level To-Be Data Flow.**

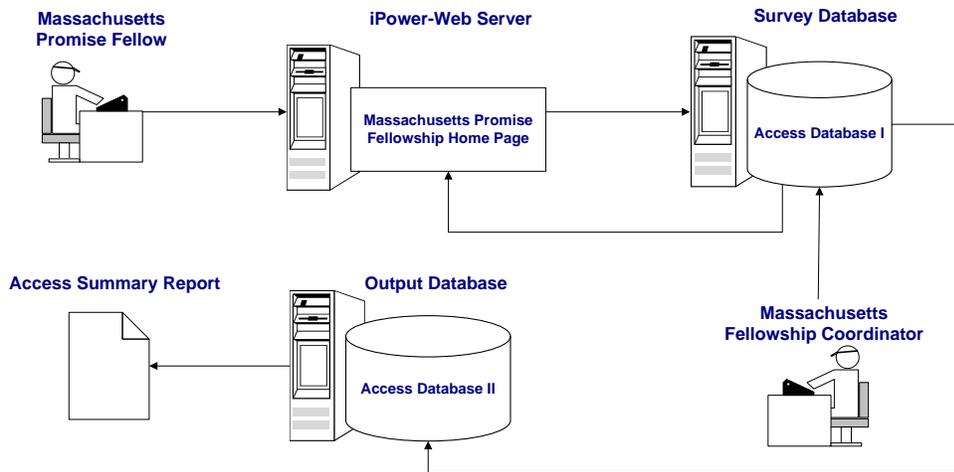
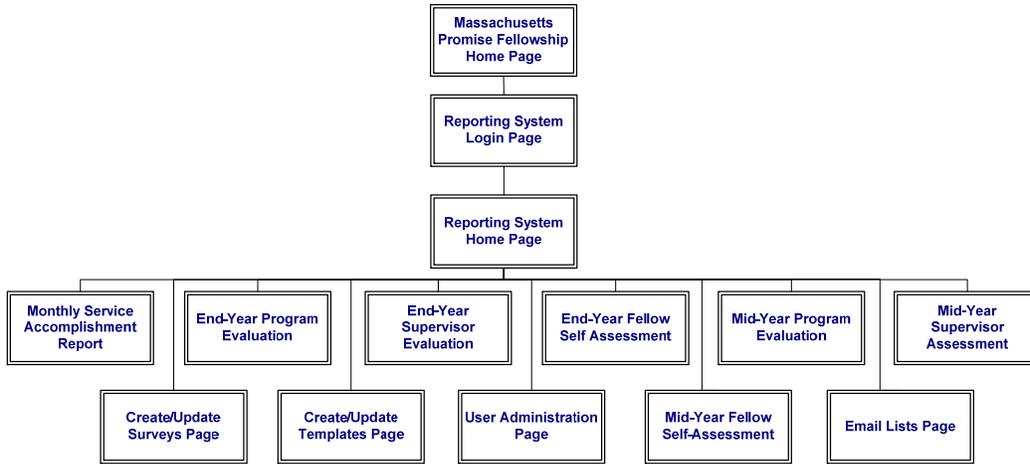


FIGURE 12: Reporting System Data Flow Diagram

Deleted: 4/11/2005

**2. System Overview**

**i. System Context Diagram.**



**FIGURE 13:** AmeriCorps System Diagram

**ii. Application Navigation.**

Massachusetts Promise user logs onto the Massachusetts Promise Fellowship system and is authenticated by the system database. Once the user is authenticated they will be directed to the Massachusetts Promise Fellowship reporting system home page. The user will select a desired link, and work to complete required tasks accordingly. Upon completion users will logout and be redirected back to the Massachusetts Promise Fellowship home page.

**iii. Technologies/Platform.**

***Client Platform***

- Windows XP..... IE 6.0
- Windows 2000..... IE 6.0 & IE 5.5
- Windows 1998..... IE 6.0 & IE 5.5
- Windows NT4..... IE 6.0 & IE 5.5

***Server Platform***

Microsoft Internet Information Server, version 4.0 or higher

***Database Platform***

MS Access, SQL Server, or MySQL

Deleted: 4/11/2005

**iv. End Users.**

**TABLE 6:** Permission Rights

<b>User Type</b>	<b>Customer/User Description</b>	<b>Interface to System</b>
Administrator	<ul style="list-style-type: none"> <li>• Fellowship Coordinator</li> <li>• Assistant Fellowship Coordinator</li> </ul>	<ul style="list-style-type: none"> <li>• Create/Edit/Delete Report Templates</li> <li>• Maintain User’s Access Rights</li> <li>• Email Distributor</li> <li>• Manage System</li> </ul>
Creator	<ul style="list-style-type: none"> <li>• Staff of Massachusetts Promise Fellowship Program</li> </ul>	<ul style="list-style-type: none"> <li>• Create/Edit/Delete Templates</li> <li>• Receives Email</li> </ul>
User	<ul style="list-style-type: none"> <li>• Promise Fellow</li> </ul>	<ul style="list-style-type: none"> <li>• Enters information into reporting system</li> <li>• Receives Email</li> </ul>

**3. Reporting Overview**

**i. Access Reporting System.**

This reporting system incorporates the exported survey result files into an MS-Access database. The database queries and organizes the data in order to produce summary reports, sorting information by fellow and by question. These summary reports are then exported into MS-Word, where the Fellowship Coordinator can copy and paste information into the eGrants for the Grant Progress Report and other publications required by AmeriCorps.

**ii. Creation of Access Reports.**

Using the exported files from the SelectSurveyASP Software, Access database tables were converted into an Access Database. This was performed by saving the comma delimited exported files as Excel 97-2002 files. These files were then imported into the Access Database in proper table format using the import wizard. Two types of Access reports were then created for the Fellowship Coordinator for each of the surveys. The report wizard was used to create reports that sorted the information by Fellow. The second type of report, which sorts by question, was created in the design view by using sub-reports containing the Fellows’ names and question field. This method of utilizing sub-reports allows for answers to be sorted by Fellow, with the answerer’s name next to the completed field. Please see FIGURES 14 and 15 below for examples of the Access reports.

Deleted: 4/11/2005

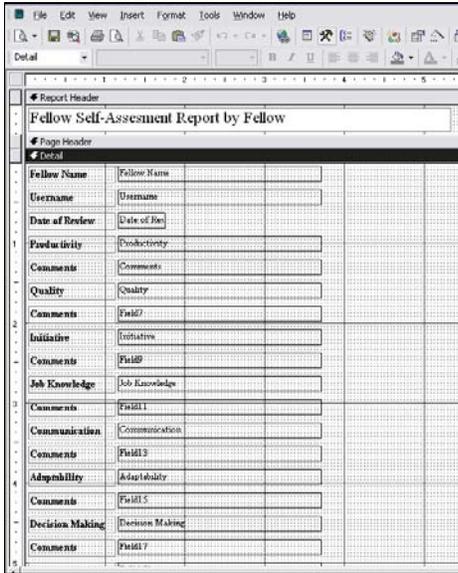


FIGURE 14: Screenshot of Report by Fellow

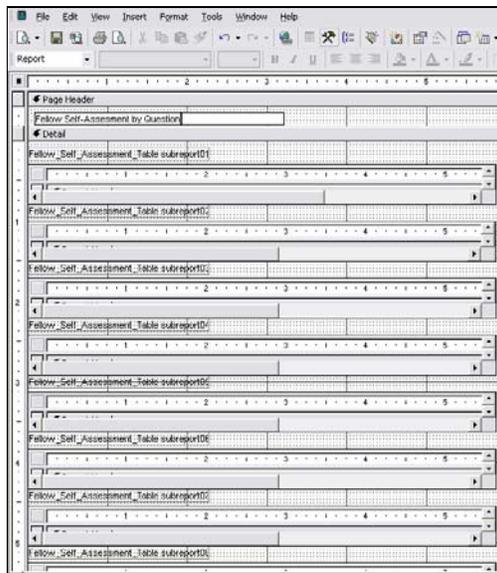


FIGURE 15: Screenshot of Report by Question

To ease the use of the Access reports for the Fellowship Coordinator, an Access Switchboard was created for command-button control of the reports. An Access Switchboard is a form that utilizes basic macro functions to connect the user to a report with a simple click of a command button. If the switchboard were not installed, the Fellowship Coordinator would need to sort through the seventy-eight reports and sub-reports created for the system.

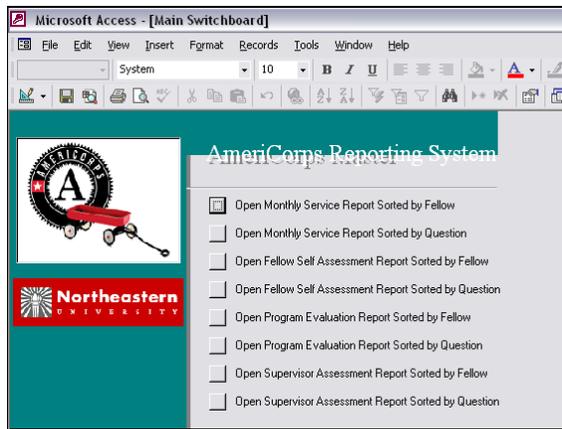


FIGURE 16: Screenshot of Designed Access Switchboard

Deleted: 4/11/2005

### **iii. Creation of Word Document Access Reports.**

Once the Fellowship Coordinator has selected a desired Access report from the Switchboard, he may choose to export the data into a Word document with the use of a standard export command button provided by Access. After the report is exported, the Fellowship Coordinator can copy and paste information directly into eGrants for the Grant Progress Report. The data will primarily be edited and organized for updates, postings, and proposals that are sent to other organization in the Corporation for National and Community Service, as well as Northeastern University.

## **4. System Testing & Validation**

Testing the system was critical to the success of this project. There are two types of testing that was conducted: Systems Integrated Testing (SIT) and User Acceptance Testing (UAT). SIT ensured the designed reporting system is compatible with the server it resides on and the computers it interacts with. UAT ensures that the system has been developed in a way that is conducive to the Fellowship Program. The section below details the two types of plans used for the testing of our system and the method used for data validation and verification. The system's information was validated through a series of steps performed by the members of the project team. Each survey was printed out and reviewed.

### **i. Systems Integrated Testing (SIT).**

The team conducted SIT to ensure the reporting system was integrated properly with the server. During the SIT period, a series of tests were performed that with the intention of "breaking" the system. Through trial, error and manipulation, the weak points of the system were identified and then carefully rectified. Once SIT was complete, the focus of the testing turned to UAT.

### **ii. User Acceptance Testing.**

During the UAT phase, the team performed a series of operations to ensure the system met the predetermined needs of the project and to verify that the components of the system were developed and implemented correctly. Each operation was evaluated as either "pass" or "fail." The components of the system were modified as needed based on which operations failed a specific operation. Below is an example of a piece of the UAT operation list used by each tester.

**TABLE 7:** Example of UAT Operations List Performed by Testers

Operation Performed	Pass	Fail
1. Navigate to Fellowship Program Home Page		
2. Navigate from Fellowship Program Home Page to Reporting System Login Page		
3. Login to Reporting System Home Page		
4. Design Survey/ Deploy Survey		
5. Reconfigure Survey Options as Desired		
6. Manage User Account Information		
7. Delete Survey		
8. Analyze Report Data		
9. Clear Survey		
10. Export Data to Excel		

In addition to performing the operations listed above, each team member performed operations as both “users” and “administrators” of the system. The system’s information was validated through a series of steps performed by the members of the project team. Each survey was printed out and repeatedly reviewed to ensure accuracy.

**5. Support Requirements**

**i. Training.**

When developing a computer information system, it is important to train users to properly use the system in order to minimize and prevent errors. Therefore, the Fellowship Coordinator was trained once the reporting system was tested and validated. The project team walked through the main features of the system and answered all of the Fellowship Coordinator’s questions.

**ii. Support.**

The Fellowship Coordinator will hold primary responsibility for creating, deleting, editing and deploying the reports. If assistance is needed to perform these actions, the Coordinator can contact SelectSurveyASP directly Monday through Friday. SelectSurveyASP also provides an online user manual that includes more details on each function of the system, the Index of which can be found in Appendix E.

Deleted: 4/11/2005

### **iii. Facilitator.**

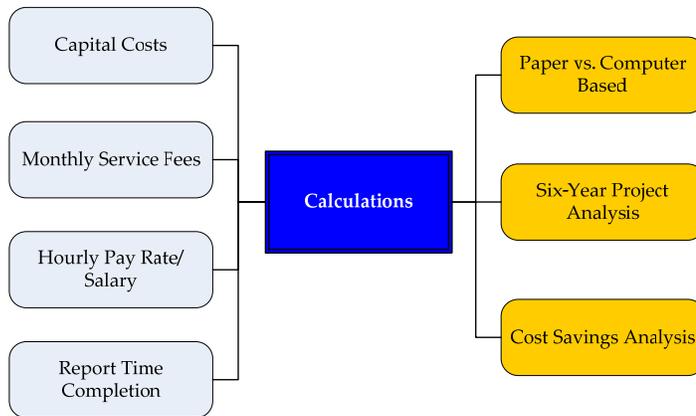
A facilitator is a simplified user manual that highlights the main functions of the reporting system. We developed a facilitator to assist the Fellowship Coordinator in updating or creating new surveys, as well as understanding and using the Access Reports. Both facilitators may be found in Appendix F.

## **C. MEASURES OF PERFORMANCE FOR OUR DESIGN**

Once our system was developed, it was important to measure the performance of the design. There are three fundamental performance measures that needed to be developed for our system. First, the time for Fellows to complete reports is expected to decrease with the new system. Since the surveys may be accessed online, the Fellows will find it much easier and therefore less time consuming to submit their reports. It is important that the surveys are valid through a limited time period in order to maximize the quality of the responses. In other words, if the Fellows have too long of a time period to complete necessary reports, they may not put as much effort into their responses. The most significant measure of performance is the reduction of time to compile data. Where the current system requires an average of 18 hours for the Coordinator to compile data from each report, the new reporting system drastically reduces this time. Finally, the time to report the measures of performance to the CNCS will also be reduced. This new system generates an easy to read report with the information that the Fellowship Coordinator needs to submit to the CNCS for funding.

## **D. COST SAVINGS**

A cost benefit algorithm (FIGURE 17) was derived in order to quantify comparisons between paper- and computer-based reporting systems and to provide a cost savings for the overall project. Although cost was not a critical factor for our project, a by-product and benefit of the reduction in reporting times is the subsequent decrease in overall costs. This information can then be shared with other AmeriCorps Promise Fellowship Programs for implementation of similar reporting systems.



**FIGURE 17:** Cost Algorithm Diagram

**1. Algorithm Input Variables**

**i. Capital Costs.**

Capital costs consist of any additional capital equipment that must be purchased for the reporting system. These costs include any hardware or software packages. It also accounts for copier, fax, and paper costs. Current annual copying costs for the Fellowship Program are reportedly \$1,000 - \$1,200.

**ii. Monthly Service Fees.**

These costs include monthly fees associated with each of the systems, such as telephone and internet services. Note that some survey systems that were investigated would have required a monthly access fees.

**iii. Hourly Rate Pay / Salary.**

Hourly costs based on the Fellows’ pay must be calculated for the time required to complete reports through the system. Since the Fellows’ stipend does not reflect normal industry rates, a normalizing factor must be incorporated into the algorithm to achieve an accurate cost analysis between the paper-based and computer-based reporting systems. The normalizing factor is based on the salary of a comparable position in the service industry that requires the same education and skill level of the Fellows. By using this industry-normal rate, the units of other algorithm variables coincide with a like dollar amount. The hourly rate currently used by AmeriCorps when calculating their Fellows’ industry standard rates is \$17.19 as of 2003.

Deleted: 4/11/2005

#### **iv. Time of Report Completion.**

The time for completing and processing reports has been established through interviews with the Fellowship Coordinator. During development of the system, trials were performed and completed times recorded in order to determine the new computer-based system's reporting times.

### **2. Algorithm Calculations**

The cost algorithm employs the input variables and converts them into a dollar per month per Fellow unit. The variables are then summed and a reporting system cost per Fellow per year was determined. The sub-output has the cost of the Fellowship Coordinator factored in on a per Fellow basis. This sub-output is then multiplied by the number of Fellows in the Program to determine the total cost of the reporting system in relation to normal industry dollars. Data is then calculated for a six year period, which is the anticipated life of the reporting system. Since some capital inputs only have initial costs, these costs dropped out of the algorithm after the first year. Instead, maintenance costs were included for the remaining life of the system as needed.

### **3. Algorithm Outputs**

Through calculations from the input variables, a total cost for the Fellows per year for six years was produced. This time period accounts for the initial development of the software and any updates needed in three years, which is the beginning of the next grant cycle. The calculations were applied to both a paper-based and computer-based system. Calculating and comparing the present time cost of each system demonstrates which is a more cost effective reporting system for the Fellowship Program.

### **4. Algorithm Conclusions**

Information collected from interviews and testing the software has concluded the following report completion times for the new computer-based system, shown in FIGURE 18 below:

Report Name	Time Required for 1 Fellow (hrs)	Time Required for All Fellows (hrs)	Time Required for MPFC (hrs)
Monthly Service Accomplishments	10.0	250.0	12.0
Service Hours	4.0	100.0	6.0
Grant Progress Report	0.0	0.0	34.0
End-of-Year Program Evaluation	0.3	8.3	12.5
Mid-Year Program Evaluation	0.3	8.3	12.5
End-of-Year Self Assessment	0.5	12.5	2.1
Mid-Year Self Assessment	0.5	12.5	2.1
<b>Total Time (hrs)</b>		<b>391.7</b>	<b>81.2</b>
		<b>Fellows</b>	<b>Coordinator</b>

FIGURE 18: Computer-based System Projected Reporting Times

The times were compiled and inputted into the spreadsheet used for cost analysis, along with times required for the current system. Interest rates were set at 4 and 6% with a time period of 6 years, as determined through project life research and interviews with the Fellowship Coordinator [12]. Using economic analyses (shown below in FIGURE 19), the proposed computer-based system is more economically feasible than the current system. Data also shows an annual cost savings of \$5932.43 for the Fellowship Program with the implementation of this system.

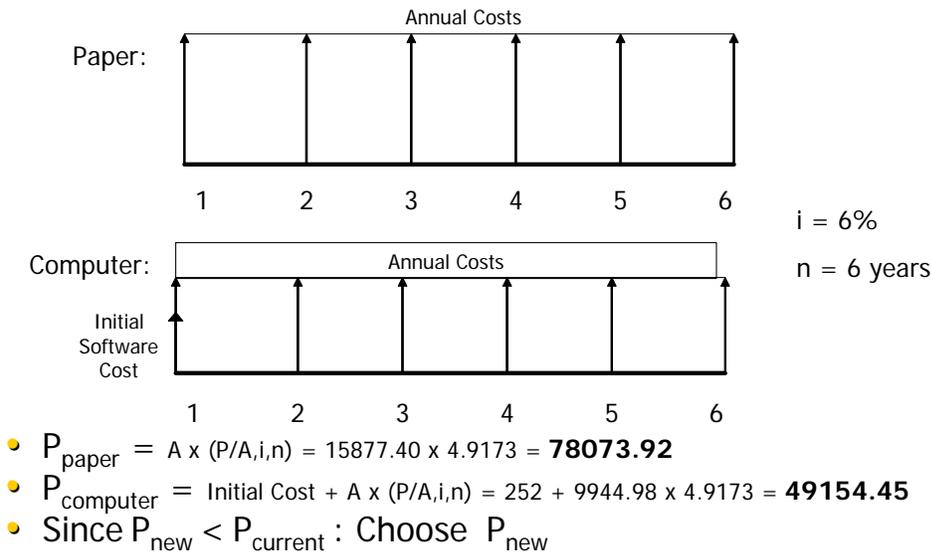


FIGURE 19: Cost Analysis of Current and Proposed System

Deleted: 4/11/2005

## SECTION VI: CONCLUSION

As stated earlier, the objectives of this project was to (1) help the Massachusetts Promise Fellowship Program facilitate a more efficient manner to collect, store, and retrieve needed information on performance measures; (2) understand, analyze, and finalize at least three performance measures that effectively evaluate the need and impact of programs for the Fellowship Program; (3) provide the Fellowship Program with a reporting system that reduces the time it takes to report performance measures back to their funding organization. Our group was successful in completing these three objectives. The first two objectives were completed through the collaboration of efforts between the project team and its sponsor. Performance measures were finalized and were incorporated into the criteria used to develop the surveys of the new reporting system. The final objective was successfully completed through the development of a computer-based web tool that can be used by the Fellowship Program, and will reduce the time it takes them to report its performance back to their funding organization.

Our group was brought in as a consultant to solve a problem. We analyzed the problem and used Factor Analyses throughout our decisions making process. We then designed, implemented, tested, and validated our proposed system. Upon review of the new system, our Sponsor estimated that the time required to collect the data for the Grant Progress Report has been reduced from 48 to approximately **2 hours per a year**. With our new system, we reduced the overall reporting times for the Fellowship Coordinator by **34.4%**. Although cost was not a critical factor, a by-product and benefit we are able to achieve is the reduction of annual costs for the program by approximately \$5,900. This information can be shared with other AmeriCorps Promise Fellowship Programs for implementation of similar reporting systems. The purpose of this project was not primarily a means to find a cost savings for the reporting process; rather it was focused on the improved usability of the reporting system. However, a cost analysis was performed to emphasize this additional benefit of the developed reporting system.

## REFERENCES

- [1] "AmeriCorps PM Toolkit," [http://www.projectstar.org/star/AmeriCorps/ac\\_home.htm](http://www.projectstar.org/star/AmeriCorps/ac_home.htm) (2005).
- [2] "Blue 360 Survey Software," [http://www.explorance.com/blue\\_360.htm](http://www.explorance.com/blue_360.htm) (2004).
- [3] Fellers, J.W., Anson, R.G., and Anson, P.H. An experimental evaluation of response bias and respondent preference for a computerized survey as compared to a paper and pencil survey. *Proceedings of the 1990 Hawaii International Conference on System Sciences*. 1990, pp 488-96.
- [4] "GuideStar - The National Database of Nonprofit Organizations," <http://www.guidestar.org> (2005).
- [5] John Paul Ashenfelter, "Web Databases: How and Why to Implement Them in Education," 1998, pp. 1-30.
- [6] Knapp, H. and Kirk, S.A. Using pencil and paper, Internet and touch-tone phones for self-administered surveys: does methodology matter? *Computers in Human Behavior*. 2003, vol 19, pp 117-34.
- [7] "Quask FormArtist Standard Survey Software," <http://www.quask.com/en/home.asp> (2005).
- [8] "Question Pro - Online Survey Software," <http://www.questionpro.com/home/howItWorks.html> (2004).
- [9] "The Raiser's Edge - Fundraising Software," <http://www.blackbaud.com/solutions/raisersedge.asp> (2005).
- [10] "SelectSurveyASP - Professional Survey Software," <http://www.classapps.com/Index.asp> (2004).
- [11] Simpson, Young, and Barrows. *Access 2003: all-in-one desk reference for dummies*. Wiley Publishing, NJ, 2003.
- [12] Swanson E. Burton and Dan, E. "System Life Expectancy and the Maintenance Effort: Exploring Their Equilibrium." *MIS Quarterly*. 2000, vol. 24, no. 2 pp 277 – 297.
- [13] "UtilPro- Workforce Management," <http://www.ultimatesoftware.com> (2005).
- [14] "Zoomerang zNonProfit," <http://www.zoomerang.com> (2005).

Deleted: 4/11/2005

## APPENDIX A: MASSACHUSETTS PROMISE FELLOWSHIP PROGRAM DOCUMENTS

| ~~10/29/2007~~

45

Deleted: 4/11/2005

## APPENDIX B: REPORTING SYSTEM QUESTION CRITERIA

| ~~10/29/2007~~

46

Deleted: 4/11/2005

## APPENDIX C: PERFORMANCE MEASURES

| 10/29/2007

47

Deleted: 4/11/2005

## APPENDIX D: FACTOR ANALYSIS MATRIX

| 10/29/2007

48

Deleted: 4/11/2005

## APPENDIX E: SELECTSURVEYASP ADVANCED USER MANUAL INDEX

| [10/29/2007](#)

49

Deleted: 4/11/2005

## APPENDIX F: FACILITATORS

| 10/29/2007

50

Deleted: 4/11/2005

## APPENDIX G: GANTT CHART

| 10/29/2007

51

Deleted: 4/11/2005

## APPENDIX H: RESPONSIBILITIES MATRIX

| ~~10/29/2007~~

52

Deleted: 4/11/2005