Information Systems Management
Course 95-822

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Final Consulting Report

Consumer Action Response Team (CART)

Nouha Nouman

Consumer Action Response Team (CART)
Executive Summary

Student Consultant, Nouha Nouman
Community Partner, Paul Freund

I. Background Information

The consulting engagement involved Nouha Nouman as a student consultant from Carnegie Mellon University and Paul Freund, as the community partner from the Consumer Action Response Team (CART) for the Allegheny County. Paul Freund has been the director of CART project since its foundation which took place in September 1998 as a collaborative project of NAMI Southwestern PA and Renaissance Center, Inc. in order to provide communication channels between consumers with mental illnesses and their families to dialogue with their service providers. On January 1, 2002, CART became solely a project of NAMI Southwestern PA. CART has 16 employees and works with a budget of about $ 500,000. Funding is provided by Allegheny County Department of Human Services and Community Care Behavioral Health Organization (CCBHO).

> CART's vision is that: *"consumers and providers will dialogue regularly about improvements that could be made in existing behavioral health services. This dialogue will result in the best possible services for consumers who will become empowered to make choices and participate in their own recovery*."

II. Consulting Tasks

The major scope of work that was undertaken during the consulting engagement was integrating the project database system with specialized survey software, SNAP. The consultation process went through analyzing the need for specialized survey software, evaluating the system requirements, evaluating different software survey solutions, installing the new software and integrating it within the system. By implementing SNAP Survey Software, data was integrated and combined into the system through one unified system framework instead of having it stored into different database systems. Moreover, SNAP provided more flexible as well as more efficient data analysis tool and supported a user friendly environment. In addition, SNAP supported a new common ground for CART in order to exchange data with other non-profit organizations that conduct surveys and that also use SNAP as their survey tool.

III. Outcomes Analysis and Recommendations

Major outcomes:

1. A specialized survey software system (SNAP) is installed on the Network and available for all staff members
2. Nine hours of training sessions were scheduled and conducted by the consultant All employees who are using SNAP have access to four hard copies and one soft copy of the software guide that made available upon the software purchase.

3. CART 2006-2005 surveys as well as ACES surveys are stored and processed using one unified software platform (SNAP software) instead of multiple software (Microsoft Access, Microsoft Word and Microsoft Excel)
4. More user friendly interface as well as efficient data processing tools and techniques have been supported through SNAP software

Major Risks:

Unlike the previous software -Microsoft Excel and Microsoft Access- SNAP has different editions that do not support all its functionalities –except for SNAP Professional edition-. As a result, having editions that supports data entry only or data analysis only, make the users of these editions rely heavily on the survey designers who can compile all the data that is gathered from different work stations through their professional edition which includes all the software functionalities. This risk appears more serious with the expansion of the network and having more working stations added to it. Finally, the system has been facing current backup problems that might not be expected to be resolved immediately and the continuous existence of such problem will directly affect the backup performance of the existing and new data.

Recommendations:

1. **Sustainable back-up system**
   The system has been facing regular backup problems that might not be expected to be resolved in the near future and the continuous existence of such problem will directly affect the backup performance of the existing and new data. Therefore, having a thorough analysis of a current backup system and going over a comprehensive update will ensure the sustainability of the back-up process. Since NAMI technical team is familiar with the current backup system and has recently reached to a level of comprehension of its defectiveness, the consultant suspects that the update process should be uncomplicated. Yet, the backup tool should be chosen carefully-disk backup drives vs. tape backup drives.
2. **Enhanced Publication Software**
   Currently the organization is using Microsoft Word for gathering their information and compiling the extracted data for reporting purposes. However, Microsoft Word is not designed to easily create the graphically more complex publications requirements for professional publications and communication materials. Therefore, a professional publication software application is recommended for a smoother reporting process and a more professional and polished output. The consultant believes that implementing Microsoft Publisher 2006 will support the organization's publication needs and will run smoothly with its Windows environment. Moreover, free training sessions will be provided from the mother organization NAMI to all employees who will use this software

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Nouha is a Masters student in the Information Systems Management Program. She will begin interning with Motorola this summer.

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I. About the Organization

Organization

The National Alliance of the Mentally (NAMI) Southwestern PA was established in 1983 to address the increasing needs for families and consumers and to have a stronger voice in the mental health system throughout the Southwestern Pennsylvania area. NAMI serves ten county regions: Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Washington and Westmoreland.

CART (Consumer Action & Response Team) was founded in September 1998 as a collaborative project of NAMI Southwestern PA and Renaissance Center, Inc. On January 1, 2002, CART became solely a project of NAMI Southwestern PA. CART has 16 employees and works with a budget of about $ 500,000. Funding is provided by Allegheny County Department of Human Services and Community Care Behavioral Health Organization (CCBHO).

CART provides communication channels between consumers with mental illnesses and their families to dialogue with their service providers. Through interviewing consumers of mental health illnesses, CART supports a structured process for providers to respond to consumer dissatisfactions, reports that identify satisfaction and dissatisfaction themes for various levels of care in the provider system and information about underserved groups in order to supply consumer feedback to system planners and policy makers.

CART's vision is that: *"consumers and providers will dialogue regularly about improvements that could be made in existing behavioral health services. This dialogue will result in the best possible services for consumers who will become empowered to make choices and participate in their own recovery*."

Facilities

CART is located at 938 Penn. Avenue, Pittsburgh, PA. It is centered by one large meeting room used for meetings and discussions, one large office for the Director, nine partitions for the interviewers and four medium offices for the Team Supervisor, the Administrative Assistant, the Special Projects Coordinator, CHIPP Liaison and the Clerical Support & Interviewer Site Coordinator. The building is located in the downtown area; it is accessible; new and clean.

Programs

CART is the second largest nonprofit survey program in Pennsylvania and the program is independent from the provider organizations which enhances the objectivity of CART's recommendations to these providers. The program runs from 8-5 from Monday till Friday. It evaluates the level of care that consumers are receiving at mental health provider sites by sending interviewers to different mental healthcare providers throughout Allegheny County. At a provider site, interviewers conduct face-to-face, semi-structured format interviews collect input anonymously from different consumers, and this input is tabulated and used to generate provider-specific reports, quarterly reports and annual reports: The provider-specific report provides and recommends areas on which to improve the service quality of the provider. Copies of the quarterly report are distributed to the provider, the Allegheny County Department of Human Services, and Community Care, a managed service organization. These organizations then use this report to improve the quality of service at the provider site. The annual report is made for public acknowledgment. On the other hand, CART holds twice a month accountability meetings with the Department of Human Services and Community Care where provider quality improvement issues are discussed.

CART surveys are divided into three main categories based on the consumer's age and gender and are conducted on quarterly bases

1. Adult: surveys are conducted with Adults customers with mental illnesses.
2. Children: surveys are conducted with the parents of a customer with mental illnesses.
3. D&A (Drugs and Alcohol): surveys are conducted with drugs and alcohol customers.

The population here is randomly selected and is not interviewed on regular basis. The interviews are of two-stage format. Both consist of multiple choice questions as well as open ended questions. The data collected from multiple choice questions is tabulated with Microsoft Excel for generating statistical information, and then the open ended questions are printed and examined for areas of improvements on Microsoft Word. All the reports are created with Microsoft Word with all of the recommendations and statistical information included.

In order to generate a more detailed feedback from the consumers of mental health services, CART is running a pilot test survey program (ACES). Survey format consists of only open ended questions. The data is intended to be kept for CART for feedback. No reports have been generated yet and the information is still in hard copies.

CART also runs a program as part of a Community Hospital Integration Projects Program initiative (CHIPP). In this program CART conducts surveys with around 77 consumers who are mentally disabled and have been discharged from the Mayview State Hospital. These consumers would be interviewed on quarterly basis in their first year of discharge, and twice a year afterwards. Reports are then sent to the Allegheny County Office of Behavioral Health and providers **of crisis services in order to provide a feedback** about the customers' satisfaction rate with services and adjustment to living in the community. Survey format consists of multiple choice and open ended questions. Generated data is all stored in Microsoft Access.

Staff

CART has six full time employees and nine part-time employees. All employees have personal computers and an email accounts. The full-timers are:

1. Project Director: directing the day-to-day operations at CART, as well as maintains overall responsibilities for budget, staffing, program development and implementation, and community involvement.
2. Team Supervisor: managing the interviewers' schedule and assigning them interviews at different customer sites.
3. Administrative Assistant: handling technical support and generating CART reports.
4. Special Projects Coordinator
5. CHIPP Liaison: processing CHIPP information and generating CHIPP reports.
6. Clerical Support & Interviewer Site Coordinator
7. Site Coordinator

Moreover, there are nine part-time interviewers who work around 20 hours a week and all of them are former recipients of services or family members

All team members are familiar with the existing applications that are available on their computers. During the previous consulting engagement between CART and Carnegie Mellon, the previous CHIPP Liaison employee received sufficient training sessions in order to process CHIPP survey data developed on Microsoft Access tool by Carnegie Mellon student consultants. However other staff members remained unfamiliar with the software and training was not available to them. Instead data process for other survey projects remained using Microsoft Excel through which all CART employees have developed sufficient skills in fulfilling their data analysis needs. On the other hand, all staff members use Microsoft Word in order to compile and report their narrative data related to the open-ended questions in the survey questionnaires.

Technical Environment

The team is equipped with fifteen computers (ten are HP computers and 5 are P2 computers for data-entry). These computers are connected to each other and networked to a file server running Novel NetWare and GroupWise and are networked to HP LaserJet printer. All computers work on Windows XP platform and have MS Office Suite as well Novel GroupWise e-mail clients that are installed in all of them. Moreover, Internet access is provided via cable modem to all of the computers. In addition, information about the program on the internet is provided through NAMI's website (www.namiswap.org).

Technical Management

Barbra Reith provides general technical support such as problems in finding or saving files. Maintenance for major problems is outsourced: A contract has been made by NAMI with a technical support that would cover CART as well. This contract covers updating virus definitions, system support as well as maintenance for the existing networking system.

Technology Planning

Paul Freund is the one responsible for Technology planning, yet CART does not have a formal permanent technology plan. Technology decisions are based on the consideration that technology is an integration tool for serving the strategic plan and whenever a technology plan has been decided (short-term plan), it would be presented to NAMI Executive Director and to the Allegheny County for approval.

Internal and External Communication

CART has good internal communication among its staff because the office space is of a reasonable size and all employees work on the same floor. In addition, each employee's personal computer is connected to every other. Each desk is equipped with telephones and voice mail and each employee has a personal email account. As it has been mentioned before, all computers are networked which allows information to be shared internally. Moreover, CART has organized external communication between the providers (100 providers) and the donors through regular meetings and CART's effective recommendations that are provided in their reports –that are all sent in hard copies-. As a result, an increasing numbers of providers are actively collaborating with CART to improve services for consumers and families who receive their services. A special page about CART is hosted under NAMI's website www.namiswpa.org with information about the project and a hyper link for to download CART's latest annual report.

Information Management

CART manages most of its information and data electronically. Surveys are conducted on paper-based formats and data is entered into the computer. Data is processed via MS Excel or MS Access for reporting. Narrative answers for some questions in the surveys are either stored on Word (if the data of the survey is stored on Excel) or Access (if the data of the survey is stored on Access) or they are not stored sometimes (Some surveys are not stored electronically and are still in hard copies**).** The administrative assistant backs up the file server nightly. Backup tapes are rotated on a 10-business day basis. The questions in the surveys are of regular changes (from once to 5 times a year). These changes are imposed from the Allegheny County Department of Human Services and Community Care Behavioral Health Organization (CCBHO) in order to extract more information from the consumers of mental health services. Therefore, the staff spends a lot of time in order to make the annual survey look coherent in which all of its questions will be consistent with each other.

II. Scope of Work

Task 1. Integrating the System with a Specialized Survey Software (SNAP)

Description:

1. Heterogeneous Database systems/problem:

The program conducts surveys and enters the data and stores it for processing. Initially, the data was stored in Microsoft Excel only. Yet, some survey questions required open ended answers and storing them in Microsoft Excel was not practical. Therefore, the staff started using Microsoft Access for some surveys that included the most open ended questions and kept Microsoft Excel for the rest. Microsoft Access solved the problem that the staff was facing, yet it did not acquire the level of user-friendliness that was expected by the staff. As a result, the staff preferred keeping the remaining surveys in Microsoft Excel rather than migrating them into Microsoft Access.

Moreover, there were surveys with only open ended questions that were kept in their hard version because storing them in Microsoft Excel or in Microsoft Access was not convenient and rather the staff decided to store them on Microsoft Word.

2. Flexibility/problem:

The questions in the survey formats are continuously changing (mainly questions are being added into the surveys), and updating the questionnaire and integrating it with the previous version of the same questionnaire is considered a long process.

3. Integrity/opportunity:

The need for unified database framework that would run under an integrated system will enhance the data transformation/communication internally (within the organization) as well as externally. Especially, that there are plans to expand the program to include more than one county, the available database system will be the sample in which the other database systems will be built upon.

Impact on the Mission:

The main role of the program is to act as a coordinator between the mental health providers and their customers: obtaining the needs of customers and forwarding them to the providers. Therefore, having a unified and flexible database platform will enhance the efficiency as well as the effectiveness of the reporting process in which the organization performs on quarterly as well as annual basis.

Moreover, the organization is looking forward to expand its program to include more than one county. Therefore, all the systems in which the program runs at will be valued as samples for the prospective systems in other counties. In addition, it will be valuable to have a unified database platform in order to have a smooth as well as flexible data exchange among other sibling database systems.

The approach:

1. Gathering information:

Gathering problems and opportunities and listing the solutions available as well as the constraints and limitations (such as budget) that were imposed by the working environment.

2. Evaluating the requirements:

Addressing the data needs as well as the system requirements that overcame the problems/opportunities listed above within the imposed limitations/constraints

3. Evaluating various solutions:

Assessing all the available listed solutions –that included special survey software- based on the requirements addressed above.

4. Setting the Design:
    a. Data Design:
       Setting a design that represented the data schema, as well as the data entry and data processing procedures of the system. The design was divided into stages and was revisited into each stage of implementation.

    b. Architectural Design:
       Assessing the project's hardware, software needs as well as their distribution within the network.

    c. Organizational Design:
       Assigning the staff that is currently implementing the new system platform.
       Assigning the team that has received training sessions during the consulting engagement, and who which in return will train the rest of the staff.

5. Implementation:
    a. System implementation:
       This included system installation and configuration.

    b. Data Migration:
       Stages were set according to the level of database migration.
       Stage 1: Designing the database schema
       Stage 2: having the new system running for data processing and storing data that was on hard copies –ACES Project- into the new system's database.
       Stage 3: storing data from MS Access-CHIPP Project- into the new system's database
       Stage 4: storing data from MS Excel-CART Project- into the new system's database
       Stage 5: storing data into more advanced database system (ex: SQL server) –optional-
       Stage 6: integrating with other statistical software for additional data processing features –optional-

c. Architectural implementation:
This included the number of computers that were installed with the professional version of the software system which included all the software functionalities (data entry, survey design and data processing). As well as the number of computers those were only installed with the data entry/survey design packages.

d. Training:
Training was first focused on the chosen team members, who will –in turn- train the rest of the staff (all the employees who will work on the new system)

e. Evaluation:
This was mainly focused on the flexibility of the data entry, survey design as well as the data processing and retrieving and how effectively they have improved the report generation process. In addition, the consultant also assessed the ease of flow of the data internally (among the staff) as well as externally (with other organizations)

f. Ensuring system sustainability:
Memory Allocation: this included the process of ensuring that the system will have/has enough memory for data storage as well as system performance. Moreover, sustainability included system support, maintenance as well as system upgrades -that will be provided by the software company from which the software has been purchased from-.

Impacts:

1. Organization:
By implementing a more efficient reporting system (data entry, survey design, data processing and retrieving), the new survey software system was able to support the organization's mission

2. Facilities:
Additional survey software tool has been implemented on six computers in order to enhance the efficiency in data processing and hence project reporting. Moreover, the software has provided an expanded reporting analysis techniques by providing more additional processing capabilities that previously were either not supported by Microsoft Excel or Microsoft Access or were required a lot of time or effort to generate.

3. Program(s):
More efficient report generation is supported due to the efficiency of data entry and retrieving as well as more effective data processing. In addition, the software supported easier data exchange between staff members, NAMI members as well as other organizations

4. Staff:
A team has been assigned for project implementation and training. This team is the one in charge for the system for any additional improvements, updates or problems and will provide training for the rest of the staff.

5. Technical Environment:
This has included the purchase of survey system software in order to install the software and run it as well as assessing the required memory space allocation that will run the system and store the data (through all the stages) in order to allocate enough memory for running the software and storing the data.

6. Technology Management:
Maintenance and support has been outsourced by the Survey Software Company through an annual based contract.

7. Technology Planning:
In order to ensure the sustainability of the system, a plan has been set for providing continuous support, maintenance as well as update for the system. Paul –the CP- is the one in charge of this plan in which the software company will continuously provide the project with new updated versions of the software on annual basis, continuous hot-line support for the staff as well as maintenance

8. Internal & External Communications:
This software solution has enhanced data exchange between members of the project and exchange of data among other survey projects since of the survey projects are implementing the same survey software, SNAP.

9. Information Management:
More efficient data flow has been supported since all the data will be stored in one database which is the new software database. Yet, SNAP does not support the same previous level of flexibility in exchanging files among staff members. Therefore, a thorough analysis of network architectural design has to be conducted in order to achieve the same level of data exchange flexibility. On the other hand, the system provided more efficient as well as more enhance data processing features.

Feasibility:
1. Time:
In the data migration process, stages 1, 2, and 4 have been completed for the years 2005 and 2006. Implementation of other historical data related to stages 2 and 4, as well as other stages will be conducted by staff members before the end of the year of 2006.

2. Motivation
Not only the partner but rather the whole staff was convinced by the importance of the project and the need/urgency to migrate into one unified, user-friendly as well as flexible database platform.

3. Resources
The required resources have been purchased (system software, data entry packages, and additional RAM). The budget covered the expenses of all various system software editions.

Extra memory (RAM) will be provided by NAMI which usually supports CART with additional RAM when needed.

4. Consultant's skills

The consultancy engagement did fit the student consultant Information Systems skills since she was able to conduct training sessions on the newly implemented software system. Moreover, she effectively was able to apply the concepts as well as the information that was provided during in the course lecture classes. Moreover, other communication materials were provided throughout the course that was effectively helpful for the development of the consulting process such as the peer reviews, as well as the mentor reviews.

5. Partner's skills

The consultancy engagement did fit the partner's skills because the CP and all other staff members were very enthusiastic about it and willing to learn. Moreover, the fact that they were dealing with their existing data software, made it easier for them during the training sessions as well as to grasp the current needs and risks.

6. Sustainability

Sustainability has been considered as part of the strategy addressed above

7. Risks

There was a need to ensure that data migration process will run smoothly without the need of re-entering the data manually. Other installation challenges were faced during the consultancy process which were overcame through the cooperation of both the student consultant and the Community Partner.

III. Outcomes and Recommendations

Task 1. Integrating the System with a Specialized Survey Software (SNAP)

Overview:

CART annual reports heavily rely on data extracted from their annual surveys conducted with mental health consumers. There was a need for unified system framework that would integrate the database and combine it into one system instead of having it stored into different database systems, provide more flexible as well as more efficient data analysis and support a user friendly environment. By implementing the specialized survey software (SNAP), CART was able to meet all these system requirements as well as to explore a new common ground in exchanging data with other non-profit organizations that conduct surveys and who also use SNAP as their survey tool.

Before:

Initially, the data was stored and processed using two different systems (Microsoft Access and Microsoft Excel) that were both unsatisfactory solutions for the organization's work process. Microsoft Excel did not provide the level of flexibility required to deal with open-ended questions in the questionnaire form as well as to add/delete questions from it. In addition, using Microsoft Excel for reporting required a significant amount of employee's work due to the multi-leveled steps that they had to go over in Microsoft Excel in order to process the data and extract the desired information. On the other hand, Microsoft Access did not meet the staff's expectations of user-friendliness and as a result was left abandoned. Moreover, other narrative data that was related to open-ended questionnaires was still in its hard copy format in which the staff was planning to store them in Microsoft Word –but did not have the time to do.

Although the employees did have the required level of data processing skills, they did not have the required level of database skills that will effectively allow them to deal with current and future data expansions as well as storing and processing different kinds of data (numeric, text, graphs, charts…etc).

Outcomes:

A specialized survey software system (SNAP) is installed on the Network and available for all staff members. Different software editions were installed according to each of the staff job description. Both CART director and CART Team Supervisor have the "SNAP Results" edition installed on their desktop since they are mainly responsible on supervising the final analytical stages of the reports. As for Barbra, Paula and Joel, they have "SNAP Professional edition" installed on their desktops since their job description includes designing and editing surveys as well as entering and analyzing data. "SNAP key stations" was installed into Michelle's desktop since her job description involves data entry. Cooperating efforts from

both the student consultant and the CP were necessary in order to reach the most effective architectural design of the system installation. Both the CP and the consultant analyzed the implications of installing different software editions in the system and how does these editions fit the needs of each staff member and based on these judgments, SNAP different software editions were installed to staff members.

Nine hours of training sessions were scheduled, created and conducted by the student consultant. Currently, two of the team members (Paula and Barbra) are working smoothly with the new installed survey software (SNAP) since the training sessions were mainly focused to them. Paula and Barbra supervise the two main projects that are running in CART, the CART program as well as the CHIPP program. Both hold the main tasks of the reporting process: the survey design as well as the data analysis. Other team members attended sessions that were within their scope of work such as data entry or analysis only. These sessions were held with complete interaction of the employees with the PC as well as additional tasks that were given during the week[1]. At the end of the training and through the given tasks, team members were able to design two survey formats for both the ACES project as well as the CART project and therefore to transform them from their hard copy version into soft copy – stored in SNAP-, migrate the data related to years 2006-2005 for both projects and store them into SNAP – for ACES, the data was still in its hard copy version but for CART, it was stored in Microsoft Excel- and finally to provide two brief analysis reports of the extracted information from both reports using SNAP as well. Moreover, the CP has assigned different tasks using SNAP software to all of Barbra, Paula and Joel –both Barbra and Paula will provide training to Joel-. These tasks will take place after the consulting process but will serve as an additional training material for all staff members before the actual system migration into SNAP will take place in January, 2007. In addition, employees had the opportunity to get exposed to relational database models and data design either through the training sessions that were held or through the actual data migration process that was planned as part of their training tasks. This level of experience has enabled them to have a clearer picture of how the data is being placed and stored in the new software system, SNAP and will support them for additional data migration of the historical data (data of year 2004 and backwards), data expansions of the current projects or data insertions for new projects into the system.

Documentation of how to use the software is provided through the software's User Guide that came upon the software purchase. These documentations are comprehensive, very straight-forward and are supported with screen-shots and figures on how to go from one step to another. There are four hard copies of the documentations and one soft copy available on the server and accessible to all employees[2].

More effective as well as efficient data processing tools and techniques have been supported through SNAP software: through the training tasks, employees realized the how SNAP data was processed more efficiently and information was extracted on the spot. Reporting productivity is expected to increase in the beginning of the year 2007 in which the complete migration of the system will take place. These expectations has been based on the following facts:

[1] See appendix A
[2] See appendix B

- SNAP supports a user friendly working environment that makes it easier for employees to process their data and hence reduces their level of error whether in data entry or in the data analysis process.
- SNAP supports a higher level of data processing tool that is specialized for survey analysis in which survey information are extracted on the spot and therefore there is no need to go over multi-level steps in order to get to the same results as in Microsoft Excel or Microsoft Access.

According to Paul –the CP-, annual reports that used to take one month of an employee's full time work for data processing will be achieved in an estimation of one week of an employee's full time work. The most time consuming part of the report generation is mainly related to the data extraction and data analysis, Paul's estimations were based after going over the survey specialized SNAP's data analysis tools and comparing them with Microsoft Excel functionalities. These estimations became clearer after conducting a brief analysis report of both CART and ACES 2005-2006 survey data as the last training task. According to the student consultant, the software does prove such level of efficiency since it is a specialized survey tool that is designed to cover almost all the needs of survey processing. However, such estimations can be made more precise as the employees become more familiar and more flexible in using the software.

Technical support number is available for all employees for any additional concern. In addition, annual maintenance agreement is conducted with SNAP Software Company that includes hotline telephone, fax and e-mail support as well as free upgrades for all installed stations. Moreover with an agreement with NAMI, a continuous budget plan has been allocated to continuously update this agreement. On the other hand, although, the current hardware computer capabilities considerably exceed SNAP requirements, NAMI technical specialists will continuously check and ensure the availability of further hardware needs (additional RAM for instance)

The system is extensible to include additional work stations in the network: by purchasing additional licenses, SNAP system can be expanded to add additional number of work stations according to the organization's needs. Moreover, SNAP provides additional software packages that support web-based survey tools as well as different mechanisms of data automated entry tools.

The SNAP survey software was recommended by the representatives of several non-profit organizations similar to CART's mission in Pennsylvania. These organizations have sub-contracted with one organization, the "Advocacy Alliance", who uses SNAP to generate their reports. According to the Computer Specialist at the "Advocacy Alliance" who conducts data gathering and data analysis for the current sub-contractors, "Advocacy Alliance" is fully satisfied by using SNAP – has been using it for four years now- : SNAP maintenance agreement, SNAP new upgrades, and SNAP tools and functionalities. As a result, the organization is currently expanding its surveys to include web-based surveys by purchasing additional web survey packages from SNAP as well.

Therefore, implementing SNAP survey software has created a common ground between CART and these organizations and thus allowed for a more effective and an easier exchange of information between CART and these organizations. As a result, SNAP has created a flexible atmosphere for implementing projects that are in collaboration with other non-profit organizations that use SNAP and conduct surveys that are of CART's interest. For instance, recently, CART is going on a project in collaboration with another non-profit organization, Pennsylvania Mental Health Consumers Association (PMHCA) that have contracted with the "Advocacy Alliance" to enter and analyze data from their state wide collection projects through SNAP survey tool as well. Such software homogeneity has allowed for an easier interaction as well as higher productivity and higher performance level for the overall projects. For instance, although the project heavily relies on surveys conducted in two different survey contexts; either manually-by CART- or web-based –by PMHCA-, both organizations are able to exchange their data smoothly and efficiently through SNAP. According to the CP, the director of PMHCA expressed his intention to contract the organization's data entry, analysis and reporting with CART upon CART's complete migration to SNAP.

Meeting the Organization's Mission:

The organization is looking forward to expanding its program to include more than one county. Therefore, all the systems in which the program runs at will be valued as samples for the prospective systems in other counties. In addition, it is valuable to have a unified system platform in order to have a smooth as well as flexible data exchange among other sibling systems. On the other hand, having a unified and flexible system platform enhances the efficiency as well as the effectiveness of the reporting process in which the organization performs on quarterly as well as annual basis since all data now will be stored and processed using one system and there would be no need for transforming data from one system to another.

Moreover, the CART program has been distinguished for its level of flexibility and coordination with the county's requirements in terms of adding new questions on the questionnaire format or deleting questions. However, such changes used to lower the productivity as well as the efficiency of the staff members in reporting. On the other hand, with the introduction of the current survey software SNAP, CART was able to attain the desired level of flexibility without affecting its level of productivity and efficiency.

Risks:

Unlike the previous software -Microsoft Excel and Microsoft Access- SNAP has different editions that do not support all its functionalities –except for SNAP Professional edition-. For example, there is an edition for entering data only "SNAP key stations" and another edition for analyzing data only "SNAP Results". Therefore, unlike Microsoft Access or Microsoft Excel in which users can enter data almost immediately, data entry key stations "the Satellites machines" cannot start entering data unless the questionnaire design has been set and sent to them from a chosen work station "the Master" that supports the design feature

and that has “SNAP Professional edition” installed in it. Therefore, such characteristic creates a chain of dependencies between the employees since employees who are located on the “satellites” workstations are completely dependent on the employees who are on the “Master” workstations. That could affect the overall productivity and slow the work process if we will be dealing with a future expanded, big network. On way to minimize the effects of this problem, is by considering the architectural design of the network combined with the job description of each employee, as whether they are full-time or part time employees and carefully studying the advantages as well as the consequences of adding any additional work station in the network.

In addition, having specialized software editions installed to employees according to their job description, has its advantage in focusing the employees’ work on their specialized tasks; yet, no longer having the access to the rest of the reporting tools, such as the analysis tools for instance, limits the employees’ further developmental abilities in exploring and practicing new additional functionalities and sharing others ideas and experiences and thus hinders the growth level of the overall project development. This will indirectly affect the performance level of the project on the long-run. Such problem can be minimized in further enhancing the collaborative work among members as well as increasing the level of interaction so that the skills as well as the information will not be limited by one person but rather shared and developed by other employees.

Finally, the system has been facing current backup problems that might not be expected to be resolved immediately. The system faces difficulties in transforming the data that is being saved on the server and back it up on tapes. The continuous existence of such problem will directly affect the backup performance of the existing and new data. Therefore, there is a need for a thorough analytical study of the current back-up system and its problems and a decision to be taken whether to go on with the current system or to install a new back-up system.

Further Opportunities:

The integration of other software within SNAP: these software include database (such as Microsoft Access), statistical (such as SPSS) and documental (publisher).

- A more professional database system will allow for long-term data storage as well as professional archiving
- The integration of statistical software will allow the company to go further in expanding its data analysis capabilities
- Using publisher instead of Microsoft Word will allow for a better and more flexible documentation of both Text and graphs/figures that will be much nicer and professional in the final report outlay. A property that Microsoft Word does not have

Evidence of a new Vision:

In brief, the current role of the CART project is to conduct surveys, and display the results of these surveys as useful and organized information to the general readers, the providers of

mental health services in the Allegheny County and to the project's donors. CART's technology vision is based on the belief of the gradual as well as the smooth introduction of technology that will serve the needs and improve the performance of their project's mission. Therefore, after realizing the improved efficiency that the new survey software has achieved, the additional statistical tool that it has introduced, and SNAP's ability to integrate with other statistical software –such as SPSS and NCSS-, CART members are planning not only to report their data and formulate them into tables or charts but rather to expand their mission in providing further statistical analysis. Therefore, the reporting scheme will be enhanced with estimations of expected performances, critics and other analytical information rather than just displaying rigid and straightforward data.

Currently, there is not such concrete evidence of this new path of the Project's mission but team members are planning to consider it seriously once the transmission to the new software is through and everyone becomes flexible in dealing with it.

Recommendations

Vision

CART's technology vision focuses to continuously evaluate the use of technology in meeting the project's mission and improving its overall performance by ensuring the existing system sustainability and adopting up-to-date software and hardware components and integrating them smoothly and effectively within the system. Moreover, CART believes that making the utmost use of the new and existing technology is achieved by improving the staff's skills and capabilities in using such technologies.

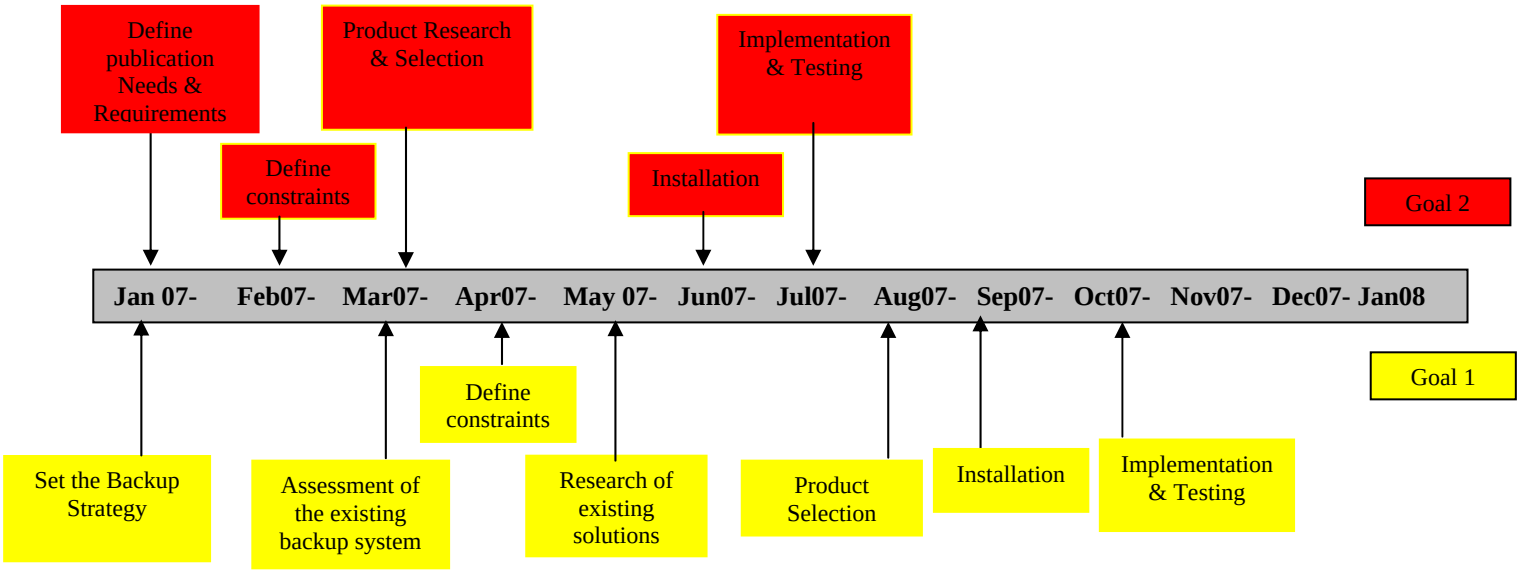
By evaluating new technology in accordance to the organization's mission, CART can take advantage of the value added from the upgraded software programs and customize them according to the organization's needs and thus implementing the most effective technologies in the most efficient way. On the other hand, ensuring the current system sustainability creates the solid background on which the new additional software applications will be installed. However, CART believes that Technology itself does not explain performance variance but rather having other company resources complementary to IT create embedded advantages that explain significant performance variance among the organization itself and within other organizations. Therefore, having human resource complementary to IT creates such embedded advantages. And by training the staff on the new technologies that are being implemented and improving their technical skills; the overall productivity increases because the staff will be better able to integrate the existing technology with the new technology as well as explore the new functionalities of the new software and thus makes the utmost use of the upgraded system.

Goals

In accordance to CART's technology vision and within the span of three years of timeline, the suggested goals are listed according to their priority level. The first one is considered as a problem that takes the highest priority, as for the second one, it is considered an opportunity. Yet, since both projects are independent from each other, the implementation can take place concurrently depending on the budget and the amount of available labor:

1. Sustainable back-up system that will eliminate the current back-up problems
2. Enhanced Publication Software

The timeline is set as the following:



Strategies

Recommendation 1.Sustainable back-up system

Backing-up the data takes place on a daily basis. Back-up tapes are rotated on a 10-business day basis. However, the system has been facing regular backup problems that might not be expected to be resolved in the near future. Technical NAMI team has been continuously trying to fix its existing problems but no effective technical solution has been reached. The system is frequently failing to save the data stored in the server and back it up on tapes**.** The continuous existence of such problem will directly affect the backup performance of the existing and new data. Therefore, there is a need for a new and comprehensive back-up strategy that will update the current back-up system and ensure the sustainability of the back-up system.

Approach[3]:

- Setting a backup strategy: all of the project director, the team supervisor and the administrative assistant have to establish a back up strategy in cooperation with NAMI technical team. This strategy should be developed based on the following considerations:

[3] http://en.wikipedia.org/wiki/Backup
"Keeping Backup Simple, purchasing the Right System", Spectra Logic Corporation.

- Ease of use: Automated backup should be considered, as manual backup can be affected by human errors. Currently, the process is done manually and tapes are rotated on a 10-business day basis
- Making two copies of backup can potentially increase security for data recovery, in order to avoid accidents such as fire and physics randomness.
  - The option of backup online via the internet eliminates these above mentioned worst case scenarios
- Since backup systems depend both on software and hardware, they are exposed to expiration due to time issues. The current backup system has been in use for eight years now. Therefore, the strategy should consider updating the current software and hardware standards into new standard versions.
- Scalability: the strategy should take into consideration additional data being added to the system in the future. Expanding the backup data mainly affects the performance of the backup system –the time it requires for backup data- and capacity –the existing memory available to store additional data- . Therefore, the strategy should consider the option of data compression. Yet, on the other hand, the strategy should consider the fact that uncompressed data are mostly easier to recover if the backup media are damaged or corrupted.
- Ease of Management and Maintenance: here again the strategy can consider the option of an online backup system in which the management and maintenance of the existing backup system is being outsourced to a web-based backup vendor.
- Acceptance and exploitation of new technologies: backup systems must be able to accept new technologies and to exploit them to their maximum potential.

- Assessment of the existing backup system and examining its defects:
  - The technology team needs to assess the current backup system and to come up with a conclusion on what are the parts that need to be updated or changed. For instance, would the update be only on the backup drive or should it include a change on the server as well or the entire backup system…etc.
- Define Constraints:
  - Cost: initial deployment and maintenance costs are part of the budget allocated.
  - Schedule: meeting the organization's deadline
  - Integration with existing technology: the solution must integrate with other existing IT environment
  - Sharable components: the solution must be able to share existing infrastructure components in order to reduce costs.
- Research: the technology team will research with the current commercial back-up systems :
  - Research in different back-up tools (Tape based vs. Disk based)
  - Research on the option of going on web-based backup systems
  - Research different back-up vendors
  - List the requirements according to priorities set by the backup strategy
  - Find points of intersection between the available solutions and the strategy requirements
- Select products: Assessment of the commercial backup systems should consider the following metrics:
  - For hardware products:

        - Size (measured by bytes)
        - Speed (measured by hertz)
        - Warranty (measured in years or in months)
    - System performance:
        - Recovery Point objectives (RPO)
        - Backup Window: is the amount of time that is taken to copy a given data set to the backup device. The current backup system requires a dataset to be frozen for hours while the entire content of a file system is copied to the magnetic tape
        - Restore Time: is the amount of time required to bring a desired data set back from backup media.
        - Retention Time: is the amount of time in which a given set of data will remain available for restore. Some backup products rely on daily copies of data and measure retention in terms of days. Others retain a number of copies of data changes regardless of the amount of time.
        - Backup Validation:
- Implementation and configuration
- Testing:

Outcomes:

- More Reliable back-up system: and therefore more secured database
    - How this will be measured: by taking the difference between the average number of days that the data was not backed-up due to failure between the previous back-up system and the current one
    - How is it currently measured: by successfully implementing the new back-up plan
- Increased efficiency: employees will be able to back-up, store and manage the system easily and smoothly system
    - How this will be measured: it will be measured by taking the difference between the average time it took for back-up process and back-up maintenance between the previous and the current back-up system.
    - How this is currently measured: by implementing the back-up system that meets the business requirements

Internal resources:

The following resources are internal resources needed in order to implement the recommended goal of having a new backup strategy. NAMI technology team will provide help regarding the functional requirements, choosing the market products as well as the system implementation and testing. Moreover, Barbra will be able to provide information regarding the kind of challenges and difficulties that she was facing during the previous system and what she will expecting from the new backup system. Finally, the available software on which the data is stored with is also one of the critical tools that can be used.

1. NAMI technology team
2. existing backup system
3. Back-up staff member (Barbra)

4. SNAP Survey Software

External resources:

The following resources are external resources that will be helpful in implementing the recommended goal of the new backup system.

5. http://www.storagesearch.com/- is a specialized website for data storage and all related backup information.
6. http://infoweblinks.com/content/web-basedbackup.html - This article provides a useful list of the most common commercial web-based backup vendors.
7. http://en.wikipedia.org/wiki/List_of_backup_software- this link provides link of the Major commercial software vendors
8. http://www.storagesearch.com/edrives.html-_storagesearch.com , http://www.smartcomputing.com/editorial/article.asp?article=articles/2005/s1604/18s04/18s04.asp&articleid=25719&guid= this article discusses the importance of online backup systems.
9. http://www.tech-soup.org – nonprofit online consultancy website- from this site you can find articles regarding the assessment of the two main backup tools: the tape based and the disk based and what are their pros and cons. Moreover, you can research on backup devices and their prices as well.
10. http://www.dqchannels.com/content/face/104071701.asp - a useful article that discusses different backing-up tools (Disk based vs. Tape based)
11. http://www.bayarea.net- specialized backup vendor in order to have an idea of the current backup systems that are available.
12. http://www.datadomain.com/tape-replacement.html - Data domain is a leading tape replacement solution

Budget[4]

	Components	Products	Labor	Consult	Total (Est)
	Back up hardware	Available	NA	NA	NA
	Disk/Tape	$100	NA		$100
	Networking equipment	$300	NA	NA	$300
	Backup Solution	$700	NA	NA	$700
	Consulting Services	NA	10 hours	NA	$300
	Installation and Storage Management	NA	20 hours	NA	$600
	Total		50 hours	12 hours	$2000

Recommendation 2.Enhanced Publication Software

As it has been mentioned before, CART is the second largest nonprofit survey program in Pennsylvania that evaluates the level of care that consumers are receiving at mental health providers throughout Allegheny County through conducting face-to-face interviews with these consumers. Data is process and tabulated for reporting. There are different kinds of reports that CART generates each year. The provider-specific report provides and recommends areas on which to improve the service quality of the provider. Copies of the quarterly report are distributed to the provider, the Allegheny County Department of Human Services, and Community Care, a managed service organization. These organizations then use this report to improve the quality of service at the provider site. The annual report is made for public acknowledgment is available in both hard copies as well as softcopies –online-. Currently the organization is using Microsoft Word for gathering their information and compiling the extracted data in order to report them. A professional publication reporting tool is recommended in order to go with a smoother reporting process as well as more professional and polished output. Microsoft Word is essential for creating many types of documents, but it is not designed to easily create the graphically more complex publications required for professional publications and communication materials. For instance, Microsoft Word is not a flexible tool when it comes to

[4] *Working hours are estimated as $30/hr*
Equipment prices are taken from the average prices available on eBay and techsoup
Networking equipment and Disk/Tape costs were evaluated according to one year of backup usage

merging text, photos, and graphs from a data source and integrating them smoothly and neatly in one report. On the other hand, using a professional publication application, staff members will have precise control over the positioning of text with images and other design elements. Moreover, some publication application provides automated page layouts, templates and design guidance.

Approach[5]:

- Define the Business Requirements:
  - Ease of use: since publication errors are considered an expensive error to recover, it is recommended that the publication system will be easy to use for staff members in order to eliminate the amount of publication errors.
  - Provide the polished and professional look of the reports
- Define the Functional Requirements:
  - Enhanced design tool (Photo/Graphic Tools)
  - Create publications by merging text and photos from database resources such as SNAP
  - Work more flexibly with commercial printers for higher quality
  - Work smoothly with existing tools and systems.
- Define Constraints:
  - Cost: initial deployment and maintenance costs are part of the budget allocated.
  - Schedule: meeting the organization's deadline
  - Integration with existing technology: the solution must integrate with other existing IT environment
  - Sharable components: the solution must be able to share existing infrastructure components in order to reduce costs.
- Select products:
  - The technology team needs to assess the current publishing software applications based on the above mentioned requirements.
  - The consultant recommends the adoption of Microsoft Publisher 2003. It is true that Microsoft Publisher is not the right tool when it comes to a highly creative graphical as well as photographic publication work, yet Microsoft Publisher supports powerful tools when it comes to a highly creative graphical as well as photographic publication is not the. Moreover, Microsoft Publisher runs smoothly with the existent Windows Operating System, and free training will be provided for all staff members through the Mother Organization NAMI's training programs. On the other hand, Microsoft Publisher help and support are not highly evaluated. –see external resource 21 for more analysis on the pros and cons of Microsoft Publisher-
- Implementation and configuration
- Training

[5] http://desktop-publishing-software-review.toptenreviews.com/publisher-review.html
http://techsoup.com

Outcomes:

- More Professional Reporting layout: The new output options as well as the additional added design features will support a more polished and professional layout.
- Increased efficiency: employees will be better able to design the annual reports and quarterly publications through interacting with a more flexible publication tool

Internal resources:

The following resources are internal resources needed in order to implement the recommended goal of implementing a professional publication application. NAMI technology team will provide help regarding the functional requirements, choosing the market products as well as the system implementation and training. Moreover, staff who is currently working on reporting will be able to provide information regarding the kind of challenges and difficulties that they are facing when using Microsoft Word and what they will be expecting from the new application. Finally, the available software SNAP form which the information and graphs are going to be imported from and merged into the new software is also one of the critical tools that can be used to assess the system requirements.

13. NAMI technology team
14. existing Microsoft Word system
15. Reporting staff members
16. SNAP Survey Software

External resources:

The following resources are external resources that will be helpful in assessing the available publishing software solutions in the market.

17. http://office.microsoft.com/en-us/FX010857941033.aspx - http://www.microsoft.com/office/publisher/prodinfo/default.mspx- provides information regarding and product description for Microsoft Publisher 2003
18. http://amazon.com – provides with a helpful source for publication software in order to have an estimation of the existing prices.
19. http://www.tech-soup.org – nonprofit online consultancy website- from this site you can find articles regarding the assessment of the publication software and what are the recommended publication software for nonprofit organizations.
20. http://www.bcschools.net/staff/PublisherHelp.htm- http://www.sprysoft.com/learning-microsoft-publisher-2003/p_256687.html- provides tutorial materials for Microsoft Publisher 2003
21. http://desktop-publishing-software-review.toptenreviews.com/publisher-review.html - is a useful link in order to get an idea of a brief ranking of Microsoft Publisher solutions.
22. http://office.microsoft.com/en-au/templates/- This link provides with different kinds of Microsoft publisher 2003 templates

Budget[6]

	Components	Products	Labor	Total (Est)
	Software Application	$250	NA	$250
	Installation	NA	3	$300
	System Requirements	$300	NA	$300
	Training	$150	32	$960
	Total		35 hours	$1600

[6].*Working hours are estimated as $30/hr*
Software prices are taken from the average prices available on eBay and techsoup

About the Consultant

Nouha Nouman is a current Masters student in the Information Systems Management Program in Carnegie Mellon University. Nouha has two Bachelor degrees, one in Computer Science and on in Economics from the American University of Beirut. She will be interning in the field of Development Management with Motorola this summer.

Appendix A.

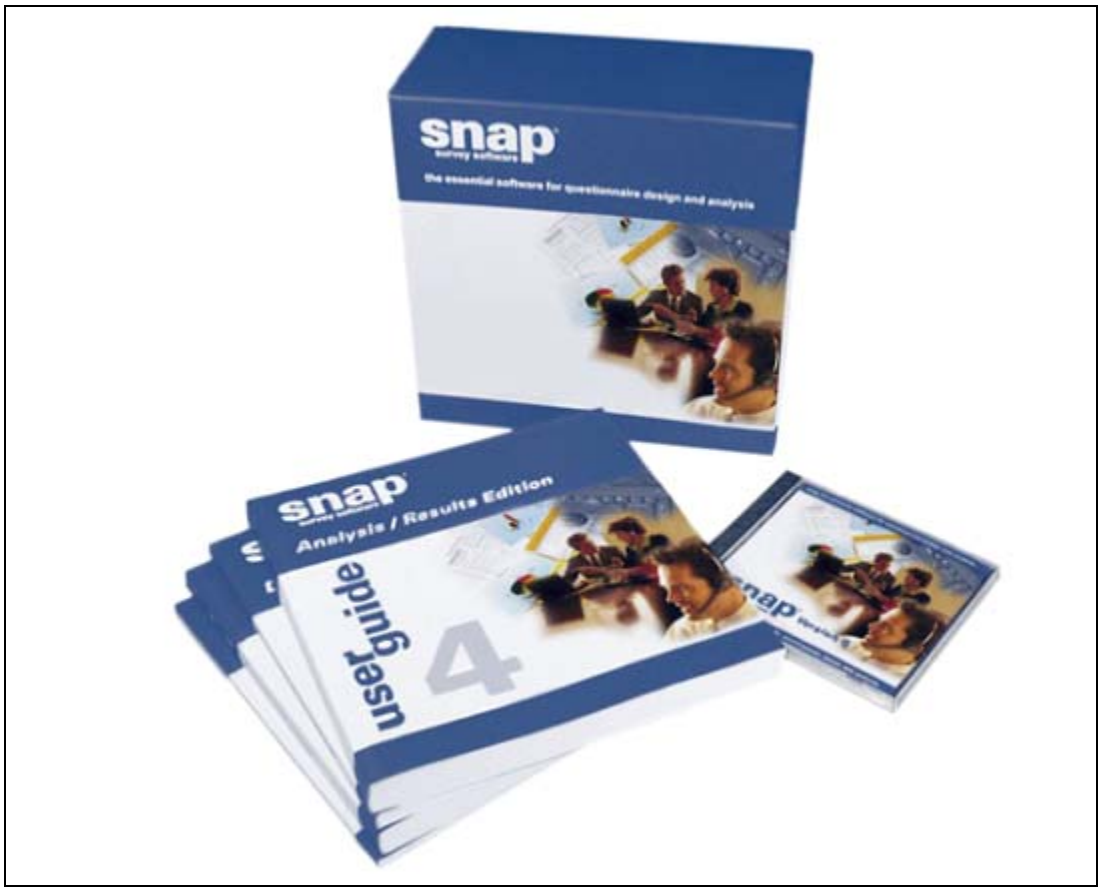
SNAP Training Schedule:

- ***a.*** *Week 1*
  - ***i.*** *Lecture 1:*
    - ***1.*** *Relational Database: Introduction*
    - ***2.*** *SNAP: Survey Design*
  - ***ii.*** *Task 1: Designing soft copies of survey forms from the ACES and CART hard copies forms*
- ***b.*** *Week 2*
  - ***i.*** *Lecture 2*
    - ***1.*** *Relational Database: Relational Models*
    - ***2.*** *SNAP: Data Entry*
  - ***ii.*** *Task 2 : Designing the data entry format and entering data from ACES hard copies and CART soft copies*
- ***c.*** *Week 3*
  - ***i.*** *Lecture 3*
    - ***1.*** *SNAP: Data Analysis*
  - *ii.* *Task 3: Processing the data that has been entered and generating two reports*

Appendix B.

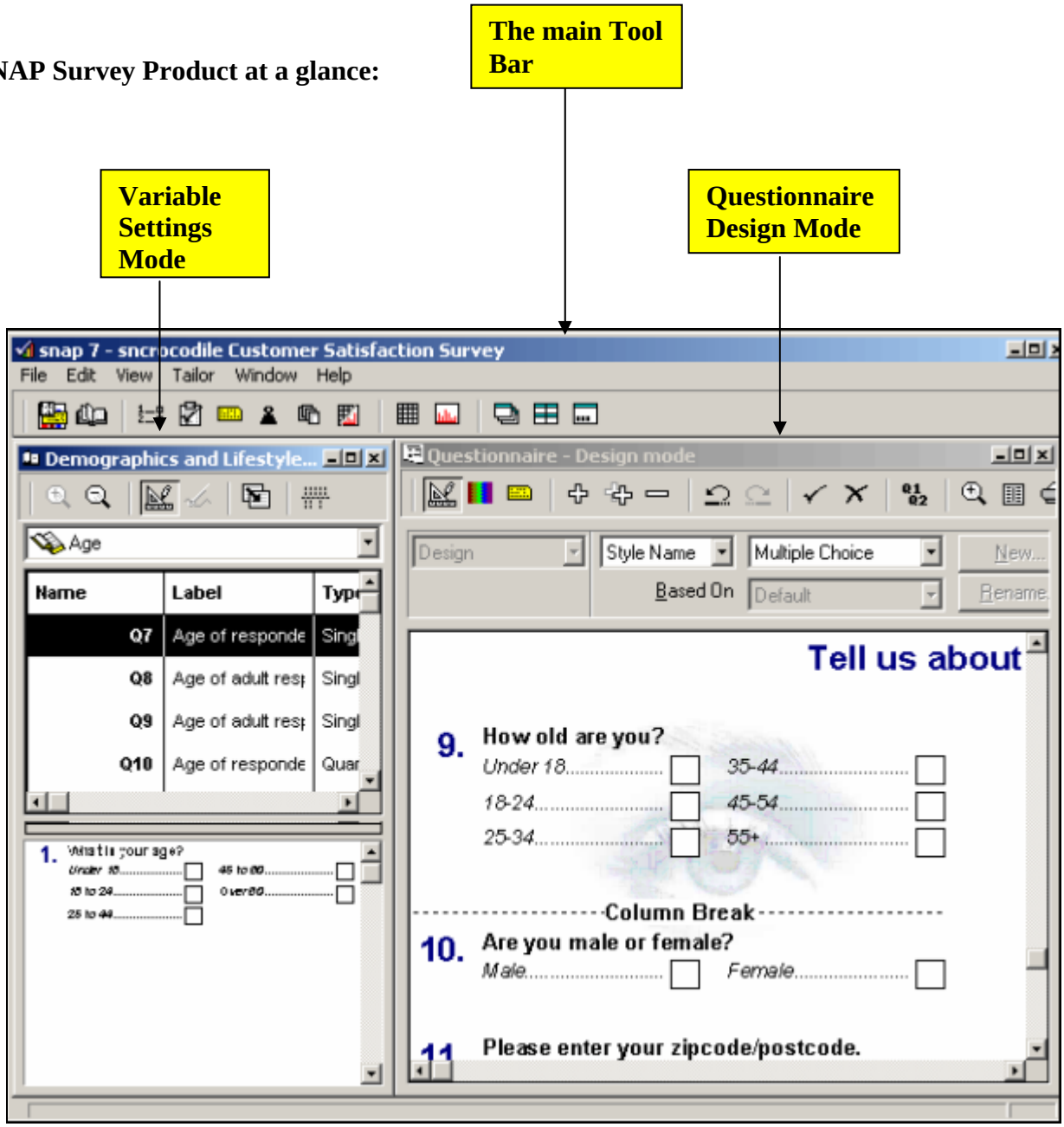
SNAP User Guide Manuals:

1. *Volume 1: "Introduction to SNAP User Guide"*
2. *Volume 2: "Questionnaire Design User Guide"*
3. *Volume 3: "Data Entry User Guide"*
4. *Volume 4: "Analysis User Guide"*
5. *Volume 9: "Additional Statistics User Guide"*



Appendix C.

SNAP Survey Product at a glance:

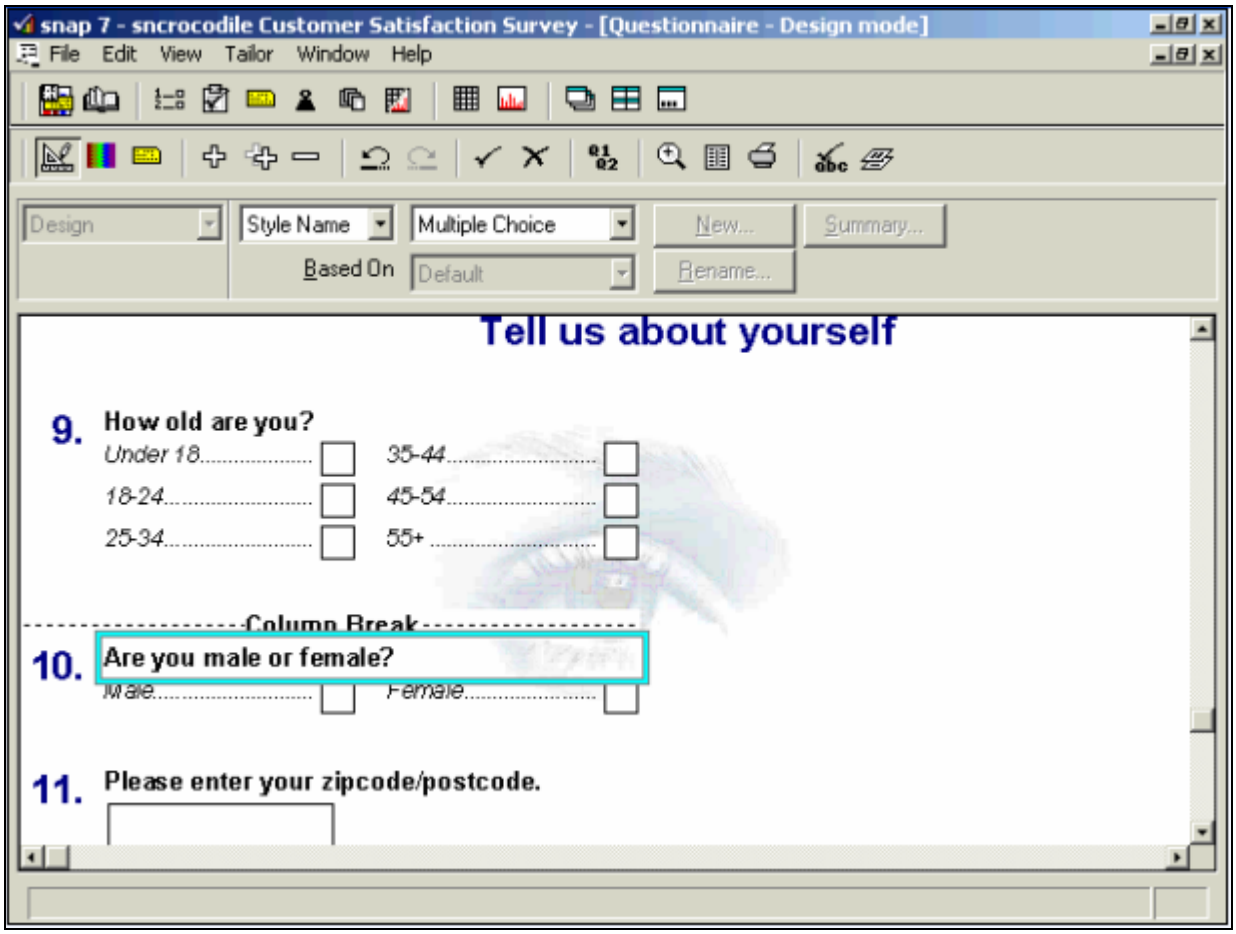


- Questionnaire Design Mode: through which the actual survey format is being built and designed

- Variables Setting Mode: through which each questions is assigned as a variable in order to be analytically processed. This variable will be assigned to different values which are basically the answers to the question that were entered from the data entry mode.

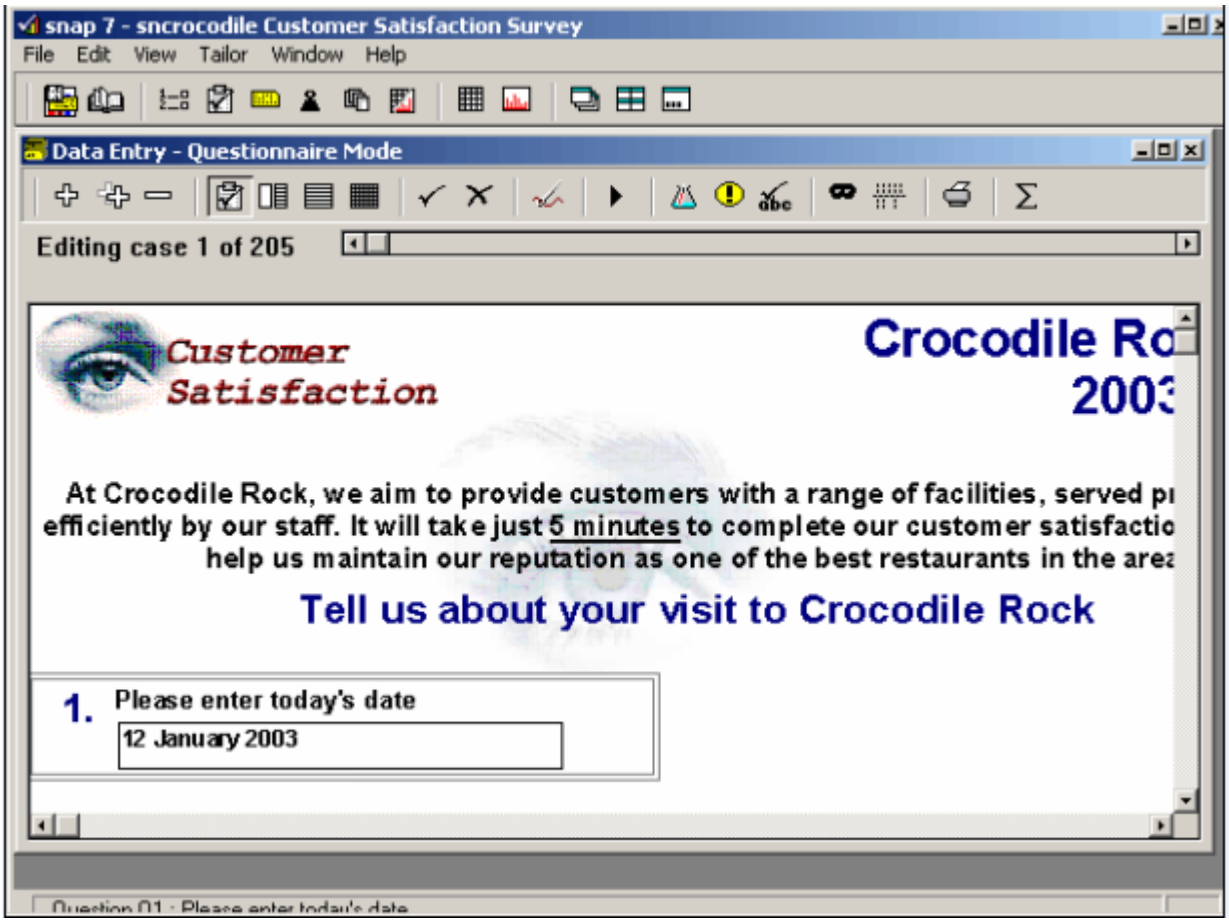
Appendix D.

Survey Design Mode:



Appendix E.

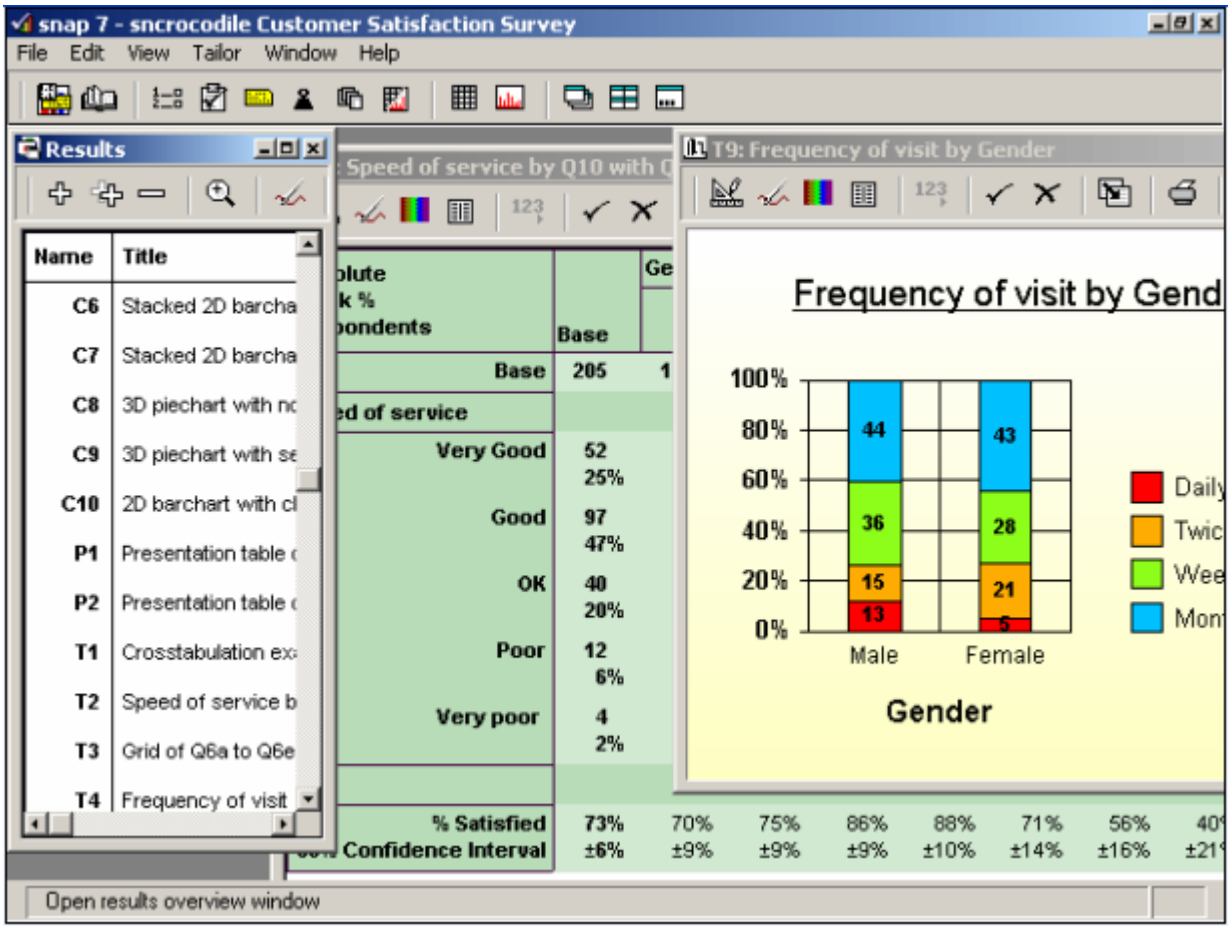
Data Entry Mode:



Appendix F.

Result Analysis:

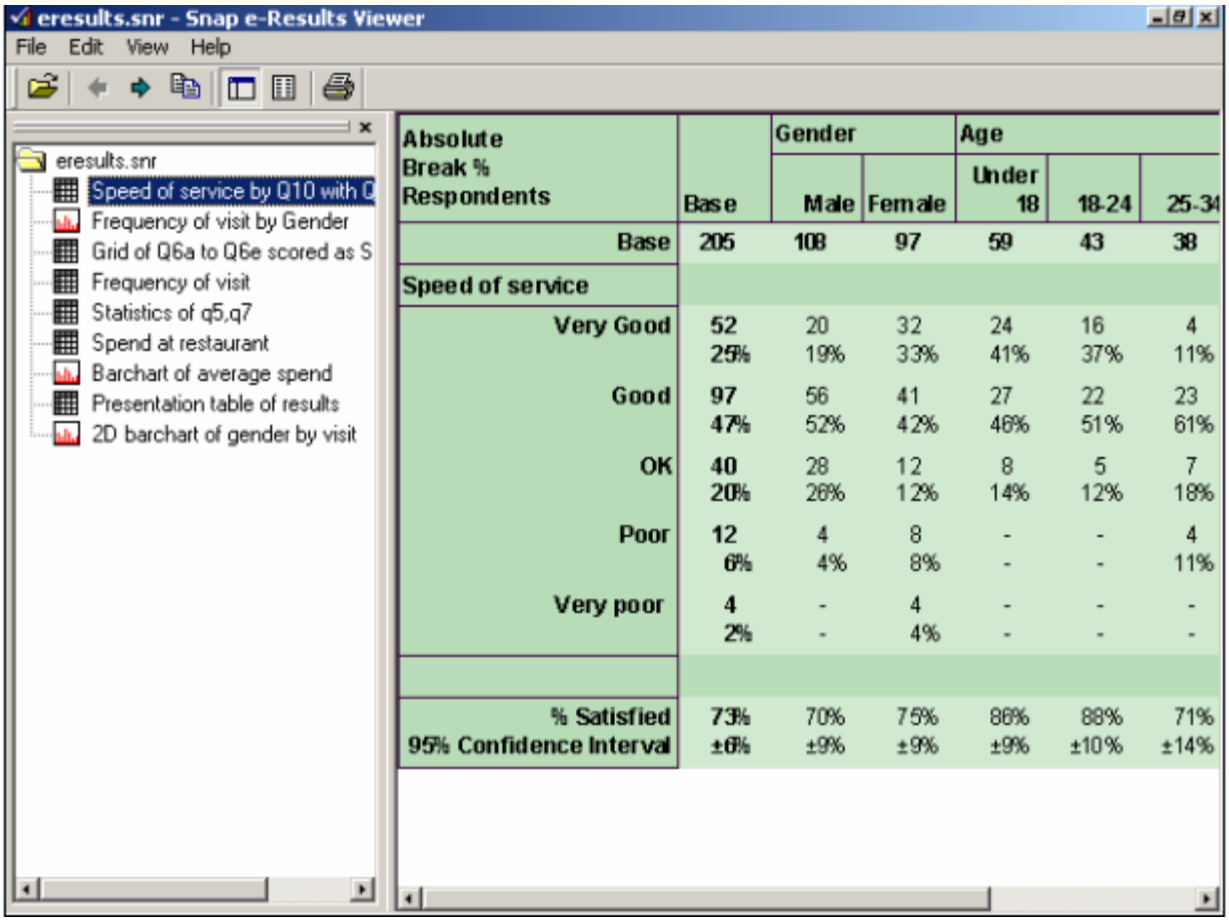
Charts



Appendix G.

Results Analysis:

Tables



Absolute Break % Respondents	Base	Gender		Age		
		Male	Female	Under 18	18-24	25-34
Base	205	108	97	59	43	38
Speed of service						
Very Good	52 25%	20 19%	32 33%	24 41%	16 37%	4 11%
Good	97 47%	56 52%	41 42%	27 46%	22 51%	23 61%
OK	40 20%	28 26%	12 12%	8 14%	5 12%	7 18%
Poor	12 6%	4 4%	8 8%	- -	- -	4 11%
Very poor	4 2%	- -	4 4%	- -	- -	- -
% Satisfied 95% Confidence Interval	73% ±6%	70% ±9%	75% ±9%	86% ±9%	88% ±10%	71% ±14%