



Technology Consulting in the Community

Information Systems
Management Course 95-822

Computer Science Course 15-391

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Final Consulting Report

**Three Rivers Center for
Independent Living**

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Three Rivers Center for Independent Living

Executive Summary

Student Consultant, Perry Chu
Community Partner, Tony Amicarella

I. Background Information

Three Rivers Center for Independent Living (TRCIL) is a nonprofit organization that provides services for around 1,000 people with disabilities each year in southwestern Pennsylvania. The TRCIL mission is:

To empower people with disabilities to enjoy self-directed, personally meaningful lives by providing outstanding consumer-controlled services and by advocating for effective community change.

Three Rivers Center for Independent Living labels itself a “consumer controlled, non-residential, non-profit, community-based human service agency,” and they serve people of any age with any disability. The four core services TRCIL provides are: skills training, information and referral, advocacy, and peer support; they also have smaller programs for housing placement, assistive technology loaning, personal assistance, and community education services. Most of the funding for their programs comes from the state and federal governments. The community partner, Tony Amicarella, is the IT manager at TRCIL, and has been with TRCIL for about one year.

II. Consulting Tasks

The first consulting task was to create a technology planning process for TRCIL in order to help TRCIL integrate its business process as a direct driver of its technology systems. In the past, TRCIL had addressed technology problems only as they came up, so the technology manager was constantly fixing problems instead of developing projects for the future. In addition, the technology manager position was created within the past year, meaning that the technology department was not very well integrated into TRCIL’s business process so there wasn’t any communication about what problems existed. The main goal for this task was to design and initiate a series of monthly technology planning meetings in order to a) facilitate communication and awareness of technology-related business problems and b) get TRCIL’s management involved as direct drivers behind TRCIL’s technology development.

The second consulting task was to update TRCIL’s technology infrastructure in order to reduce technology costs and set the stage for the future projects that would be started in the technology planning meetings. Through initial analysis, the student consultant and community partner found that TRCIL’s slow internet connection and aging workstations were areas that would greatly improve efficiency while also being problems that could be addressed in the near term. TRCIL had been running two internet lines, of which only one was being used, and it also had several workstations from 2003 or earlier and computers with 512mb or less of RAM that could easily be upgraded. Thus, for this task, the first goal was to research and decide on an action plan for

switching to a cheaper & faster internet provider, and the second goal was to create a hardware replacement plan to upgrade or replace TRCIL's obsolete machines.

III. Outcomes Analysis

The technology planning meetings are now established with the first two meetings being held during the consulting engagement. If they are sustained, the meetings represent a increased capacity because TRCIL will now have a structured channel for the technology manager to communicate with the organization's leaders and for TRCIL to start planning for future technology development. The meetings are expected to be sustainable because the community partner has demonstrated his understanding of the meeting purpose and structure by leading the second meeting and updating the technology plan document. In addition, the meetings have buy-in from TRCIL staff, as shown by the executive director's requirement that all program managers attend the meetings.

Switching ISPs from Steel City Broadband to Comcast Business has been approved and will be implemented soon. This switch will cut TRCIL's internet cost by half while more than doubling the connection speed, resulting in much more time and cost efficient web access. In addition, a hardware replacement plan has been developed to set a standard process for rotating out old workstations. This will enable TRCIL to reduce staff time spent waiting for programs to load or waiting for troubleshooting help.

IV. Recommendations

The first major recommendation is for TRCIL to implement some kind of technology skills training. Currently, not all staff are aware of how to access the technology resources that are available at TRCIL, or are not familiar with more than basic functionality on programs such as Microsoft Excel. Increasing this knowledge through technology training would help make TRCIL's operations more efficient by reducing the technology manager's workload and by reducing general staff downtime.

The second major recommendation is that TRCIL should investigate using video conferencing technology. TRCIL has three satellite offices ranging from 40 minutes to 3 hours away, and when meetings are held that include satellite office staff, those staff have to drive from their offices to Wilkinsburg, incurring both time and gas costs. By installing video conferencing equipment, TRCIL will be able to reduce travelling costs and may eventually be able to use the equipment to communicate more effectively with consumers in their homes.

Community Partner

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Three Rivers Center for Independent Living
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About the Consultant

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Perry is a junior in Computer Science at CMU. He is interested in a consulting career, and is expected to graduate in May 2010.



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I. About the Organization

Organization

Three Rivers Center for Independent Living (TRCIL), first established in 1983, is a Center for Independent Living that provides services for around 1,000 people with disabilities each year in southwestern Pennsylvania. Centers for Independent Living are private, community-based, nonprofit organizations made especially unique because they serve people of all ages with any disability and because they require a majority of staff and board members to be people with disabilities. The TRCIL mission is:

To empower people with disabilities to enjoy self-directed, personally meaningful lives by providing outstanding consumer-controlled services and by advocating for effective community change.

Three Rivers Center for Independent Living defines itself in informational handouts as a “consumer controlled, non-residential, non-profit, community-based human service agency.” Reflecting their emphasis on the people they serve, visitors are termed “consumers” to reflect the fact that services are provided for free (versus customer) and to reflect that they are being helped on a one-to-one / equal basis (versus “client”). The four core services TRCIL provides are: skills training, information and referral, advocacy, and peer support. They also have smaller programs for housing placement, assistive technology loaning, personal assistance, and community education services.

Facilities

The TRCIL main office is located at 900 Rebecca Avenue, Wilkinsburg, PA 15221. The building has three floors and a basement, but the third floor is being renovated. There are many individual rooms because the building used to be a nursing home, so most employees either have their own office or share an office with one co-worker. The entrance is staffed by a secretary, and they have a sign-in system to track visitors. Lighting is good, and there are two elevators though only the main one reaches the third floor. TRCIL also has smaller satellite offices in the towns of Erie, New Castle, and Washington, Pennsylvania.

Programs

TRCIL provides four core services:

- **Skills Training** – This program provides specific training to help consumers develop skills they need to live independently, including the use of assistive technology.

- Information & Referral – TRCIL serves as a central location for consumers to find information and resources regarding both TRCIL's own services and programs offered by other agencies.
- Advocacy – The advocacy program works to promote change on both individual and systemic levels in important issues (ie. discrimination) through legal and political means.
- Peer Support – Through informal meetings either one-on-one or in groups, TRCIL's peer support program provides support and advice for people with disabilities by people with disabilities.

They also have housing placement services for people who want to live independently, assistive technology/equipment loaning programs, a library for materials on disability, and various community education, public relations, and fundraising events. The majority of funding for these programs is granted by the state and federal governments.

Staff

The staff numbers around 100 people at the main TRCIL office, with around 10-15 more employees at each of their three satellite offices. The executive positions are:

- President/CEO, Stan Holbrook
- Director of CIL Services, Sandi Weber
- Director of Waiver Services, Roxanne Huss
- Comptroller, Wendy Guy

In addition, there are management positions that report to these directors for each of TRCIL's main programs (like the assistive technology program) and operations (like accounting).

In terms of technology staffing, the only person dealing specifically with IT issues is Tony Amicarella, who is the IT manager and the Community Partner for this consulting project. As the IT manager, he is responsible for all technology issues including troubleshooting/support, management of the current infrastructure, and development of new technology programs.

Technical Environment

Most of TRCIL's computers are from around 2003-2004, and are running Windows XP. There are around 100 machines in the building, including a Microsoft Exchange server for email, a SQL database server, and a file server. Each person has their own network mapped drive on the data storage servers which is used to store their work since the servers are backed up nightly. The internet connection is a DSL line with 768 kbps up and down shared between all 100 staff; there have been some complaints about the speed. There is also a backup line with the same setup, but it is not used very often; the two lines together cost \$388 monthly. TRCIL's internal network is mostly wired, but they do have a wireless router that can be used for large meetings where people bring laptops. Different software programs are used on each computer depending on the employee's role; however, Microsoft Office 2003, including Outlook, Word, and Excel, is used by everyone.

Technical Management

The technology manager is the sole person managing IT for the main office and all of the satellite offices, and is responsible for all issues involving all technology/electronics including troubleshooting, reporting problems, fixing problems, updating software, maintaining hardware,

replacing hardware, and planning additional services. The IT manager has been in place for around 10 months and is the first person dedicated to technology needs; prior to that one person had responsibility for both facilities (physical building infrastructure) management and IT management. One of the major technology challenges facing TRCIL is that technology is managed on an as-needed, project by project basis which is preventing them from moving forward because most of the IT manager's time is spent troubleshooting and maintaining the current technology.

In terms of security management, all data on the file servers is backed up nightly via tape media, with one copy stored in the IT manager's office and one copy that is taken with the IT manager at the end of each day. In addition, they currently use Symantec Anti-virus, Enterprise Edition and have a hardware firewall.

Technology Planning

There is no set system for technology planning; technology has historically been managed on an ad-hoc basis. For example, a staff member in accounting with some business applications knowledge is working with outside developers on an updated database, and a different staff member is working with an outside firm migrate their website to a CMS solution from the current externally hosted solution. One recent development is that the first technology budget was drafted by the IT manager, and was officially included and approved as a part of TRCIL's overall budget for the fiscal year starting October 2008. The technology budget for 2008-2009 totals \$123,000.

Internal and External Communication

There are servers for data sharing, but security is a concern. Each staff member has his/her own email account and Microsoft Outlook is the main email management tool. TRCIL also has a phone system managed by an outside company that supports extensions, voicemail accounts, and automated messages; most communication is done through phone or email.

Internet access is available but sometimes is slow, especially around the mornings (when people are coming into work) and the evenings (when people are leaving). The website is somewhat outdated since the person who used to manage it has left TRCIL, but a new one is being developed as a project separate from the IT department. Information is kept via Excel spreadsheets, in CTS (the old database system), and in HALO (the new/developing database system); data is shared through the file server, but security is a concern.

Information Management

A significant amount of information is stored via Microsoft Excel spreadsheets since Excel is used by employees for any information that the database system doesn't have tables for. The Excel sheets are passed from place to place, and at each stop relevant information is copied down, resulting in a lot of replication of data.

TRCIL also has two database systems: an outdated database system (CTS) that is still in use by some staff and a newer, customized central database (HALO) that is still being developed and implemented incrementally. The new database will be more flexible and should eventually be able to track donor and consumer information from all the departments, but development has been underway for 18 months and progress has been slow. Certain forms and reports are kept on paper in three ring binders due to program requirements, and this is a problem whenever two different people need the same binder.

Business Systems

There is an accounting department that keeps track of services provided to consumers through accounting software; this information is then reported to the state in order to receive funding. Software is also used to manage payroll; employees mark their own timesheets, subject to manager approval.

II. Task 1: Create a Technology Plan

Effective technology planning is crucial to running a successful organization. Without a technology plan, TRCIL has historically implemented technology on an ad hoc basis, leading to a buildup of technology-related inefficiencies that have reduced TRCIL's ability to carry out their mission. Some examples are: TRCIL's internet service is slow and overpriced, the technology manager is spending the majority of his time troubleshooting problems, TRCIL's data is copy-pasted between excel files and databases, and the technology manager has a backlog of potential projects.

The creation of a technology plan will improve TRCIL's technical management capacity by:

1. Opening communication so that the IT manager gets more insight into what problems exist
2. Tying technology to business process so the business managers are driving development

This task involves structuring and initiating a technology planning process and then creating a written artifact to be filled during the planning meetings in order to guide development. In the long run, the technology plan can potentially increase capacity in all of TRCIL's programs and business processes as projects are developed to address needs in those areas.

Expected Outcomes

Phase / Step	Expected Outcome	How to Measure	Current Measure	Evidence of Change
Background research	Consultant & CP are well informed about the technology plans & TRCIL's planning process	CP comfortable with process	none	CP enthusiastic
Hold first & second technology meetings	TRCIL staff is informed and interested in further meetings	# staff attending, interest in meeting shown in ending survey	none	Staff attending, awareness of process
Assess TRCIL's needs	Business-driven vision of technology is established	# & priority of listed needs	none	Written list
Draft the technology plan	Working document with short, mid, and long term goals	Detail on 3-4 most important issues, list of other issues	none	Written Document
Establish the structure and process for future technology meetings	Second meeting is held and third meeting is planned, processes for the CP are established	Attendance / interest in second meeting, CP actively manages technology process	none	Second meeting happens, CP edits the technology plan, Agenda created for third meeting

III. Task 2: Update the IT Infrastructure

When leveraged correctly, technology can produce exponential returns in an organization's ability to further its mission. In the past, however, TRCIL has dealt with technology on an as needed basis, leading to a disorganized, aging IT infrastructure. The second consulting task was to update TRCIL's technology infrastructure in order to reduce technology costs and set the stage for the future projects that would be started in the technology planning meetings.

Through initial analysis, the student consultant and community partner found that some of the major complaints were TRCIL's slow internet connection and aging workstations. TRCIL had been running two internet lines, of which only one was being used to support 100 staff, and it also had several workstations from 2003 or earlier and computers with 512mb or less of RAM that could easily be upgraded. Thus, for this task, the first goal was to research and decide on an action plan for switching to a cheaper & faster internet provider, and the second goal was to create a hardware replacement plan to upgrade or replace TRCIL's obsolete machines.

By addressing current infrastructure problems of a slow internet connection and aging computers, TRCIL will increase operational efficiency, reduce maintenance costs, and trim the amount of time that the IT manager spends troubleshooting hardware issues. As the infrastructure is upgraded, TRCIL will be able to consider using new technologies that they couldn't access before due to constraints in bandwidth or processing power.

Expected Outcomes

Subtask 1: Internet Connection

Phase / Step	Expected Outcome	How to Measure	Current Measure	Evidence of Change
Identify TRCIL's internet service problems & needs	Clear knowledge of what is lacking in current service	CP Agreement	none	CP excited
Research possible solutions & alternatives	Knowledge of solutions and how they address TRCIL problems	Analysis produced	none	Written / verbal analysis or recommendations
Discuss research & feasibility with CP	Decision on a course of action	Consensus on solution	none	Plan created
Implement chosen solution	New internet ISP or delivery medium	Faster internet, money spent	none	Staff satisfied, service change

Subtask 2: Hardware Replacement

Phase / Step	Expected Outcome	How to Measure	Current Measure	Evidence of Change
Background research	Understand budgeting & planning process, best practices	Consultant ability to inform CP	none	CP understanding of goals
Develop Plan	Clear, concrete plan for replacing all current hardware	CP satisfaction, how comprehensive	none	Written document
Implement Plan	Budget approval, initial orders	Budget allocated, management support	none	CP actively follows plan

IV. Results of Consulting Work

A. Task 1: Technology Planning

The purpose of this task was to initiate a technology planning process that focuses on “TRCIL driven” technology management – integrating TRCIL’s business operation into its technology management process in order to develop a long-term vision of how technology can support TRCIL’s mission. By creating a series of monthly technology planning meetings involving staff from every department, TRCIL will be able to avoid ad-hoc trouble shooting and instead work on executing projects that address business needs and directly improve TRCIL’s ability to carry out its mission.

1. Outcomes

a. Technology Meeting Series

The first two technology planning meetings were held in a series of monthly meetings, and the CP led the second meeting. While the consultant and CP worked together to develop the structure of the meetings, the consultant led the discussion on why technology planning was needed at TRCIL and what the basic structure would be during the first meeting since the initial meeting was meant to be an introduction to build buy-in from the other managers. For the second meeting, the CP took over in leading discussion on what TRCIL’s technology and technology skills needs are in order to generate ideas for potential projects that later meetings would follow through on. By the end, the managers were assigned to produce a short list of technology needs and of minimum software skills they wanted their employees to have. Following the meeting, the CP developed an agenda for the third meeting to discuss and figure out a plan to act upon the needs reported from the assigned items. This initial CP-led meeting is a positive step toward sustaining this meeting process because it shows that the CP understands the goals and structure of the meetings and can engage the attendees. The mission/vision statements and format for these meetings are attached as Appendix A.

However, there are a few challenges that will need to be addressed. First, the discussion sometimes goes off track during meetings. This is a concern because if the meetings don’t have a clear direction, interest will wane and the process won’t be sustainable. This risk can be addressed by making sure to have a clear agenda for each meeting and actively refocusing on the agenda when discussion is off topic. Second, the content and format of the first two meetings has been more informational since the goal was to introduce the technology planning concept and to list out TRCIL’s technology concerns as a foundation for deciding which issues should be considered first. Since the first action items are due at the third meeting, there is no real evidence for whether or not the attendees will be committed to carrying out what is discussed in the meetings at the writing of this report. If the action items become a problem, Tony can try to push back by reviewing why each of the action items is important and how carrying them out will help both technology management and TRCIL’s mission.

b. First Draft of Technology Plan

In terms of the technology planning document, a quick initial outline was written by the consultant before the second technology meeting that outlined the structure of the document and included sample entry on technology skills training. After the second meeting, the CP has updated the projects section to include video conferencing and network monitoring, since those are the two projects that will be developed in the near term. The CP has also updated the document to reflect the action items from the second meeting, and the CP has made this version available to staff.

The next step will be for Tony to make changes to the short term plans section of the document by adding in the action items that will be determined at future meetings, since the technology meetings have not reached that point. This continuous updating of the technology plan document is useful for TRCIL by helping them keep track of their plans over time, but there is also a risk that the document may be abandoned since it requires extra effort to keep everything updated in the document format.

c. TRCIL staff involvement & attendance

The most significant outcome in terms of sustainability is that TRCIL is committed to following through with this process. The executive director is excited about the process and is requiring every program to be represented at each meeting. The executive director's support directly contributed to increasing attendance from two of the four executive managers and a few program managers from one department at the first meeting to all of the executive and program managers as well as some line staff at the second.

This interest on the executive level is a major boon to the sustainability of this meeting process because in the past, a series of technology initiative meetings was started and cancelled due to low attendance. It will be critical to maintain this momentum and interest going forward because there won't be enough interest to continue supporting the process. Another risk is that there will be resistance from the attendees, since some of them are only attending because they are required to. These risks can be addressed by engaging attendees with discussion, showing them that their input matters by setting action items after each meeting, and by providing concrete results that are coming out of this process.

B. Task 2: Infrastructure Updates

In the past, TRCIL has dealt with technology on an as needed basis, leading to a disorganized, aging IT infrastructure. As a result, the current IT manager is stuck keeping the existing infrastructure running instead of working to develop projects that can directly impact TRCIL's mission. By addressing current infrastructure problems like a slow internet connection and aging computers, TRCIL will increase operational efficiency and will also be able start working on projects that have a direct impact on their mission.

1. Outcomes

a. ISP Change to Comcast Business Cable

One of the biggest problems TRCIL had was slow internet service. They were running two SDSL lines from Steel City Broadband at a total cost of \$388 per month with only one being used at a time and the other being kept as a backup. The main line had a bandwidth of 768 kbps up/down connecting around 100 staff to the internet. After comparing the other options Steel City offered against a Comcast Business cable line, TRCIL has switched to a cable line from Comcast Business with bandwidth of 16mbps up/2mbps down. This line costs \$90/month, which represents a \$298 savings per month over the old setup.

There are no sustainability issues with this outcome. However, one thing that hasn't been done is deciding on what to use as a back-up for the cable line. The Steel City contract is renewed on a monthly basis, and while TRCIL is keeping the backup line, they are interested in cheaper alternatives. At some point TRCIL will have to make a decision on whether the backup line is useful enough to keep the SDSL lines active.

b. Hardware Replacement Plan

TRCIL has around 70 desktops (40 from 2003 or earlier), around 25 laptops, 3 servers, and networking equipment supporting over 100 people, around 30% of which was purchased in 2003 or earlier. In order to create a plan for updating the old equipment, the consultant and CP worked together to create the staff survey in order to get numerical and opinion data on how quickly their computer would load websites and programs (survey questions are listed in Appendix B). The survey was sent by email to all 120 TRCIL staff from both the main and branch offices; the response rate was around 25%.

The consultant and CP then worked to decide on a minimum standard for processor speed and RAM for each workstation using data from staff surveys, TRCIL's computer inventory, and the amount of incremental improvement provided by refurbished computers in TRCIL's \$300-400 price range on the refurbished computer market. Then, the consultant and CP discussed the CP's plans for periodically replacing TRCIL's servers due to age and memory limitations, and decided on replacing one of the three servers each year for the next three years. Next, the consultant and CP discussed how TRCIL's network hardware would be affected by TRCIL's ongoing plans for upgrading their internal network to 1 gigabit capability and established a written record of the steps that would be taken over the next three years. Finally, the plan was compiled into a written report and discussed briefly at the second technology meeting in order to inform the attendees; copies were also made available (the plan is attached as Appendix C).

This plan sets actions and recommendations for the next 2-3 years, but there is no process for defining the hardware requirements following that point or for updating the plan during this period. The next step for the hardware replacement plan is to incorporate it into the technology planning process by repeating the survey and reviewing the plan on a yearly or twice-yearly basis so that it can be adjusted as needed.

V. Additional Recommendations

A. Technology Skills Training

The need for general technology awareness at TRCIL was brought up in the first technology meeting as a base point for discussion. Several of the staff mentioned that some form of technology skills training would be useful so that everyone at TRCIL would be aware of what resources are already available. Increasing this awareness through technology training would help make TRCIL's operations more efficient by reducing the IT manager's workload and by reducing general staff downtime.

The first step in carrying out this recommendation would be to determine what software is critical to the operation of each department and what skills the staff currently has in order to determine what basic skill sets the staff may need. This can be done by surveying the program managers to determine the required knowledge in their department and then surveying all staff in order to find out what additional skills staff might be interested in. It is a good idea to involve the program managers in the surveying process because they have authority over the staff, which can help in getting a better response rate.

The next step would be to set a technology skills standard for all the different commonly used features in software (ex. Microsoft Word), hardware (network printers), and the network (finding / mapping their folder on the server). The technology skills standard would be the minimum amount of knowledge each staff member at TRCIL would have to be familiar with. The managers can decide on the software standards based on what is necessary for the staff to do their job efficiently. Tony can set the hardware and network standards after some discussion with the managers because he is most involved in troubleshooting those items so he has an idea of how difficult those tasks are and also how widespread they are.

The final step would be for the IT department to work with TRCIL's training manager to develop training workshops consisting of both demonstrations via a projector and practice exercises. The workshop could be repeated for new hires or repeated yearly as the standard changed. In addition to the training workshop, the technology and training managers could also work to develop a library of training videos using screen-capture technology so staff would have a resource to turn to before asking for troubleshooting help. Free screen capture technology is available that allows users to record their screen as a video file and add voice-overs and captions; see the resources section for a review for some different screen capture options and for a great TechSoup article with a walkthrough and examples of how to use screen capture in training. Microsoft also has fairly comprehensive audio training courses for free online, which can either be used as examples to build off of when creating the videos or can be used as the self-help component for Microsoft office tools.

This technology skills training could eventually be further extended to directly further TRCIL's mission in the future if consumers can be trained using the same process. This would serve TRCIL's mission by helping people with disabilities develop skills they might not otherwise have exposure to. For example, training videos for commonly used features in Microsoft Word might be especially helpful for consumers who are looking for work, and a training workshop on Excel would be helpful to consumers who wanted to start tracking their own budgets.

Resources:

- **TechSoup Training Page** - <http://techsoup.org/learningcenter/training/index.cfm>

This page is a directory to all of the TechSoup articles related to training. The articles provide a good overview of how to design effective training and how to use visuals like video or “screencasts” (video from screen capture with a voice over) to deliver that training in an engaging manner. The webpage should be used as a resource in both designing the training workshops to make sure they are effective and engaging and used as a walkthrough for how to use screen capture technology for further training.

Notable links:

An Introduction to Screen Casting:

<http://techsoup.org/learningcenter/training/page6885.cfm>

Eight Common Training Mistakes:

<http://techsoup.org/learningcenter/training/page5419.cfm>

- **Review of Video Screen Capture Programs** -
<http://randomtechnotes.com/rtn/video-screen-capture/>

This page is a review of three video screen capture programs by someone who wanted to do screen capture in order to do software demos. The options covered are WINK (freeware), CamStudio (free & open source, also used in the TechSoup article), and Snapz Pro X (30-day free trial, \$69 to purchase). The review discusses the output file formats, output quality, annotation features, and ease of use for each of the programs; the reviews were done on an Macintosh computer so performance may be slightly different for Windows XP. This website can be used as a quick reference in deciding what screen capture software to use based on features. It seems like CamStudio will probably be the best application to use for a beginning to intermediate user.

- **Microsoft Office Self-paced Training** –
<http://office.microsoft.com/en-us/training/default.aspx>

This is Microsoft’s page for self-paced training. There are a wide range of tutorials ranging from basic how-tos on using charts in PowerPoint or using keyboard shortcuts in Word to walkthroughs on advanced features like using macros in Excel. Each Office program has 6-8 tutorials that are each around 45 minutes long. The tutorials are audio guided with text highlighting the main points. This is a great resource to use as training for Microsoft Office products and also to use as a reference for building other tutorials – one good way to practice creating a tutorial using video screen capture would be to take the content of one of the lessons and create a video tutorial based on the lesson.

Notable Links:

Training Roadmaps – Links to overviews of course content for faster browsing:

<http://office.microsoft.com/en-us/training/HA102295801033.aspx>

B. Video Conferencing for Satellite Offices

The idea of video conferencing was initially brought up by the CP in discussion about TRCIL's satellite offices. TRCIL has three satellite offices ranging from 40 minutes to 3 hours away. When meetings are held that include satellite office staff, those staff have to drive from their offices to Wilkinsburg, which incurs both time and gas costs. By installing video conferencing equipment, TRCIL will be able to reduce traveling costs and may eventually be able to use the equipment to communicate more effectively with consumers in their homes.

Recently, TRCIL was given a video conferencing set-up for their main office through a grant by the Pennsylvania Centers for Independent Living (PCIL). Similar setups have been given to around 80 Centers for Independent Living around the state and they are intended to be used during training sessions hosted by PCIL. TRCIL has the option of buying similar equipment for their satellite offices at an additional cost, but they first need to explore how useful video conferencing might be since the training sessions have not yet started.

The first step for TRCIL to take is to determine how effective video conferencing would be in the context of its own business operations. Video conferencing between TRCIL offices can be tested with a cheap web-cam solution via video chat functionality on Skype, which is a free voice & video communication program. As an alternative to Skype, many of the major instant messaging programs also have video-chat functionality, but Skype generally has better voice quality because they also have a pay service for Skype to phone conversation while the instant messaging services are more directed at text messaging.

Simple webcams can be purchased for \$30-\$40, making a set of 2 or 3 webcams a viable initial test for smaller meetings between the main and satellite offices. The purpose of these tests would be to get feedback on how effective communicating via video conferencing is. If video conferencing is useful, then the next step would be to decide on what kind of video conferencing system TRCIL needs since in addition to testing the web-cam solution, TRCIL will get experience with dedicated video conferencing hardware through the PCIL program. Another alternative might be to use a software & webcam based solution for the branch office that can interact with the hardware at the main office. The technician that installed the hardware mentioned this possibility, and the hardware manufacturer would be a good resource to consult to figure out what software and video standards would be necessary. The advantages vs. costs of each system should be considered in making the final decision.

Set Up	Advantages	Disadvantages
Webcam & Skype	<ul style="list-style-type: none">• Extremely easy to set up• Very easy to start using• Cheapest solution	<ul style="list-style-type: none">• Lower Quality• Lack of camera control• Not feasible for large meetings
Hardware at main office & software at branches	<ul style="list-style-type: none">• Moderate cost• Builds off of the installed PCIL system• Good video & sound	<ul style="list-style-type: none">• Requires technical knowledge of video conferencing standards• May be difficult to

	quality <ul style="list-style-type: none"> • Multi-way conference capability 	troubleshoot without consulting outside sources
Hardware at all offices	<ul style="list-style-type: none"> • Highest Video & Sound quality for both ends • Multi-way conference capability • Best solution for large meetings 	<ul style="list-style-type: none"> • Requires technical knowledge of hardware and video standards to set up and maintain • Takes the longest between purchase and first use • Very expensive

Resources:

- **Webcam Enthusiast Reviews** - <http://cowboyfrank.net/webcams/index.htm#index>

This is a webcam enthusiast's page including information on how to evaluate webcams, webcam reviews, and instructions on setting up webcams. Each review includes sample still photos under different lighting conditions and a screen capture of the camera controls. The reviews and instructions are fairly thorough, making this a good first reference to get some background on webcams. Most of the webcams listed are in the range of \$60 to \$100.

Notable Links:

Reviews Page:

<http://cowboyfrank.net/webcams/index.htm#reviews>

- **Skype's Video Chat Page** - <http://www.skype.com/allfeatures/videocall/>

This is Skype's promotional page on their video calling feature. It is partly an advertisement, but also has a good general overview of how to use the video calling – simply install Skype on two computers with webcams and connect through Skype. There are also links to download Skype, information on webcams, and instructions on how to start the video calling. This will be a good reference to use in setting up Skype for testing the webcam solution.

Notable Links:

Webcam Informational Page:

<http://www.skype.com/allfeatures/webcams/>

- **Video Conferencing Reviews** - <http://thinkofit.com/webconf/videoreview.htm#articles>

This is an aggregating site of information related to video conferencing. The page contains reviews of video conferencing solutions (Skype, iChat, LifeSize, etc), comparative reviews, and links to other resources related to video conferencing. This would be useful to browse through in order to get more knowledge on the software and hardware alternatives.

About the Consultant

Perry Chu is a junior majoring in computer science with a minor in business at Carnegie Mellon University. He is interested in working in the consulting field after graduation, and is a member of CMU Solutions, an undergraduate consulting group. He is expected to graduate in 2010, and can be contacted at apchu@andrew.cmu.edu.

Appendix A.

Mission, Vision, & Purpose

Mission:

To create and sustain interest in TRCIL-driven technology management in order to further TRCIL's mission through the use of technology. Through strong communication and a focus on concrete solutions, the technology meetings will generate strategic, results based plans and will build staff awareness of technology problems and opportunities.

Vision:

Through this process, we envision making meaningful technology accessible and easy to use for all TRCIL staff. TRCIL will be able to take advantage of technology opportunities and implement them quickly through a transparent policy.

Purpose:

In the past, TRCIL's technology management has been separated from TRCIL's daily business operation. As a result, technology problems were addressed only as they came up, resulting in disorganization and a lack of a vision for how technology could impact TRCIL's mission.

The purpose of this technology planning process is to create that vision by focusing on "TRCIL driven" technology management. This process integrates TRCIL's business operation into its technology management process in order to develop a long-term vision of how technology can support TRCIL's mission. By creating a series of monthly technology planning meetings involving staff from every department, TRCIL will be able to avoid ad-hoc trouble shooting and instead work on executing projects that address business needs and directly improve TRCIL's ability to carry out its mission.

Technology Meeting Details

Meeting Format

- Tactical Issues (10-15 Minutes)
 - What daily operational problems are users/TRCIL having with existing computers, software, and networks?
 - Discussion of problems and potential solutions
- Strategic Planning (35-40 Minutes)
 - What role does technology play in TRCIL's strategy for the next five years?
 - Review actions taken since last meeting
 - Discuss progress and next steps
- Review & Actions (5-10 Minutes)
 - What did we go over this meeting and what are actions were assigned?
 - Review the major discussion points, action items, and who is assigned to each

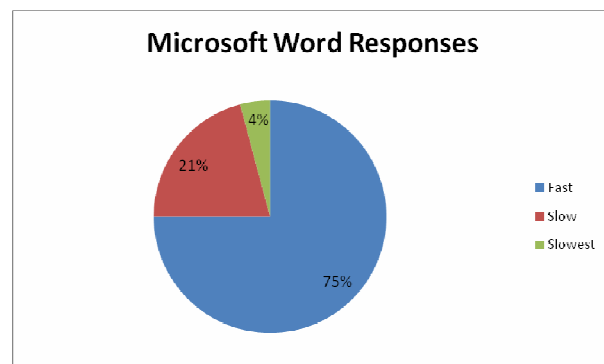
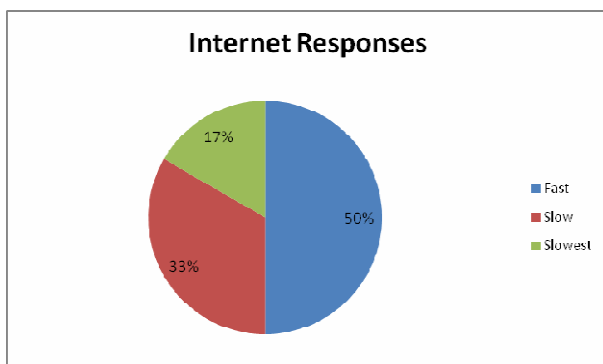
Appendix B.

This survey was distributed via email to measure the performance of staff computers. The response rate was around 25% (30 people).

IT Performance Survey

1. When you are on the Internet how long does it normally take to go from page to page?
 - a. Less than 5 seconds.
 - b. 6 to 10 seconds.
 - c. Greater than 10 seconds.
2. Name all the programs you have open when your computer is slow?
3. What weekday and time is your computer usually the slowest?
4. On a scale of 1 – 10, 1 being the best, how would you rate your work computer?
5. How long does Microsoft Word take to open a document from the point where you double click on the document?
 - a. Less than 20 seconds
 - b. 20 seconds to 1 minute
 - c. More than one minute

Results for question 1 & 5:



Appendix C.

TRCIL - Hardware Replacement Plan

The purpose of this plan is to establish a standard for hardware replacement throughout TRCIL. By establishing this standard process, we will be able to make the technology budget more accurate, ensure that all hardware meets TRCIL's minimum needs, and cycle out machines as they become obsolete. This plan is considered a working document and should be reviewed and updated annually by the IT manager and/or at the technology planning meetings. Standards are included for three types of hardware: Computers (Desktops and Laptops), Servers, and Network Appliances.

Computers (Desktops / Laptops)

Computers will be replaced based on two guidelines. The first guideline is a minimum processor speed and minimum memory (RAM) requirement, and the second guideline is an age guideline. Only the computers that are older than 6 years old will be automatically considered for replacement each year. Of the computers that are older than the age requirement, those that have a processor speed lower than the processor requirement and/or an amount of RAM under the memory requirement will be replaced each year. The stated standards are for desktop computers; laptop computers will be held to standards that are roughly 75% of the desktop requirements.

Year	Processor	RAM	Other
2009	2.0 Ghz	1.0 GB	
2010	2.5 Ghz	1.0 GB	
2011	3.0 Ghz	2.0 GB	1-Gbit network card

This plan also states a minimum standard for the replacement computers. All incoming computers should have components that meet or exceed the specifications below.

Year	Processor	RAM	Other
2009	3.0 Ghz	1.0 GB	1-Gbit network card
2010	3.5 Ghz	1.5 GB	1-Gbit network card
2011	4.0 Ghz	2.0 GB	1-Gbit network card

Additional Notes: All computers that won't be replaced until after 2010 should be upgraded to 1.0 GB of RAM by the end of 2009, and all computers should be upgraded to 1-Gbit network cards by the end of 2010.

Servers

It is estimated that TRCIL's servers will need to be replaced roughly every 5 to 6 years in order to keep up with the increasing workload. In order to minimize yearly budget costs, only one server should be replaced during any one fiscal year. After the current servers are replaced, performance should be evaluated after the fifth year and each year thereafter to determine when the next replacement is necessary.

Year	Server to be replaced
2009	File Server*
2010	Exchange Server
2011	SQL / Database Server

*The file server is already replaced as of Fall 2008, but this will be counted as the server replacement for fiscal year 2009.

Network Appliances

The goal for the TRCIL network is to upgrade to 1 Gbit network infrastructure by the end of 2010. The third floor renovation specifications include a 1Gbit network, and the rest of the building will need to be upgraded so that the additional bandwidth can be taken advantage of. Other network goals are to install VPN firewalls so that the satellite offices can be linked directly into the main office network, and to upgrade the unmanaged switches to managed switches so that network traffic can be monitored.

Year	Network Upgrades
2009	Install Watchguard VPN Firewall units <ul style="list-style-type: none"> • Main unit at TRCIL main office • Secondary units at each satellite office
2010	Install 1Gbit network for 1 st and 2 nd floor <ul style="list-style-type: none"> • Upgrade all computer network cards to 1Gbit cards • Replace any old Ethernet cabling to a 1Gbit standard Upgrade to managed switches <ul style="list-style-type: none"> • Replace all (~6) of TRCIL's network switches