

# Arthritis Care Corporate Information Database

An Interactive Qualifying Project  
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Worcester Polytechnic Institute  
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Sponsoring Agency: Arthritis Care Organisation

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## **Abstract**

Arthritis Care is a multi-regional organisation with communication needs that have outgrown its information technology resources. Implementation of a new Corporate Information Database (CID) was needed to improve the efficiency of Arthritis Care's internal communications structure. This IQP project team designed and constructed a CID, with complementing training materials, based on research we conducted on the organisation. To facilitate our successful integration of the system we also conducted training seminars at regional locations of the organisation.

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## **Chapter I: Introduction**

Arthritis Care is a multi-regional organisation that's current communication needs have outgrown its information technology resources. A previous IQP group determined that the organisation needed to incorporate a new corporate information database (CID)<sup>i</sup>, or Intranet<sup>ii</sup>, in order to improve the efficiency of its internal communications. This project is the work of the third IQP group from WPI that the Arthritis Care organisation has sponsored. The first group (D-term, 2001) investigated the organisation and made recommendations on how to improve internal communications. They decided that an Intranet would be the best method to solve their communications issues. The goal of the second group (E-Term, 2001) was to design and code that Intranet for the organisation. However, due to limited resources at the time, the second group was unable to complete the code. Our group (C-Term, 2002) constructed a corporate information database system, developed a CID integration strategy, and produced training methods and materials to help with the integration of the software.

Arthritis Care has over 600 branches and offices spread across the United Kingdom. In addition, Arthritis Care maintains a network of local contacts, a group called Young Arthritis Care, and four hotels. The organisation is the UK's largest non-profit voluntary organisation working with arthritis. These divisions are spread out across England, Scotland, Northern Ireland, and Wales; each region has an office and there is one central office in London.

The major goal at Arthritis Care is to help those with arthritis maintain control over their disease and not let it affect their lives. They use various mediums to meet this goal such as publishing a bimonthly magazine entitled *Arthritis Times*, monitoring phone-in help lines, and maintaining a web page. Arthritis Care provides a great service to its users, and wishes to expand the organisation need to meet the demands of its clients. Arthritis Care was having trouble keeping up with the organisation's growing internal communication demands. The organisation relies on an all-paper communication system, proving to be somewhat ineffective. The implementation of an Intranet will help reduce the reliance on the paper system, which is a major benefit.

Adopting the CID software gives Arthritis Care a central location for storage of all of its information and documentation, as well as a quick and efficient way to transmit that information. This centralized information storage system provides every branch with quick and easy access to the records of the entire organisation. Users also have the ability to update and change information on an as-needed basis, improving the accuracy of records, and the time necessary to communicate between branches. Also, the implementation of a CID is a large step towards the elimination of paper. Files can be transferred from one location to another instantaneously without use of a fax or regular mail system. This will dramatically reduce cost and wasted time.

This project has three goals: complete the Intranet, develop training materials, and integrate the CID into the company such that employees of Arthritis Care will use the software. A survey was conducted to determine what the needs were for both the Intranet



and the training materials. The CID software was one of the main deliverables of our project. The research conducted by the previous project on how the CID should look was used to an extent, however major changes were made based on new input of Arthritis Care employees.

The training materials that were created were the other major deliverables for the project. These materials, like the software, were based on organisation input. Integration was the final step for our project. This stage of integration involved setting up lectures, distributing materials, and presenting the new system and material.

Upon completion of the project, Arthritis Care received a completely operational corporate information database, and training materials to support its integration. Involving the entire organisation in the design helped provide a sense of comfort in the integration process. We were able to spur enough interest in the new system that employees were asking when they would receive accounts so that they could begin using it. Getting users interested and trained in the new system was always a top priority and remained a key goal throughout the project. In the end, the CID was successfully developed and integrated into Arthritis Care. Hopefully, this will have increased the organisation's internal communication effectiveness for years to come.

## **Chapter II: Literature Review**

Arthritis Care has begun the advancement of its internal communications through the creation of a “Corporate Information Database” (CID). A CID is a form of an Intranet in which users from anywhere in the world are be able to share data instantaneously with all the other people associated with the organisation. Undertaking the construction and integration of a corporate Intranet requires extensive background research in many fields. Items that need to be understood include knowledge of programming languages, an understanding of the integration design, data management, business integration, and finally instructional research.

### **1. Previous Project**

This project is a continuation of two previous Worcester Polytechnic Institute IQP projects. Students Krisen Blitsch, Jonathan Perreault, and Eric Tripodi conducted the first project during D term of the 2000 academic year. The purpose of their project was to develop recommendations for an information exchange system to be used by Arthritis Care. By gathering information from the staff of the organisation, they extracted a prioritized list of what information needed to be shared. They were then able to make a recommendation to the organisation for an Information Technology System that would best suit their needs and make their organisation more efficient.

The second project took place in D term of the 2001 academic year. Students Helene Gwizdak, Peter Vitello, Nicholas Williams, and Stephen Worsham received

approval from Arthritis Care to begin development of the information exchange system. This information exchange system developed into an internal communications system known as a corporate Intranet. They were challenged with pulling together the organisation of many users into one communications network. Following surveys of the Arthritis Care organisation and analysis of its organisational structure, they set out to develop the first software release, and more importantly the format of the Arthritis Care's "Corporate Information Database" (CID). The software package was designed to be expandable and flexible enough to accommodate the developing needs of the organisation. This searchable system incorporates tools that train employees, permit one to view the organisation's internal directory and share documents, and satisfy other internal communication needs of Arthritis Care. A training manual was prepared for their version, and their database was hosted on the World Wide Web at <http://www.cid.ac/>.

In reviewing the website prior to the project only 30% of the system was operational. The user interface written in HTML<sup>iii</sup> was in place however the much larger "behind the scenes" code was not implemented. There are 2 main tasks to be addressed: (i) completing the code and (ii) integrating the system into Arthritis Care. Once both the software and the training materials are completed, implementation of the Intranet into the organisations' daily business practices can begin.

## **2. Intranets**

### ***2.1 Their Benefits***

The corporate Intranet was developed as an efficient way for Arthritis Care to communicate within and between its various central and branch offices, as well as with other parts of its network (e.g., its hotels). The corporate Intranet “has been hailed as the most important business tool since the typewriter” (Schneider, Davis, 2000). But essentially it is an internal communication tool for a company. A well-developed Intranet can become the backbone of communication for any organisation. Implementation of a well-organized, effective Intranet can result in substantial savings in time and money. In addition, Intranets are expandable and can be customized over time to grow with the needs of the organisation.

An Intranet is a tool to manage a business intelligence. Companies such as Boeing, General Electric, Motorola, Ericsson, Microsoft, Cisco, Teleglobe, Amoco, Shell, Merck, and France Telecom are examples of large companies that rely on Intranets for internal communication needs. Basically, an Intranet is “any web site based on Internet technology that is placed on private servers within an organisation, a site designed not to allow outsiders in” (Competia, 1999). It can be considered as a World Wide Web designed for one company. Information can be stored in database form, and accessed in the same fashion as a Web page on the Internet.

Saving time is one of the largest benefits of maintaining an Intranet. Communication between groups or people becomes almost instantaneous. There are a

number of advantages of e-mail<sup>iv</sup> communication compared to telephone. With an e-mail system, there are no busy signals, no phone messages, and a written record of communications. Also, form systems can be set up on an Intranet to further speed up communication. For instance, a report or other document can be posted on an Intranet, allowing everyone within the organisation instantaneous access to complete the form and submit it. Forms can also be centralized on an Intranet, allowing each member access to any form they may require without searching filing cabinets or other departments. Registration forms for example are usually mailed, yet they can also be filled out online. Filling it out online minimizes both registrant time and, more notably, data collection and storage time. A frequently asked question (FAQ) database can be established using the Intranet or a message board system to keep everyone informed about the organisation.

An Intranet can also host an array of archival information for the organisation, making information retrieval both fast and easy. A search tool can, in the time it takes to open a filing cabinet, sort through all of a company's archived documents and give the user instant access to all relevant material. In Intranet form, all of the information is available anytime, anywhere.

Intranets are also a quick way to convey information to a large group of people at once. A company phonebook, frequently asked questions, guides, documents, specification sheets, and manuals can all be posted on an Intranet web page. In this way, documents do not get misplaced or lost, and there is no waiting for access either to original documents or to the copy machine.

The cost savings of an Intranet are evident. Savings in print, telephone, and travel costs can be directly attributed to the introduction of an Intranet (Shepherd, 1998). Training courses can be set up online that eliminate the cost of classrooms, trainers, equipment and printed materials. Document management and publication costs are also significantly reduced. The expenses of printing, paper and distribution are eliminated by making documents available on-line. Federal Express Corp.'s website is a good example of cost savings. The company installed an Intranet in November of 1994 and set up a web page to allow consumers to track packages and documents. In 1997 when Federal Express employed an Intranet with over 12,000 hits a day it saved almost 2 million dollars a year (Cortese, 1997).

With the implementation of an Intranet, an increase in productivity usually will ensue. Faster access to information, as described above, helps streamline productivity. On-line training ensures that employees have access to the required knowledge they need to remain productive. Online collaboration helps speed processes using long distance communication. For instance, at Ford Motor Co., engineers used an Intranet to link design centres in Asia, Europe, and the U.S. to collaborate on the design of the 1996 Ford Taurus (Cortese, 1997).

The transition to a new CID is often difficult and there is adjustment time in changing files to a digital format. Sometimes this goal of updating all files may not be possible or desired due to financial or time constraints. Initially multiple locations for an

item will exist. Over time files will be either inputted into the system and paper copies will only exist as backup copies. Old files might additionally become out of date and not need to be inputted into the system.

The CID allows communication to be easier for its users. Time intensive tasks can be dramatically simplified and made less stress full. Once implemented a CID can vastly improve the efficiency and organisation of the work place. Merging the CID into an existing workplace is very difficult and adjusting to the new system may take a significant amount of time.

## ***2.2 Technical Considerations***

The cost of setting up an Intranet depends on the size of the organisation because larger organisations need more powerful machines than smaller ones. Expenses associated include hardware, software, and labour. The required hardware varies in proportion to the size of the Intranet required. A web server, network adapter, and related hardware are necessary components (Sheth, 1998). For a small Intranet, a server can be set up from a small computer, network interface cards<sup>v</sup> (NIC) for each computer, network cable<sup>vi</sup>, and Ethernet hub<sup>vii</sup>. At very minimal cost, computers across the network and world can then access any data stored on this relatively inexpensive solution. For small applications the server need not be a two hundred thousand pound machine; in most instances, 233-MHz Pentium<sup>viii</sup> II could handle the load. However, if a large Intranet for many users is desired, more expensive mainframes are required which may entail millions of pounds worth of equipment.

The operating system an Intranet uses is very critical to what it can accomplish. Many different companies offer many options. For instance, in 1998 Microsoft offered Windows<sup>ix</sup> NT Server at the price of £800 for a ten-user license (Lipschutz, 1998). There are a large amount of different operating systems with different prices and benefits. In choosing a server, cost, ease of use, security, and capability are considerations.

The actual design of an Intranet is based on the client/server relationship, much like the Internet with its web pages. Hypertext Markup Language (HTML) is the most common tool used to build pages of information or text (Ishikawa, 2001).

Interactive pages are different and may depend on a Common Gateway Interaction<sup>x</sup> (CGI) protocol that allows the page to perform some task. The difference between HTML pages and CGI pages is that HTML pages are static; a user can change them. In contrast, a CGI page allows the user to interact with and perform some function (NCSA, 1998). For instance, an example of an HTML page is an article from an archived magazine, while an example of a CGI page is the search page used to find that article. It should be noted that HTML is a computing language whereas CGI is not. CGI is the “standard for interfacing external applications with information servers such as HTTP or Web servers,” (NCSA, 1998). CGI applications can be written in a variety of languages, including C++<sup>xi</sup>, JAVA<sup>xii</sup>, Perl, Visual Basic<sup>xiii</sup>, or any UNIX shell<sup>xiv</sup>.



Perl<sup>xv</sup> is an acronym for Practical Extraction and Report Language; and was first developed in the 1980s (Sheppard, 2000). Perl is a language designed to sort through text files, gather data from text files, and produce a report about the text file searched (Ashton, 2001). It is also useful for automating system administration tasks and acting as a mediator between two computer systems. Perl is the most popular CGI protocol language on the market (Sheppard, 2000), and it was the previous language used “behind the scenes” to support the Arthritis Care Intranet.

An Intranet must grow and expand as the organisation it serves does -- in features, speed, and storage capacity. A server’s usage logs give a measure of what users are using the Intranet for as well as any major increases or decreases in use. Monitoring this helps keep Intranets optimised for updating demands and warns when expansion is required. The content of the Intranet must also be updated. If the information available on an Intranet is not accurate and up to date, the purpose is defeated. User feedback is a good way to gauge the effectiveness of an Intranet. The Intranet was designed for them, so their input is essential to making sure that it is working and meeting their needs.

Finally, if the Intranet is going to be accessed externally, bandwidth must be considered. Bandwidth<sup>xvi</sup> is the amount of room for communication that a server has with the outside world. Sufficient bandwidth must be provided so that all requests made upon the Intranet can be handled. As an Intranet grows, and the number of external users grows, bandwidth must be increased.

### ***2.3 The Arthritis Care Intranet***

As discussed in Section 2.2, a CID for Arthritis Care began development, but only approximately 30% was completed. The Intranet's main interface page consists of the following sections:

- Organisation News section
- Document Repository
- Directory section
- Training section
- Tools section
- Search tool.

The Organisation News section allows management executives and other employees a way to communicate important news and events to the entire Arthritis Care community quickly. The Directory section allows users to search a database of employees, much like a telephone book. The Training section consists of materials pertaining to the use of the Intranet. The Tools section holds administrative functions. The Document Repository section allows for the transfer of documents and files. The search tool permits queries of the entire database; which reduces the time spent looking for information.

As of March 2002, the Arthritis Care Intranet is hosted externally. This means that anyone with a username and password can log in from any computer connected to

the Internet. This serves the purpose of relieving Arthritis Care from the cost and obligation of running its own server.

### **3. Integration of Information Databases with Organisations**

Integration of a CID includes not only the physical installation of software and hardware but user training and acceptance. Advances in computer technology have made it possible for data management tools to automate many communication needs within a business. Planning is imperative for the design and the integration of data management into any organisation. In the implementation stage of the design, the users of the software become the key to success. Successful integration is a massive and difficult task, which can be managed only by focusing on a few key areas (Sadleir, 1992).

First, information needs must be carefully considered when interfacing with users. Too much information presented at once can be overwhelming, while too little leads toward frustration. The software design and teaching materials must reflect studies of individual department needs. Teaching materials should include enough targeted material to give students the information required in an easy-to-understand manner.

Isolating the needs of departments, groups, and individuals is also important in the success of this project. “It becomes imperative to ask users questions about what they need and want. The lack of such information leads to longer development cycles and endless missteps which could be otherwise avoided” (King, 1995). The Arthritis Care

organisation is divided into many different sectors, some directly interacting with arthritis patients. Our training material is customized so that information can be conveyed to targeted users more efficiently.

“What’s holding organisations back are the people issues and the political infighting that goes on? If you don’t focus on these issues, no matter what you buy or build, it will be wrong” (King, 1995). By communicating with senior managers of each department, political backing can be gained within Arthritis Care. “In integrating technology many of the political problems can be linked to and likewise solved by the upper management by removing mixed messages being transmitted to the base levels of the organisation” (King, 1995).

By communicating with upper management first, managers can be assured that their department will benefit from this new technology. Targeting the managers will increase support for the software, and make finding training time for employees easier.

Ease of use and understanding can never be overlooked when it comes to working with individuals. The difficulty comes in communicating with each person on an appropriate level where they can learn comfortably. It is important to be able to use language and terms that are comfortable for the learner to use. Special considerations need to be taken toward skill level of people being taught. A mentality has to be assumed to address *everyone* in the audience. “If you can crack the hardest nuts first then you can crack them all.” (Stephen Matson, 2002). The new technology needs to be introduced one

concept at a time to make the new information systems easier to understand, and to help users overcome fears associated with the development of new skills.

Users connections to software entail much more than their physical connection to a network infrastructure. Before any user will voluntarily learn to use a new package they must be convinced that it benefits them. By conducting research on a department's needs, it is possible to isolate the key features that they will use. Highlighting these features early might help users appreciate that their everyday tasks can be better managed digitally.

Gathering information from users is essential to the successful integration of any technology. A method to gather important information is by conducting interviews with all demographics of the intended audience. Questions must be framed in the mind of the interviewer and verbally presented to the subject. An example of a poor question would be, "What information do you need this software to manage?" Questions targeted at a specific point solicit much more valid data than more general questions. At the end of an interview it is important to know the decisions, functions, and types of data for which the interviewee is responsible. The Arthritis Care information system design now attempts to satisfy the demands of each department. Our task is to make sure each group is aware of how the software meets their particular needs.

Arthritis Care's goal of a paperless office may not be possible, despite the addition of the CID. There is much reluctance in many individuals to make this transition.

Automation should be targeted to repetitive or time-consuming tasks. Users that will not completely adapt on principle must be taken into consideration. It must be determined what conditions they would have on using the system and how to best accommodate those desires. In addition they have to be reassured of their fears about the adaptation. Conducting interviews to determine their concerns is key to a successful integration.

The final step to integration is information security. One aspect of security is the protection placed on data by provisions in the software. Equally important, and sometimes overlooked, is the conveying of information about security to users during training. Many individuals feel insecure when it comes to the Internet, which leads to hesitation in their storing material online. This needs to be addressed in training the staff.

Our group both fix and install the physical software designed for the organisation. An equally important task was the training of department heads using material that was designed, based on needs assessed through interviewing. Keeping the managers informed and connected to this project ensures that getting users to start using the system will go as smoothly as possible.

#### **4: Internet Service Providers Used by Arthritis Care**

##### ***4.1 Synergy Communications***

The Arthritis Care organisation as of March 2002 contracts its website to Synergy Communications. Communication between Arthritis Care and Synergy is channelled through an intermediary consultant Maggie Gibbons. Her role is to inform Synergy of the

desires of Arthritis Care in order that they can design and maintain the Arthritis Care website. Synergy personnel serve as consultants to Arthritis Care and bill out their time accordingly.

Synergy states that its services include strategic consultancy, branding development, dynamic web design, streaming video and audio, marketing, copywriting, data basing, secure online systems, and creative campaigns (Synergy, WEB). They state that they have the capability to design and build professional websites and post them online for their clients. They have designed websites for many agencies including seven boroughs of London, various charities, the Institution of Electrical Engineers, and the Royal Society (Synergy, WEB).

Consulting Service	Hourly charge	Daily charge*
Training	Not Applicable	900.00 plus preparation time
Internet and Systems Consultancy	85.00	650.00
Project Management	80.00	600.00
Systems Set-up and Configuration	75.00	500.00
Server Side Programming (Cold Fusion, ASP, Perl, Database)	75.00	500.00
Graphical Design	65.00	450.00
HTML Programming	55.00	375.00

Table 1: Synergy Communications Consulting Rates

#### ***4.2 Big Oxford Computer Company (BOCC)***

The website is then given from Synergy to the consulting firm Big Oxford Computer Company (BOCC) to put online. They have had a partnership with Synergy Communications for the past five years. Web hosting is part of the contract Arthritis Care

has with Synergy. As of March 2002, the main website of Arthritis Care is hosted with BOCC services. This company offers a wide range of hosting options. For instance, their offerings range from straightforward web space on a shared server, to facilities management of client-owned machines. In addition they use Windows NT and 2000 servers, which would allow us to use Active Server Pages<sup>xvii</sup> (ASP) and SQL Database Storage<sup>xviii</sup>. To support the CID software, they offer shared server site hosting, constant monitoring, and data backup services. They also guarantee 99.5% availability of all the sites they host and guarantee that no more than 80% of their total bandwidth will be used, thus ensuring timely file transactions with the CID (BOCC, WEB).

Service	Charge
UK domain name registration	£35 inc
UK domain name renewals for year 3 onwards	£25 per annum
Web account set up charge	£35
Static web site hosting with 5Mb of space	£300 per annum
Use of server side application languages (i.e. Cold Fusion, ASP, Perl)	£200 per annum
Additional 5Mb of space (10Mb total)	£120 per annum
Additional 5Mb blocks over 10Mb	£60 per annum
Secure hosting setup charge	£100
Secure server hosting	Additional £110 per annum on top of standard hosting
Electronic mail forwarding to a single external Internet email account	£100 per annum
Search engine registration	£150 per domain

Table 2: BOCC hosting charges



### 4.3 Clara.net

As of January 2002, Arthritis Care used Clara.net to temporarily host the CID. This Internet service provider offers full CGI support for the UNIX platform. The contract with Clara.net is due to expire in April 2002.

Clara.net was originally chosen to host the CID because Arthritis Care's main website was still being designed by Synergy at the time the CID needed installation. Arthritis Care has since launched its full website on BOCC (through Synergy), and Clara.net is only responsible for hosting the CID.

Under their contract with Clara.net, Arthritis Care was allowed 80 MB of web space, email forwarding, and 15 email account mailboxes for £329.00 per annum. Due to new pricing schemes, Arthritis Care has the option of upgrading its account to a different package at the end of the contract if they decide to stay with Clara.net. If Arthritis Care decided to stay with Clara.net, it could upgrade to the Enterprise package to save money and obtain better services.

Package	Prior 01/2002	Enterprise Package	Professional Package
Annual	£329	£199	£399
Email Mailboxes	15	100	200
Transfer Limit (monthly)	3.0 GB	5.0 GB	10.0 GB
Web Space	80 MB	200 MB	500 MB

Table 3: Clara.net Service Charges

#### 4.4 Demon Internet

The London central office uses Demon Internet for access to the Internet. All workstations in this office access the CID through Demon Internet. Demon was founded in June 1992, and is one of the largest ISP's<sup>xix</sup> for the UK. In addition, Demon offers web hosting, and dial-up access. As of March 2002, the main office is set-up with an ADSL<sup>xx</sup> modem and the Demon Express Plus plan. This plan includes 20 MB of commercial web space, domain name with mail and web forwarding, and unrestricted TCP/IP<sup>xxi</sup> traffic. This plan costs Arthritis Care £95.00 per month. To upgrade to the higher plan with 50mb of commercial web space and additional bandwidth would cost an additional £195 (Demon, Web). This may be a potential location to hold the main website because Arthritis Care is already paying for it. However if this company would offer inappropriate services for Arthritis Care to use, even with the largest package the size limit is not large enough. Many other companies offer better rates for web hosting.

ADSL Plans	Express	Express PLUS	Express Pro	Express Gold
Monthly Rental	£49.99	£95.00	£175.00	£290.00
Web Space (Mb)	20 Mb	20 Mb	20 Mb	50 Mb
Downstream Bandwidth	512 Kb	512 Kb	2048 Kb	2048 Kb
Upstream Bandwidth	256 Kb	256 Kb	256 Kb	256 Kb
IP addresses	1	1	1	4
Domain Name		X	X	X
Mail / Web Forwarding		X	X	X
NetPilot Internet Server				X

Table 4: Demon Internet Service Charges

#### 5: Previous Project Survey Research Related to Training

Previous IQP's collected information from Arthritis Care through various surveys in order to determine how individuals in the organisation preferred to learn new software. The Arthritis Care organisation is comprised of volunteers as well as staff members with

different levels of education. The first survey attempted to ascertain the average user's computer education and skill level. Analysis of survey results showed that the majority of the staff of Arthritis Care is not afraid to use a computer, and they understand basic computing techniques. The previous survey did not address how many people did not answer questions or how comfortable in general users are with computers. However, the measures and questions used in this survey to reach this conclusion do not seem entirely justified. Certain questions that were asked seem insignificant and bear little relevance to how much workers knew about computers. An example of this is asking if they know what a pull down menu is. Therefore, another survey needs to be conducted using more specific questions to determine how to present the software to these individuals.

The previous IQP group also conducted a survey to determine percentages of how individuals in the organisation would prefer to learn new software and what training materials would be of most use to them. There is no number of surveys taken or confidence levels within the data. (Please Note Figure 1).

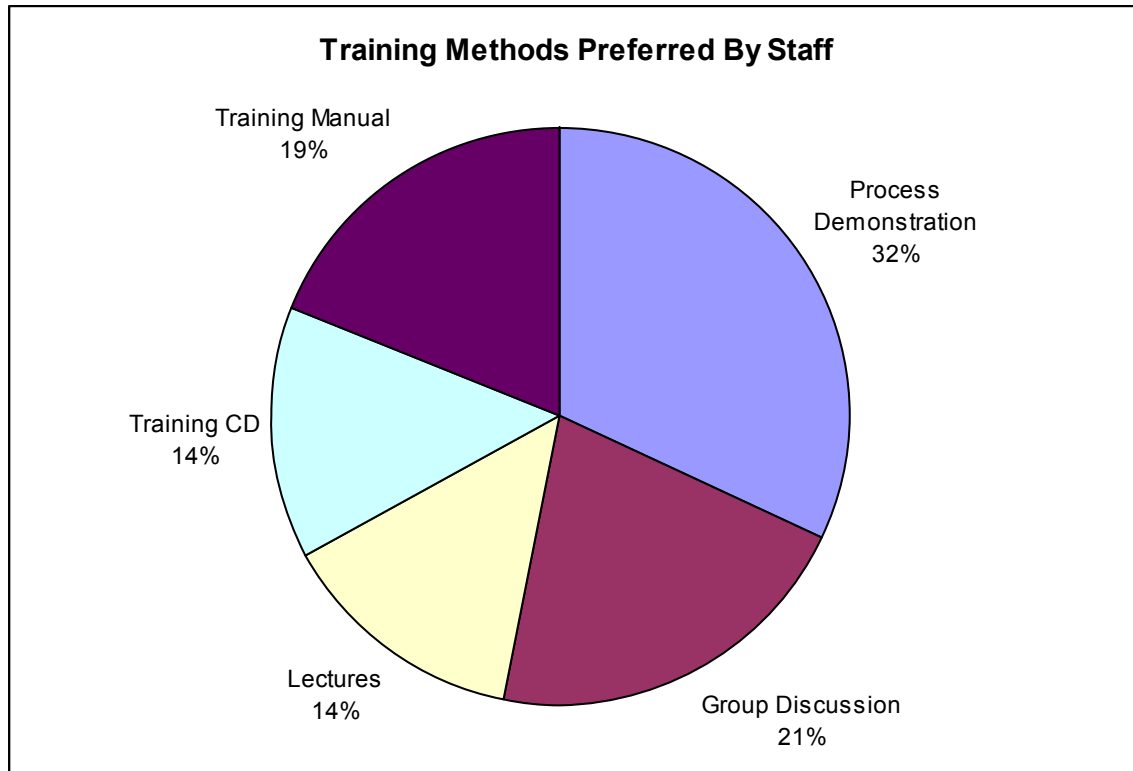


Figure 1: Previous IQP Training Method Results

There were several problems with all surveys taken by the previous groups. For instance, there was little difference in the categories selected to code the user response to questions. Moreover, this survey let the staff choose only one answer when they might have preferred a combination or had little difference in their preferences. A more complete survey would ask whether the interviewee would prefer a combination of training methods. It would also be advantageous to learn what methods the staff did not like in learning the new material, and why they disliked those methods.

Focus groups and interviews were also held with members of the staff by members of the previous IQP team to discuss issues and concerns with the software. Information on potential features, insights, questions, and concerns were gathered from a focus group of 23 employees. Some of the training concerns and ideas expressed were:

- Develop notes to follow training (like a cheat sheet).
- Conduct individual training when needed
- Use language and terms in training similar to that of the training manual
- Keep the training manual small
- Use the manual to support training demonstration
- Break up training sessions by skill level

Make sure presenters are available for extra help after training sessions.

In addition, another survey was conducted to learn what training tools the individuals in the organisation preferred. (Please Note Figure 2).

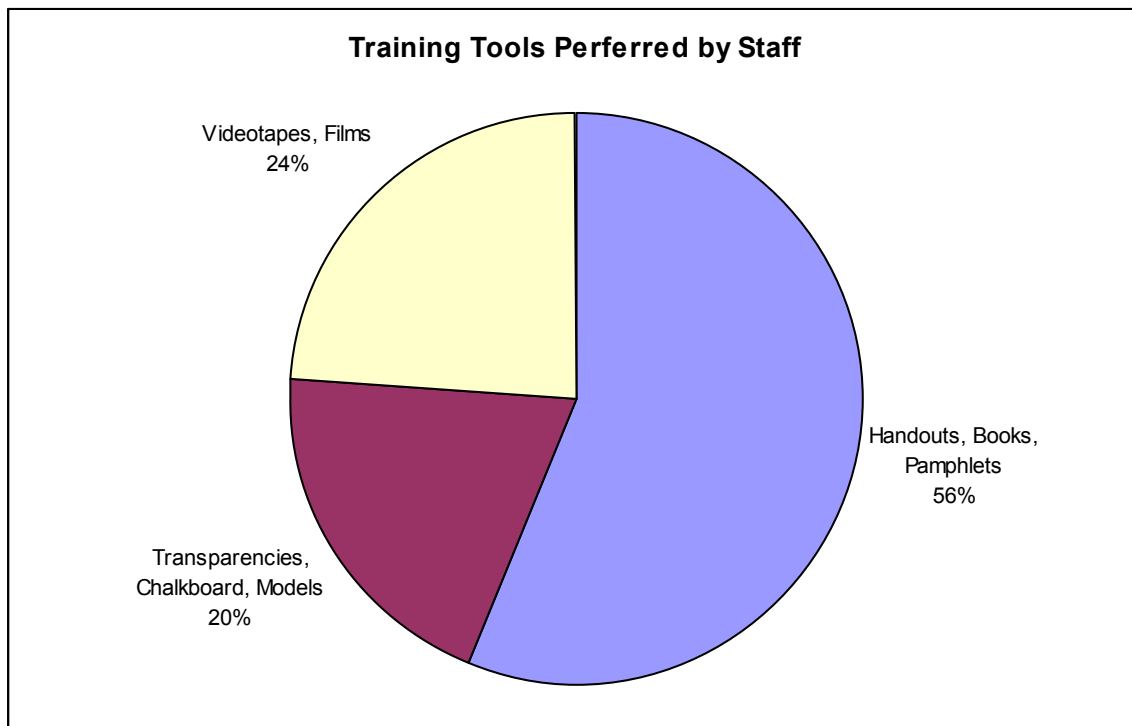


Figure 2: Training Tools

The data collected and analysed by the previous IQP team answered preliminary questions but also opened up still more questions that must be addressed. Of these, the

issue of multiple training options makes the existing data incomplete. It would be much more useful to understand how the staff felt about each individual item, as opposed to which they preferred. Because 24% of the staff would prefer a film copy of training, consideration should be given to videotaping training lectures so that they may be used again in the training of new employees and for future reference. PowerPoint<sup>xxii</sup> slides from the presentations and a training manual on a compact disk would serve useful as reference materials and in retraining new staff. Multiple selections would no doubt increase effectiveness of training by giving users both hands-on training with instructors as well as printed or digital materials that students could take away for reference purposes.

## **6. Teaching Computer Use**

Once preferred training styles and methods are discovered, training the employees of Arthritis Care in how to use the Intranet can begin. This requires us to be familiar with some basic teaching terminology and ideas. According to Atherton's scheme (Atherton, 2001), teaching can be broken down into the interactions between the teacher, the learner, and the subject. The subject is not neutral; it imposes its own discipline. For example, mathematics is linear in that you take what you have learned and build on it. The learner has his or her own attributes, motivation, and style. The teacher has values, a preferred style of learning, a history of learning the subject, and a certain level of skill. When all these things are put together, the teaching and learning must be at the same level to ensure success. The challenge is to take all these attributes into consideration and tailor

the teaching, learning, and subject matter so as to be suitable for all those involved, particularly the learner (Atherton, 2001).

There are three major models for the interactions between the teacher, learner, and subject according to Atherton. The first is the traditional model. In this model, the subject is dominant (i.e., at the top in Figure 3), indicating that it determines the structure of the relationship. The teacher is next down in the range of dominance, indicating that it is subservient to the subject but master of the learner. That is, in this model the subject dictates to the teacher how to instruct the learner. The learner then “holds on for the ride” with little voice in the direction of instruction. For instance, advanced calculus consists of formulas, equations, and rules that the teacher must present to the learner. There is no way for the teacher to change the way the material is presented, because each rule builds on the previous one. The teacher simply has to take the subject matter and format the presentation to fit the subject. The traditional model is summarized in Figure 3.

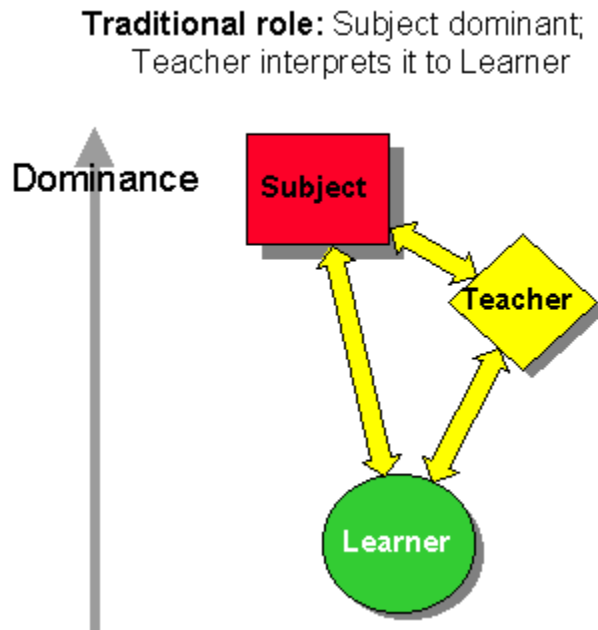


Figure 3: Traditional Model (Atherton, 2001)

In the next model, the so-called apprenticeship or situated learning model, the teacher is highest in terms of dominance, meaning that the teacher manages the relationship between the subject and the learner. This model is similar to what may be found in many public school systems where the teacher selects and interprets the subject for the learner. Teachers have a broad selection of subject matter, which can be covered at their discretion. The student still has little control over the course of the education, but since the teacher makes the decisions, the information can be better tailored to the learner (Please Note Figure 4).



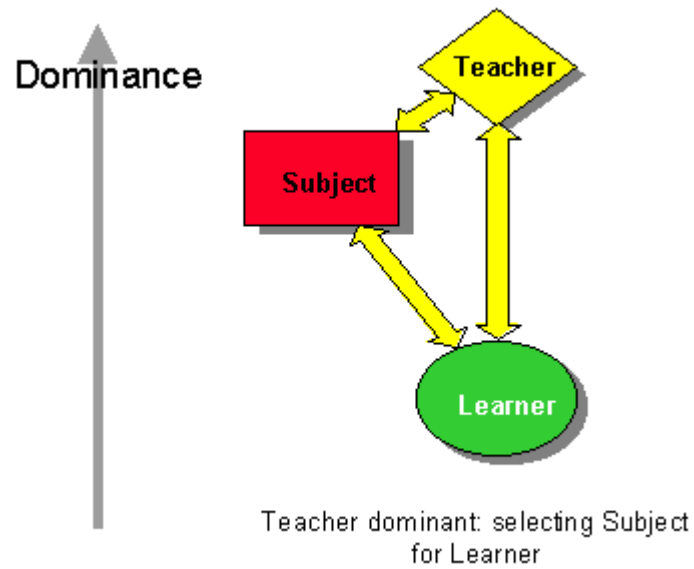


Figure 4: Apprenticeship Model (Atherton, 2001)

The last model is called the supervising advanced studies model (Figure 5). Here it can be seen that the relationship between the learner and the subject is very close. The teacher facilitates the interaction between the learner and the subject. This method allows learners to find information on the subject in whatever manner they see fit. The instructor is present to make suggestions on the direction of study. This method works extremely well in a hands-on atmosphere where the student has physical interaction with the subject, allowing him or her to pursue paths that apply to them individually.

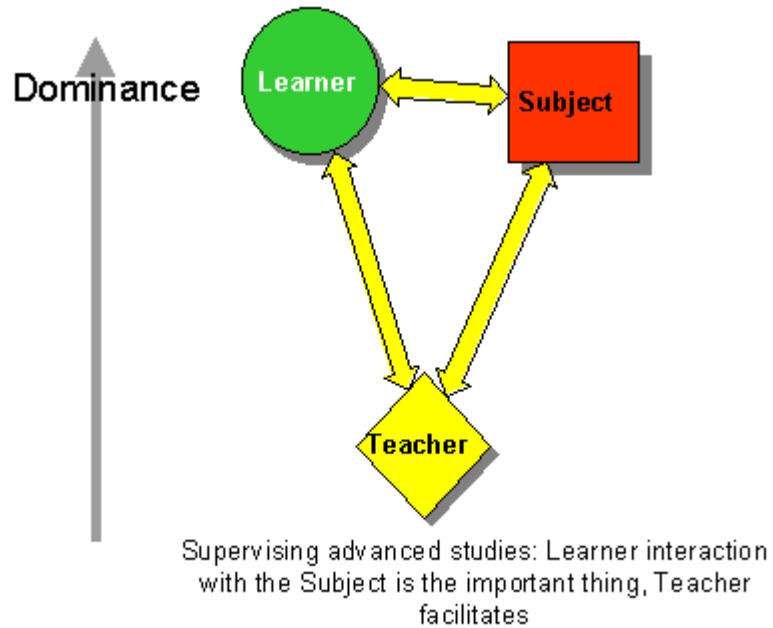


Figure 5: Supervising Advanced Studies Model (Atherton, 2001)

Our group's preliminary analysis of the data collected by the previous IQP group has suggested an appropriate teaching style to adopt with Arthritis Care. We rejected the traditional model, because it implies that the subject is dominant over the teacher and learner. This is not the case, because the group has played a large role in the development of the software and ultimately has the power to change the subject as deemed appropriate. We were then left undecided between the supervising advanced studies and the apprenticeship models. The supervising advanced studies model initially seemed inappropriate because many employees of Arthritis Care do not have an advanced knowledge of Intranets. However, the apprenticeship approach put the teacher in too dominant of a position. We then learned that most of the staff of Arthritis Care is familiar with Microsoft Office and various other software packages. The supervising advanced studies model allows us to address the majority of the staff and people who are not confident with office can be addressed separately.

“One of the most effective ways of teaching is the progressively mastering of tasks for immediate value” (Berryman, 1993). When the user can immediately see how they can benefit from learning something new, the concept becomes more concrete and is more likely to be retained.

Arthritis Care employees should feel comfortable with their computing environment. This principle can be applied when making any kind of design decision; for example, consistent availability of the “undo” function provides users with an environment where they will not be afraid to explore and learn new aspects of the system.

It is very important to affirm for teaching to be done in context, rather than separate unrelated computer courses. This important method is known as teaching integrated information skills (Eisenberg & Johnson, 1996). The basic skills that are needed include bulletin board communication, form processing, and file system comprehension. When these skills are combined with the supervising advanced studies model and the training methods preferred by the staff, a context for training begins to form.

Developing seminars requires the explanation and demonstration of basic skills with reference to actual applications. The user then can be allowed to explore the features they deem important, and he or she will be instructed on other basic skills needed. For instance, it is important to explain directory structure to Arthritis Care

workers, because the CID will allow users to create folders to organize documents. Accordingly, a brief explanation of file structures needs to be presented in terms where users feel comfortable, allowing relationships to be established. When learners are released to investigate the system, they then bring with them a basic knowledge of how key elements of the software operate, giving them the freedom and confidence to pursue avenues they would otherwise avoid.

Upon completion of the training of the CID, gathering feedback would be useful towards creating another revision of the software that is further customized to the organisation. The previous IQP project was designed to find what Arthritis Care needed in a CID. However upon completion of the training, new ideas could be generated because the staff understands how the software works and its potential. This information on new features and potential areas of addition would allow us to finalize our version and address issues not found by the previous project. This information would also give a strong foothold for future growth of the system.

## **7. Handicap Accessibility**

Arthritis is a highly incapacitating disease. It causes inflammation of joints, which sometimes leads to permanent damage. Arthritis is very painful disease, and can often make even the simplest of everyday tasks difficult. Interacting with a computer could potentially be a source of difficulty with many members of the organisation as a large percentage of the staff has arthritis. In today's high-tech society, using a keyboard,

mouse, phone, etc. are all important and common tasks. Arthritis, as well as many other common disabilities, could make this extremely difficult and painful. Because of the vast number of people with arthritis and other similar disabilities in the organisation, finding ways to make navigation easier is a large topic of consideration. The Intranet will interface like any Internet web page, so any research relevant to more accessible web pages is also relevant to our design.

There are a number of different options available to users with disabilities. Some devices that could help include: specialized mice and keyboards, microphones, and head wands. A good web design will not be reliant on any one device, this phenomenon is known as “device independence” (WC3, 1999). For example, if a web site requires a mouse to navigate to the important functions, a user with only a specialized keyboard will have difficulty. The same holds true for a user with only a specialized mouse at a site that requires a keyboard. For our Intranet to be arthritis friendly, it must not completely rely on any one means of input to operate the system.

The key to making a web site accessible to people with arthritis is to minimize the number of keystrokes and mouse movements necessary to navigate around the page. There are a number of ways to accomplish this. For most, the keyboard is easier to use than the mouse, as pressing keys requires less movement than controlling the mouse. One option is to use access keys. Access keys allow the user to select an item on the screen by pressing the ‘alt’ button and another defined key. For instance, in the following mock-web site:

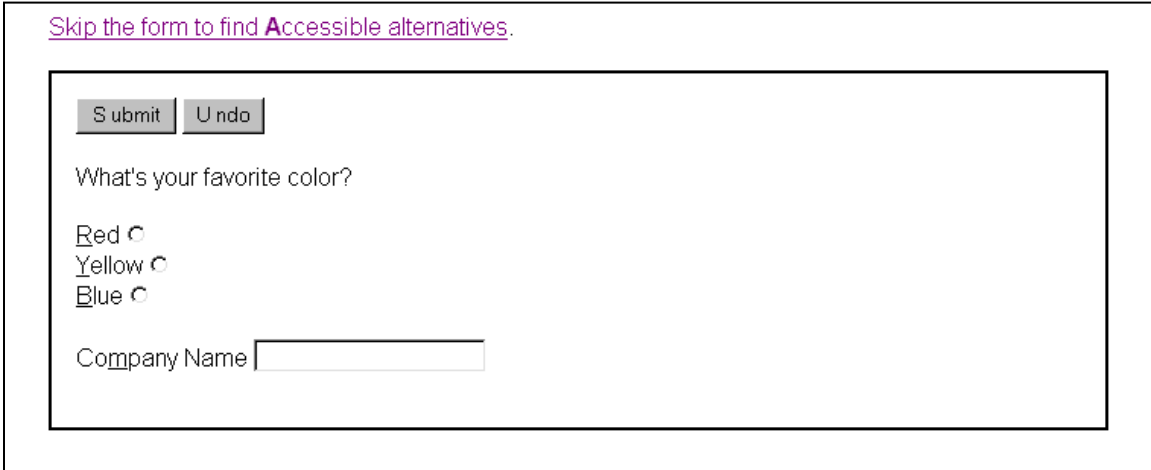


Figure 6: Illustration of Access keys

Access keys are used at each of the options. Notice how the 'a' in the top text is bold and capitalized, the 's' and the 'u' are separated in the buttons, and the 'r', 'y', 'b', and 'm' are underlined. These instances define the access keys. To select 'Red', one could either click the radial button next to the text 'Red', or press 'alt - r'. Once 'alt - r' is pressed, the 'Red' option is selected.

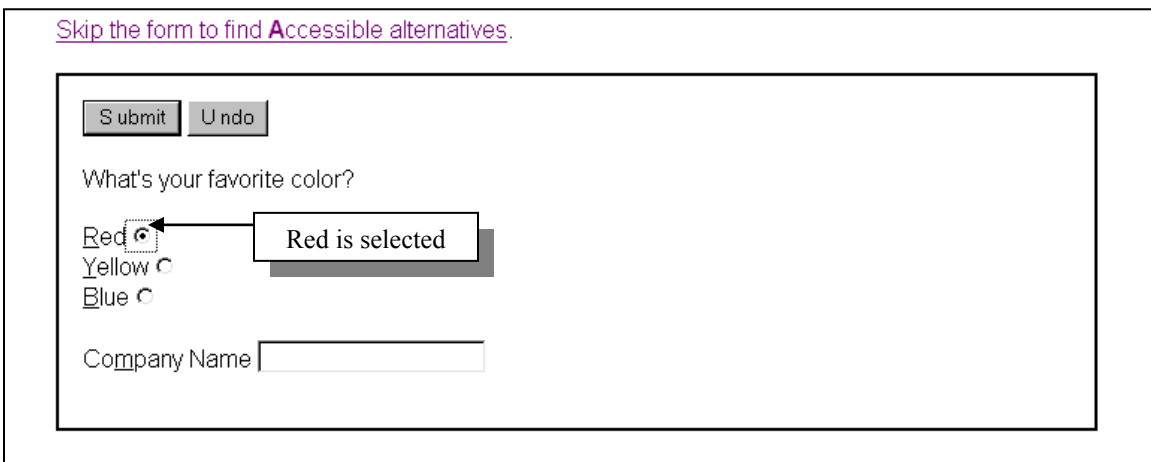


Figure 7: After pressing 'alt-r'

To enter the company name into the box, pressing 'alt – m' will move the cursor there:

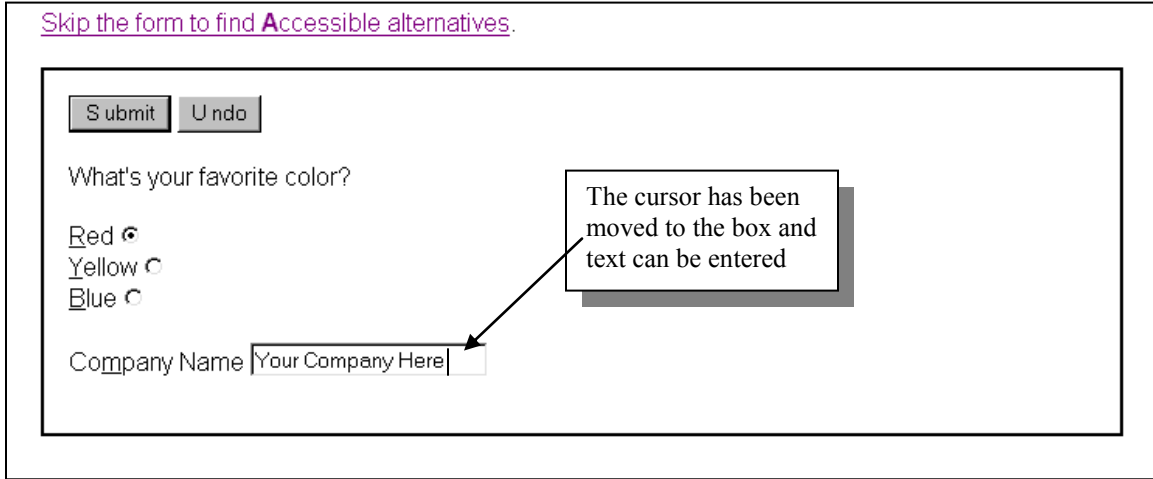


Figure 8: After pressing 'alt – m'

Access keys are a simple and effective alternative to using the mouse to navigate around a page. This concept can be applied to an Intranet rather easily. In addition to this method of navigation, by default hitting the tab button cycles through each selection on a web site. When an item is highlighted that you want to click or modify, spacebar will select a radio button or check box. Text fields can be entered as they are selected.

Another concept that can be applied to web pages to make them more accessible is using drop-down menus. A drop-down menu is illustrated in the following figure:

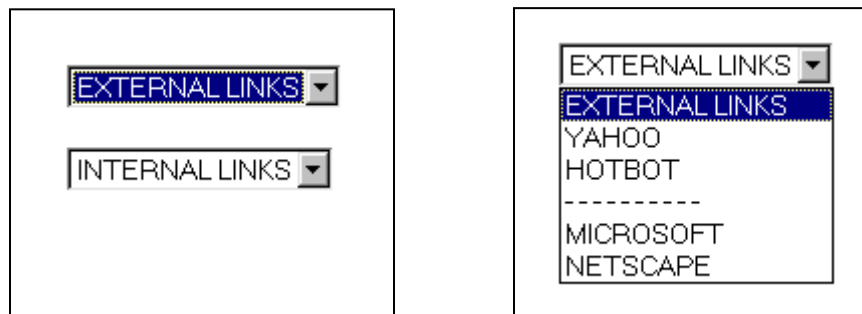


Figure 9: Illustration of drop-down menus

On the left, the drop-down menus appear as they would before being selected. On the right, the top drop-down menu has been selected and the options are shown. Drop-down menus can be used as navigational tools, providing access to the entire web page from one central location. This makes the site less confusing, and requires less mouse-work or clicking around. Also, the drop-down menus can be accessed and used strictly from the keyboard by using the tab button and arrow keys. Furthermore, if a user employs a voice recognition system, navigating through a drop-down menu is much easier than trying to find links scattered about a page.

Ergonomics is another factor that can be adjusted to make a web site more accessible. This consideration involves the outer cosmetic design. If a page employs a lot of buttons, than making those buttons large and close together will make them easier to access. Keeping a constant look and feel throughout the page will reduce confusion and make navigation easier.

## **8. Conclusion**

Training individuals to use a new corporate information system is an important aspect of the software integration that cannot be overlooked. The most complete and innovative Intranets are useless if the target audience is unable to use its features. When the software has been completed, training needs to be provided based on the preferred methods and styles selected by Arthritis Care workers. By tailoring the integration to everyone's needs, workers will ample reason and confidence to utilize it.



## **Chapter III: Methodology**

### **1. Introduction**

Arthritis Care is a large-scale volunteer organisation maintaining many interdependent departments. The first week was dedicated to familiarizing ourselves with the flow of data throughout the organisation. Our primary concern was to introduce ourselves to the senior managers and ensure their cooperation for our project. On the second day of arrival a presentation was given to the organisation to introduce both the project and the group. This presentation gave us preliminary insight into the perceptions and reluctance some members of Arthritis Care have toward moving to a new system. Company dynamics and etiquette became evident after talking with our liaison and during a meeting that followed the presentation. Most of the follow up discussion involved interfacing with the Synergy liaison responsible for the Arthritis Care website. During the introduction answers were learned for the following questions:

- What is the general willingness to incorporate new software?
- Who are the division managers that we will be teaching and how can we contact them?
- What Internet browser does the organisation endorse?
- How does the department currently communicate documents?

The next step was to investigate the Arthritis Care computer and network facilities, because a complete understanding of the organisation's current computer infrastructure was needed to begin the integration process. In addition, it was essential to learn the hierarchy and speed of computers on the network to ensure the software designed would run on intended machines. An investigation also begun focusing on the

specifications of the servers currently used by the organisation. It was also crucial to investigate the paper system we were replacing because statistics of its size and use would prove to be essential in formulating the specifications for the server. These investigations will give us a full understanding of the organisation's current computer infrastructure that we will be using to integrate.

Upon completion of those investigations, information related to where the software will be hosted was investigated. Prior to our arrival, the existing Intranet software was hosted on a Clara.net UNIX-based web-server. We developed four options for the future host location. The first option is to leave the software on the Clara.net server. Our second option would be to host the software on the server for the website at the Big Oxford Computer Company, and upgrading the account. The third option was to create a separate account on the BOCC system. The fourth option would be to use other external hosting services. Hosting the software internally is not an option due to bandwidth restraints from the load of other branches connecting to the system. Once data is collected on all possible options, we presented them to our liaison with our value analysis and recommendations.

The criteria that affected the choice of platform are: cost, server resources, compatibility and accessibility. To determine the cost of each option, a value analysis was conducted on each option. When examining server resources, bandwidth, storage space, data transfer allowances, and operating system were used as evaluators in the value analysis matrix.

The operating system on the server was an important evaluator because the original software was written for a Windows platform, but then the platform was changed at the last minute to UNIX. At the beginning of the project the software was approximately 30% functional on the UNIX platform and 65% percent operational on the Windows platform. A Windows based hosting solution would eliminate a large amount of software compatibility issues if fixing the existing code were chosen. In addition if the software was rewritten it would be more robust and easier to redevelop on the windows platform.

The last factor needed to be addressed was that during the initial presentation Arthritis Care addressed the idea of merging the website and the Intranet to prevent overlap of information. Both must have access to each other if this integration was to be perused in the future. However it was determined that all options accommodate this possibility for integration and there is no need to have the CID and Website on the same server.

In order for us to complete our analysis of hosting options, we needed to schedule interviews with the web coordinator, information technology manager, and the information manager for Arthritis Care. The web coordinator answered questions pertaining to the website, while the information technology manager reviewed technical specifications. These discussions were focused on determining expectations of the Intranet, determining the criteria for hosting, and presenting recommendations for host

options. The information manager then gave final approval of our recommended proposal. These meetings and our analysis led to a decision being made to use the fourth option of an external hosting platform, UK Hosting Solutions.

At this point, our IQP group then split into two groups – the code group and the development group. The development group was responsible for interviewing staff, developing and distributing surveys, conducting analysis, developing training materials, and revising the IQP report. The code group was responsible for working on code based on analysis and comments received by the development group. Determining the host was the first essential step in completing the code. However as a backup, a contingency plan was available if a final hosting solution was not determined in a reasonable amount of time. The software started development prior to the official hosting decision for Windows.

Instead of completely rewriting the code or just debugging the old code, the code group decided to use a combination of the two. The code for the Employee Database, Bulletin Board, News Section, and the security issues was completely rewritten. The code from the previous IQP group for the document repository section was debugged. Much of the original group's HTML code for the interfaces was also conserved. The entire Intranet coding involved the use of Perl, HTML, JavaScript, and Visual Basic Script.

## Major Objectives for Code Group

- Develop Document Repository
- Develop Employee Database
- Address Maintenance / Automation Issues
- Develop Bulletin Board
- Address Handicap Accessibility Issues

The most important goal for the Intranet software is functionality. Once the Intranet is functionally stable, cosmetic issues were then addressed and modified based on input received from the development group. Upon completion of the code, the Intranet was installed and tested. Because the server is external and web-based, installation was not difficult.

The Development Group at this time was developing and distributing surveys, revising the IQP report, interviewing staff, and relaying analysis to the Coding group. The first step required designing a survey that would give us a sense of demographics in the organisation and see what we could do or add to make their adaptation easier to the new system. This survey was designed to be submitted via the Internet on a website, post mail, email, fax, or voicemail in order to reach everyone in the company.

Phone interviews and travel to other locations throughout the United Kingdom was later conducted so all demographics of skill levels of the organisation could be reached. To address people who were reluctant or unenthusiastic about the CID to respond to a questionnaire, we conducted personal phone and personal interviews to identify concerns. If the concerns of the least technical savvy individuals could be identified and addressed we could teach anyone within the organisation.

It was crucial that surveys were conducted in this manner due to time limitations and vast distances between employees, so that enough time was allotted for training. The survey was not distributed via postage mail to speed up response time and to demonstrate the advantages and ease of CID type communication across distances. It was estimated that to send the paper version to all employees, wait for them to fill it out, and for them to mail the surveys back would take at least 2 - 3 weeks for first responses. In using other alternatives to postage, evaluations could be made on the organisation's response and adaptation rate compared with their traditional means of distributing this type of information through the mail.

This survey gave insight into the computer literacy and general feeling about learning the new software within the organisation. In interviewing staff and analyzing results from surveys it was evident that even though the Intranet was introduced to the organisation, many people were still unaware of its intentions or what it would do. This may have been resultant from the lengthy explanations that were distributed by the organisation that most people didn't want to read. This was identified after the first round of surveys and a brief introduction to the system was distributed by email. A general overview of the program was also given at a meeting of all the regional directors in which we showed them examples of what the Intranet could do for their divisions. A discussion was initiated on what each department could use in the communication system, and what additions or considerations could be adapted into the Intranet. This meeting gave us insight into specialized manuals concerns need to be addressed.

Our analysis of the data from the senior managers enabled us to provide training materials to each department that focused on the sections they will be using. The type of presentation styles, level of assumed computer knowledge, and points that were emphasised were based from the survey results. Training materials were then designed and drafted utilising online help, manuals, and presentations. The following table illustrates the development group's major objectives:

#### Major Objectives for Development Group

- Conduct interviews with all senior managers
- Finalise needs of Intranet/CID
- Conduct anonymous survey to finalise needs of training materials
- Develop training materials

In order to begin training, both groups needed to have their tasks completed. Training could not commence without the materials, and the materials could not be finalised without a functional system. Thus, when the development group finished with their other tasks, they began helping the code group. The entire group is experienced with computer programming so making the transition was not difficult.

Once there was sufficient confidence in the systems functionality, meetings were held with senior managers and people resistant to using the system to demonstrate its features and use. During these sessions we asked them to try it out and provide comments as to any features they would like explained, fixed, or added. This also helped to isolate where difficult areas were in the Intranet. This feedback was crucial in gathering information to complete the software package and training materials.

After distributing the training materials to the departments, we finished gathering our notes and finalized this report. Our last week was spent preparing for our project presentation and completing this final report for submittal. This project includes all surveys, results, and conclusions we were able to draw. The training materials are also included so that future IQP's can reference our training methods and systems.





## **Chapter IV: CID System Document**

### **1.0 The Corporate Information Database**

A Corporate Information Database (CID) is a software system that enhances internal communication within an organisation. The CID serves as an organisational tool designed to enhance efficiency and productivity throughout all of Arthritis Care's regional offices. Arthritis Care has been growing not only in number of employees but also the distance between branch offices. It was in filling this need for electronic communication of files and information that WPI was contacted. The goal of this and past projects was to analyse needs and construct a system to meet those needs.

Past projects interviewed Arthritis Care employees and managers to find out what they thought should be addressed in an information system. After analysing the flow of information in the organisation they concluded that an information system should be constructed that would allow for documents and forms to be stored online for branch and home offices. News and an organisation directory would also be added along with open-ended programming for added features at a later date.

### **2.0 System Architecture**

#### ***2.1 Possible Approaches***

##### **Wide Area Network Development**

Before our arrival Arthritis Care had already implemented a considerable wide area network (WAN). This wide area network linked five offices of Arthritis Care using

eight ASDL and two ISDN lines (Figure 12). A CID could have been hosted within this network to facilitate communication between five of the branches. However there are several locations and numerous home-based users that are not connected to this network. The network also experienced a number of connection problems, and employees had little faith in its use. Most of the organisation cannot access this network and expanding the WAN would be an inefficient use of resources. Using the WAN is not an appropriate means to develop the new CID.

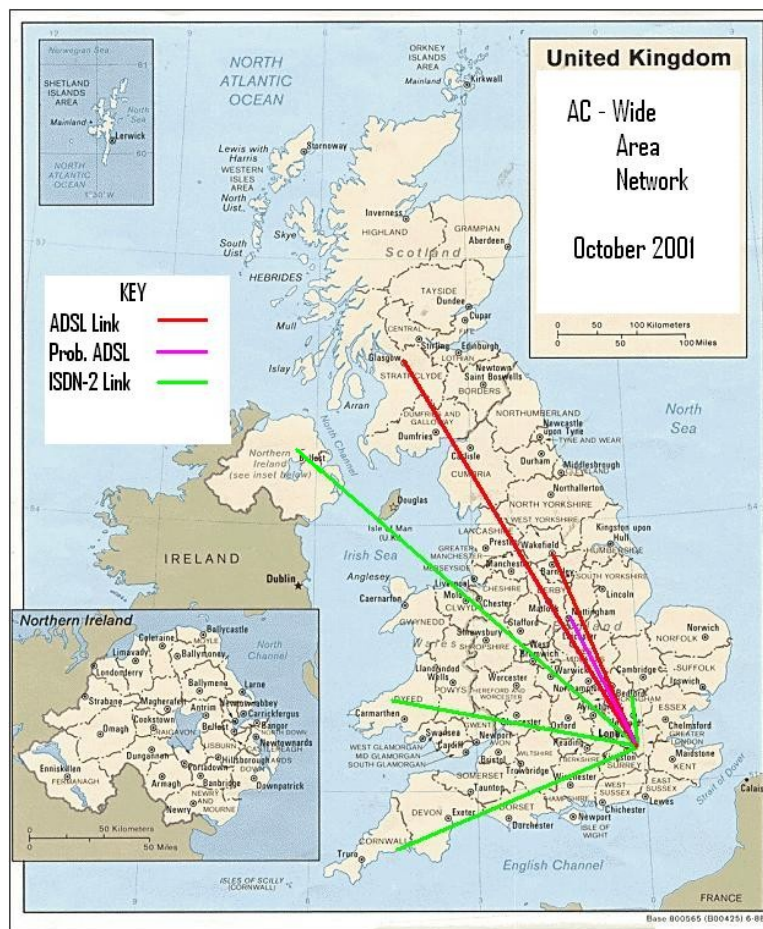


Figure 12: Wide Area Network

### **Central Office Hosted CID**

An internally hosted CID that resides on a server in the central office would be another possible solution for the system. The member of Arthritis Care using the Internet could access this system. However the bandwidth of the central office would need to be dramatically increased and maintaining the system would become a full time responsibility of Arthritis Care.

### **Externally Hosted CID**

The CID could also be hosted on an external web server that is not at an Arthritis Care location. This system would be maintained and set-up by another company that specialises in hosting systems on the World Wide Web. This implementation would have minimal cost and allow easier access to the employees of Arthritis Care. Within this option there are three further choices.

- ***CID hosted on same server as current website, same directory***

If the CID were to be hosted on the same server as the current website, in the same directory, it would essentially become an extension of the website only accessible to employees of Arthritis Care. However, the current website is hosted on a Synergy server, and all files are maintained by Synergy. If Synergy were to grant us access to the folders and files on their server, this would create serious security problems for them.

- *CID hosted on same server as current website, isolated directory*

In this implementation, Synergy would be less concerned about our access to stored files, as we would not have access to their secure locations. Also, in this implementation, files could be maintained on the same location as the website, reducing the distance for files to travel. This in turn will reduce the amount of bandwidth necessary. However, the current website server is inappropriate for the anticipated growth of the CID because it does not contain enough storage space to host the CID.

- *CID hosted on different server as current website*

Hosting on a separate server would remove file protection issues; however, data duplication issues would become more of an issue. If selecting a new server, we would have our choice of web hosts and platforms. Other companies besides Synergy would potentially be able to give us better prices that better meet the needs of the organisation. The five largest hosting solutions in the United Kingdom offer the following features for the following prices (see Table 5):

Host	Web Space	Transfer Limit (monthly)	Operating System	ASP	Cost/Year
<a href="#">Clara.Net</a>	200 MB	5 GB	Unix	No	£199
<a href="#">BOCC</a>	5 MB	None	Windows NT	Yes	£500
<a href="#">Dreams 4 Real</a>	200 MB	3 GB	Unix	Yes	£250
<a href="#">Magic Moments</a>	100 MB	3 GB	Unix	No	£199
<a href="#">UK Hosting Services</a>	100 MB	1 GB	Windows 2000	Yes	£89

Table 5: Specification of Hosting Options

## ***2.2 Chosen Design***

The decision was made to host the CID externally, on a different server as the current website, using the company UK Hosting Solutions. This option allowed for the best implementation at the cheapest cost for Arthritis Care. There were no duplication issues between the two systems. However if communication between the systems was later deemed necessary, UK hosting solutions could accommodate this integration. The adaptation of the system hosted on a web server allows authorised personnel to login anywhere in the world from an Internet connection. All division branches currently have Internet access and can access the system.

## **3.0 Software System Design**

This complicated system was split up into many sub-sections. There are five critical features that will allow this program to perform to specification. These features include the news, company directory, document repository, account administration (tools), and security sections of the software. In addition there are two other areas of concentration in the software: addressing handicap accessibility, and designing the system to allow for future growth.

### ***3.1 Intranet Components***

#### **News**

The news section of the Intranet is completely functional. Administrators can successfully post and edit news messages. The Intranet program then correctly

displays the first three titles and all urgent notices with posted dates on the Intranet's main page. Clicking on any of the news posts brings the user to the full text article and lists any remaining posts not shown. Clicking on the "Review Previous Posts" link correctly displays the previous post in increments of ten posts.

### **Company Directory**

The company directory section of the Intranet is completely functional. There are two methods of searching: quick and advanced. For the quick method, the usable field is Name. For the advanced method, the fields are: First Name, Last Name, E-mail, Address, Work Phone, Mobile Phone, Fax, Job Title, Team, Location, and Division. The first and last name fields are set up on "sounds like" protocol. This means that if a user enters "Dan" in the first name field, the program will return all users named Dan, Daniel, Danny, Dana, etc. The company directory searches through a database of employees maintained by administrators.

### **Document Repository**

The document repository on the new Intranet is up and fully functional. Our team created main folders for the following departments: Accounts, CEO, Communications, Directors, Facilities, Human Resources, IT, Policies, Services, and Support Services. Additionally main folders were also created for the following nine regions: Central Office, Central England, Hotels, North England,

Northern Ireland, Scotland, South East England, South West England, and Wales. Each of the folders has two sub-folders, a public folder and a private folder. Any logged-in user can see the public folder; the private folder is accessible only to those who supply the proper credentials. Once in a folder, a user can create or delete folders or files, upload files, or download anything posted there. A recycle bin has been implemented so that if a folder or file has been deleted by accident, it can be recovered.

### **Account Tools**

The tools section is currently responsible for password and account management. This section is responsible for maintaining and organizing the security levels and permission levels of the system. For non-system administrators in this section there is a tool to allow users to change their password, or to have their password e-mailed if lost. This email address can be changed in this area as well. For user administrators a section is available to modify permission levels for the system. Users can be added, deleted, and modified. The administrator can also modify user folders and permission levels.

### ***3.2 Security***

Security provisions for the current Intranet are fully functional. We have dealt with two security issues. The first pertained to accessing the Intranet in general. When the user clicks the “Login” button at the main page, a window opens, prompting them for



their username and password. The server then checks the username and password against an associated text file of names and passwords of acceptable users. If the username and password exist on the specified list, the user is granted access to the Intranet. If not, the action is cancelled and an error message comes up.

The next security issue pertains to the document repository. The security system needs to be capable of distinguishing users in order to decide to whom it grants access to the private folders. In contrast, the public folder in each section is visible to any user who logs in. When the user initially logs in, the system also checks which private folders the user has access too. The user can freely access the private folders to which he or she has been granted access. If the user tries to access a folder to which they do not have rights to, they will be prompted for a username and password. The password box comes up in order to give the user a chance to enter higher credentials, but their current password and username will not allow them past. The prompt is looking for credentials that match the list of allowed users for that specific folder, preventing unauthorized access to the private folders.

A software package for administrators was written to manage which folders users can access. This software keeps track of all users, which folders they can access, and it contains text files of names and passwords the server needs. This software is only available to users with administrator security clearance.

One advantage to this security set-up is that the administration of users is quite straightforward. The software package supplies an interface that is simple and uncomplicated. If a user does not supply the correct username and password, they will not be able to access a private folder under any circumstances. By using an external host, UK Hosting Solutions is responsible for maintaining and keeping the systems security current with upcoming advances and new virus definitions.

### ***3.3 Considerations to Handicap Accessibility***

From the background research in this project we learned that in order to make the CID handicap accessible it must be designed so that it is device independent. This means that the site minimizes use of just using the keyboard or mouse. The entire website can be navigated with keyboard commands. In addition the CID has help available on the current screen by hitting control H. For document readers all images and navigation items have background text associated that facilitate navigation. The system was designed to be proportionate around the system default size for fonts. For users that require or prefer larger text size all they need to do is change the default size in Internet Explorer to their preferred size.

### ***3.4 Changes and Upgrades From Previous Project***

The biggest change from last year's IQP project is that the software developed in this project is fully functional. We were able to secure a platform and proceed directly to working on the code within the first week of our project. In contrast, last year's project

group unexpectedly had to change platforms, and thus re-write most of the code, towards the end of their project. Our early focus on pushing the platform decision was an important factor in our success and helped us ensure we could complete and test the code in a timely fashion. Had the platform not been changed on such short notice during the previous IQP team's tenure, we believe that the Intranet would have gone "live" at the end of the previous Arthritis Care project.

Cosmetically, the "look and feel" of the Intranet we developed stayed the same. We decided to keep the "look and feel" of the original project because it had been designed with input from the upper management. We also felt that our time would be better spent working on the functionality of the system rather than the design. Thus, we were able to salvage the login page and the main page from the previous IQP.

Though it was not posted online, the Windows code written for the project was more functional than the UNIX code. Therefore, we were able to salvage some of the Windows-based Perl written for the document repository. An estimated 35% of the total current code for the document repository was taken from the previous project. Beyond that small portion of code, everything from the previous project had to be recoded. We used the same concept for the news section as described in the previous project, but it had to be coded from scratch.

The only security implemented in the first project was the initial login screen. Beyond that, users had access to any folders in the document repository and there was no

administration control. The security implemented in this version of the Intranet is much more in-depth and thorough.

### ***3.5 Potential for Future Upgrades***

The addition of more storage space or transfer allowances can be done in the future through the U.K. Hosting Solutions service. The account is in Dave Wright's name, the current head of Arthritis Care's technology department. To upgrade, he would simply have to call and make a request. The proper contact information has been given to Mr. Wright. Also, U.K. Hosting Solutions will monitor the bandwidth and the space used. If they feel that an upgrade may be necessary, they will contact Dave Wright.

Adding content -- for instance, more sections -- is feasible but a bit more difficult. Such additions would require hard coding in the actual Intranet code. This would be very difficult and complex to work through, even though it has been thoroughly commented. It would also be very risky, since if something were to go wrong with one of the other sections, we would not be on-site to fix it. We recommend that no future changes to the content be made by anyone who is not completely familiar with HTML, VBScript, JavaScript, and PERL.

If a follow up project is established it could focus on transitioning Arthritis Care documents to the new system. After the system is being used by the organisation, research could be conducted on what modifications or additional features could be added to the system. These can include online schedulers, employee trackers, and a punch

clock. New forms and additional automated tasks, similar to the staff expense claim form that was created by this project, could be researched and incorporated into the system. An online organisation of the various boxes of reference materials on arthritis could also prove advantageous to the organisation. During training sessions, feedback was received about the potential to design a system that would monitor the training and classes that Arthritis Care gives to the public. Research and implementation of this tracking utility could be investigated.

## **4.0 Experimental Results**

### ***4.1 Testing***

To test the system, it was placed under simulated working conditions. Variations of all commands at all points of the program were entered into the system. Invalid entries were also sent to the system to test and identify areas that needed to check input. We continued testing until no additional bugs could be found in the system. From these tests, it looked as though all functions were running properly. However this software has just been developed and due to time constraints has not undergone a beta testing process. As the system is implemented new problems may still be discovered.

### ***4.2 System Response within the organisation***

Initially we found a slight reluctance within the organisation about transitioning to the system. Survey and interview results showed concerns that the system would be too complicated for everyone to use. In addition many people were unaware of its existence

and potential to make their lives easier. When we taught and presented our final version of the software at the end of the project the system was received with open arms. The individuals in attendance were extremely excited about its potential and did not find the system intimidating. Every division we interacted with exhibited support and approval for the software design.

## **Chapter V: Results and Analysis**

To achieve successful integration of the Corporate Information Database with Arthritis Care, it was important for us to conduct research on the needs and dynamics of the organisation. Gathering feedback from the future users of the system allowed us insight on how to develop the CID and integration strategy. This section examines the feedback gathered from Arthritis Care, and how it influenced the integration and design of the new system.

Analysis of current computer and information needs of Arthritis Care included surveys, employee interaction, and discussions. The main section of the survey was designed to gather data to calculate a computer use confidence level within the organisation. Computer confidence levels allow the programmers to construct a look and feel for the site that will be accessible to all users. The next section of the survey gathered preferences and ratings on various possible features. This section helped reduce wasted time and space and promote use. The last section collected information on preferences for training materials and user manuals. This section helped ensure our training would go as smoothly as possible.

### **1.0 Survey Response and Accuracy**

The first step taken in gathering input from future users was by distributing a survey, in paper and electronic form, to the organisation. Response was slow, and motivation was required. The most effective ways we found to do this were reminder e-

mails and asking regional directors to endorse the survey's completion. Overall, we received 73 surveys, approximately two-thirds of the organisation. A chart of the rate of incoming surveys with respect to time can be seen in Appendix A, Figure 21. In this graph, the three spikes illustrate our efforts to motivate completion of the survey. The first spike on January 18<sup>th</sup> represents the response from the initial distribution of the survey. The second spike on January 21<sup>st</sup> resulted from follow-up reminder e-mails. The third spike on January 29<sup>th</sup> was the result of contacting regional managers and asking for their endorsement. In discussion with our liaison, we learned that this type of response usually requires triple the amount of time using the traditional post system. This example of online communication vs. the post system illustrates through example advantages of the new system.

As survey responses returned, concerns were raised that we had not reached enough employees. Unfortunately, an organisational restructuring has made things hectic throughout Arthritis Care. Also, it meant that a number of layoffs were going to occur. The impending layoffs meant that a number of people were not concerned with the new system and did not respond to the survey. Also, a number of those counted in our total population were listed in our contact database as employees, but were outside consultants who would not be using the CID. To compensate for these two factors, we received a list containing the names of these people and removed them from our total population.

Concerns were raised about the possibility that low computer confidence level on the part of some Arthritis Care personnel -- coupled with their attendant inability to



complete a web-form -- might result in biased data and low returns. We addressed this by offering paper and phone options. The issue was discussed with a number of employees at the central office. One person we discussed this with, identifying himself as “not so tech-savvy”, responded that the survey was easy enough to handle, even for novice users. One of the network administrators commented that many users would be reluctant to follow an e-mail link from an unknown source, as Arthritis Care instructs employees not to open emails and download files from people they do not know. To address this potential loss of survey returns, we asked for endorsement from senior managers.

By dealing with all of these issues, we can qualify the accuracy of our results. We ensured that all facets of the organisation were reached and our survey results were unbiased. The multiple options for completing the survey helped prevent our results from being skewed towards technically inclined individuals.

## **2.0: Population Demographics**

From the data that we received, the various demographics of the employees at Arthritis Care can be seen. From background research we knew that Arthritis Care regional branches and offices were distributed across the United Kingdom, and forty percent of regional associates are home-based (Appendix A, Figure 1). This means that a larger portion of the organisation will see benefits from the system than previously estimated. This large percentage of people not in the central office made communication with these associates a major consideration in the design and hosting for the CID. Also,

the training material we developed had to be self-explanatory because we were unable to directly reach all of the Arthritis Care staff. It was important to understand the distribution of personnel within the organisation to guarantee the CID would be accessible by everyone. Furthermore, it was very important for us to get a good idea of the general technical background of the organisation. The following chart is a summary of the averages of the questions asked on the survey:

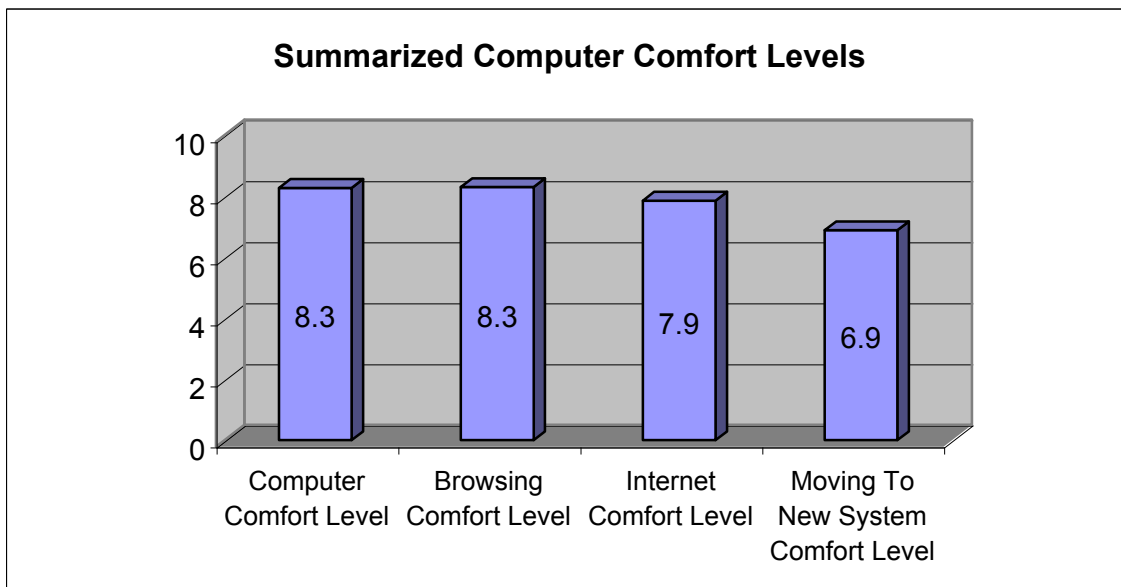


Figure 13: Summary of Survey Results

### ***2.1 Computer Comfort Level***

Generally, most of Arthritis Care is comfortable with using their computer. This is illustrated in Figure 13, as the average computer comfort level is an 8.3. A distribution analysis of the specific results of this question can be found in Appendix A, Figure 2. The chart indicates that the results for this question alone are generally right-skewed towards a higher comfort level. However, about seven percent of the responses indicated a very low computer comfort level.

## ***2.2 Browsing Comfort Level***

The average confidence level in browsing the computer is 8.3. Analysis of the distribution graph, Appendix A, Figure 3, shows that the results are skewed to stronger comfort. The percentage of users, who do not feel confident with browsing, 23%, is greater than the percentage reporting a low computer comfort level. One reason for this is the ambiguity of the word “browse.” We intended the word browse to mean locating a file on a computer or network. Follow-up interviews and discussions revealed that people who responded low to this question were confused by the word. People who understood our intended meaning answered higher.

## ***2.3 Internet Comfort Level***

The average Internet comfort level is 7.9. Distribution analysis of this data, Appendix A, Figure 4, indicates that the graph is generally right skewed. There is a large percentage, 30%, of people who are not as comfortable browsing the Internet as we would like. In follow-up interviews and discussions with the staff of Arthritis Care, we learned that many users are afraid of contracting viruses from the Internet. The information technology department updates virus definitions and makes announcements about new viruses on a regular basis. For people to use the system and for it to be effective, we need to convince users that using the CID will be safe, and contracting a virus from the CID will not be a concern. This anti-virus system at Arthritis Care is maintained by our liaison Dave Wright and has proven effective for the organisation.

Another potential reason for hesitancy in Internet use, identified from interviews, is that some staff members have not been trained in how to use the Internet and generally do not need to use it.

#### ***2.4 Comfort Level with Moving to a New System***

This question had the lowest average value at 6.9. The distribution analysis that was conducted (Appendix A, Figure 5) indicated that the responses were less right skewed than for all other previous survey questions. A much larger percentage of the staff indicated relatively low comfort levels, with twenty-five percent of the people indicating a comfort level below five.

Directors and managers who were initially familiar with the system were enthusiastic about its integration. However, upon our arrival, much of the staff was unaware or uneasy about the CID. There were several introductory e-mails sent out to all of Arthritis Care, but many people did not read them. This led to ambiguity in the question, which is probably one reason the value was so low.

This emphasizes the need to ease the transition to the new system as much as possible. From the training sessions, we learned that despite prior communication about support for the CID from upper management, many people had been made aware of the system only recently. As a result, they were unclear about the new system and therefore were uneasy about the change.

### ***2.5 Results of Population Demographics on Training Materials***

Even though ambiguity occurred, a general conclusion could be drawn that a wide range of computer use and comfort levels existed and training materials would need to address all users. We decided to develop materials for two groups, novice and advanced. By using these two extremes, we guaranteed that all users would be adequately supplied with proper training material no matter where in the range they fell. Advanced users, with no need for the beginning materials, could reference the advanced training materials. Novice users, for whom the advanced material is too broad, will have available materials geared toward learning the system from the very basics and on up. Even though users might make use of some materials more than others, all developed material was offered to all of the Arthritis Care staff. This way, users could select materials to suit their own pace of learning.

### **3.0 System Priorities**

The purpose of including system feature preferences in the survey was to gauge what users would want included and expect from the system. Questions about the relative importance of system features allowed us to determine what would be most useful to the staff of Arthritis Care. This would also make time spent working on code and developing training materials more efficient, as we would not be working with tools that were not going to be used. In making our decisions about what to implement, we weighted the priority assigned to various potential features by the staff alongside such

factors as development time, maintenance requirements, perceived importance, and difficulty and feasibility of development and implementation.

In figure 14 is a summary of the priorities assigned by Arthritis Care staff to various development features:

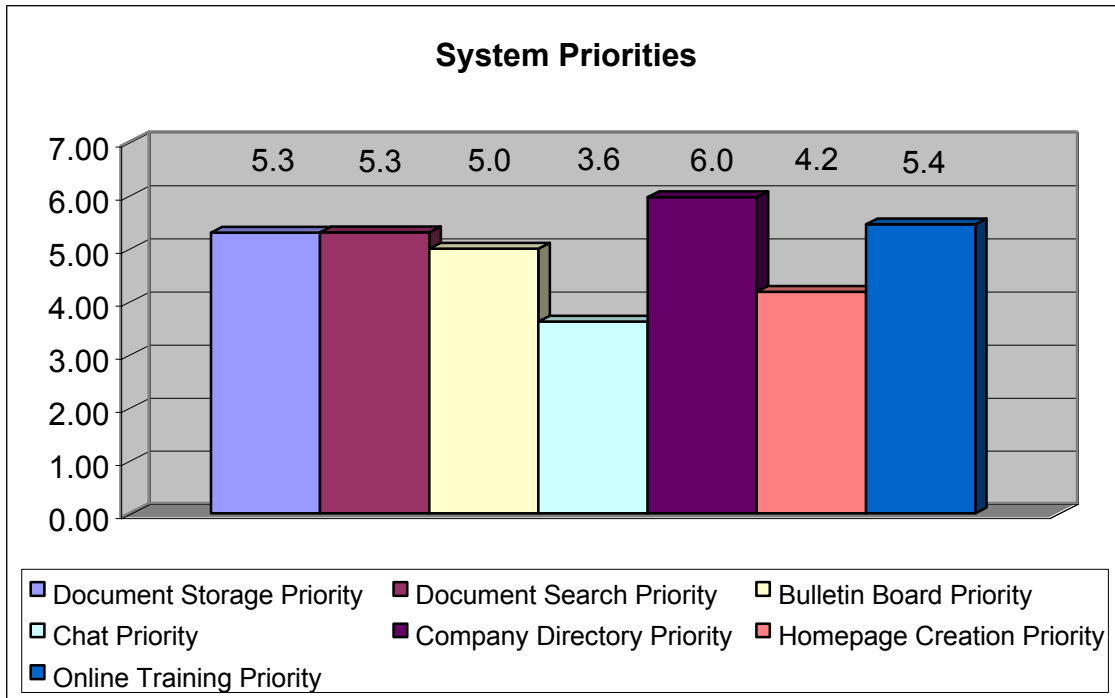


Figure 14: Average System Priorities

### 3.1 Document Storage Priority

Document storage is one of the most important features to be implemented into the system, indicated by the fact that it tied for second-place importance with a mean response of 5.3. Half of the population surveyed selected a level of six or better. This indicated that this section is one of the most important sections to implement. In the opinion of our liaison, the document repository was the most important feature. Having

an on-line document repository will produce the biggest gain in the efficiency and speed of Arthritis Care communications, as files can be broadcast to the entire organisation. We found that many users were unsure what a document repository could be useful for. Follow-up interviews uncovered more ambiguity, as users were not exactly sure what a document repository was. To demonstrate its utility, we gathered important documents frequently distributed from various departments, digitized them, and posted them on the Intranet prior to its official live release. These were used as basic illustrations of how the repository worked, what it was used for, and how it could benefit any user. This helped greatly in the integration process.

### ***3.2 Document Search Priority***

From the data we collected, document search is regarded as one of the more important features to be implemented into the system. As illustrated in Figure XX.2, this feature has a mean response of 5.2. This search feature will enable members of the organisation to search all the document titles in the repository. Implementing this required very little development effort. Since a very large percentage of the staff indicated that this feature would be of great help sorting through documents, it was included in the new system.

We have had specific questions raised by both users and our liaisons about whether employees would be able to search through the text of documents to find specific sections in that document. One of the examples was the regional manual that is a few hundred pages long. In these instances we were hoping to be able to run an automated

search feature that would open automatically when the document was opened. But due to virus protection software, any script that runs automatically is deemed potentially dangerous and a message pops up displaying such. The negative connotation of this message might deter users from the system, especially with the constant warnings from the IT department. Therefore, this text-searching feature was not implemented.

### ***3.3 Bulletin Board Priority***

The bulletin board feature had one of the smallest mean priority ratings, at 5.0. Had it been implemented, this feature would have provided for a quick means of posting current information, and development and maintenance would have been minimal. However, concerns were raised by our liaisons, advisors, and other users in follow-up interviews and discussions that bulletin boards have tendencies to go off subject and might be distracting. Based on this feedback, we decided not to implement the bulletin board.

### ***3.4 Chat Priority***

This section was not added to the CID because it is not needed and does not offer significant communication advantages to Arthritis Care. The time required to implement this would have been relatively extensive. Also, concerns similar to the bulletin boards were expressed by our liaison. Given the low priority assigned to it by staff, 3.6, we concluded that users did not particularly want a chat feature, and it was not implemented.



### ***3.5 Company Directory Priority***

The company directory was identified by the organisation as the most important CID feature. With the highest mean response of 6.0, it was widely recognized by the organisation to be useful. A possible reason for the importance assigned to this feature is that there was no ambiguity about what it entails. Implementation of this feature was rather simple.

Some concern was raised about security of employee names and home phone numbers, but the system has been designed to protect all employee data files. The online version does not contain any personal information, such as home address or home phone number. The database is kept in a secure folder, so only users who have access to the main system can access the organisational directory.

### ***3.6 Homepage Creation Priority***

The homepage creation section of the CID was neither necessary nor desired in the final version of the software. The priority level indicated by users was relatively low at 4.1. It was determined that this feature would not be needed because very few people would use this feature. Also, the required development time and future maintenance outweighed the value of this feature. Users generally recognized what a homepage was, and how this feature would work. This feature was not included.

### ***3.7 Online Training Priority***

Online training in the use of the system will be essential in easing transition to the CID and ensuring the continual use of it. Division managers and staff both expressed enthusiasm for online training, with a mean survey average of 5.4. This feature was added to the system in the form of a PowerPoint presentation and an HTML version of the training manual. These were located in the Training section. Help will also be available at each of the main features via a “*Help*” link. Clicking on this link will open a new browser with help topics for that particular feature.

In interviews with them, regional directors and administrators placed a huge importance on the online training option. The only people who work in regional offices are a small group of core directors, administrators, and managers. The regional Arthritis Care sites consist mostly of volunteers and people who work part-time from home. The Central England regional site alone maintains 1000 volunteers. It would have been impossible for our group to train everybody in the short time we had. Indeed, it would be extremely difficult for the core regional staff to train all of the volunteers as well. The online training offers the opportunity to reach everybody with minimal effort.

### **4.0 Training Preferences**

Prior to arriving on site, we developed a number of training possibilities. These were: training manuals, individual walkthroughs, training CD’s, and lectures. The most efficient way to integrate the CID was to use training materials and methods preferred by

the people we would be training. To gauge this preference, we asked users in our survey to rate the options we developed.

#### ***4.1 Preference for Lectures***

Offering lectures to the staff was our primary means of training the organisation. Presenting to the staff was the most efficient way to directly reach as many people as possible given our time constraint. Eighty-percent of the staff was not opposed to learning from lectures.

It was decided that the lectures would serve two purposes: a main training tool for advanced users, and an introduction for novices. Also, the lectures offered an opportunity for questions and feedback, which were very valuable to the success of the system integration. For most advanced users, the best way to learn any new software is hands-on, one-on-one with the software. The main training presentation was tailored towards these users. It was meant as a general introduction, an overview of the system, an outline of its capabilities, and a demonstration of what it can do. After that, advanced users can log in and get to know the system by trial and error. The training manual served as a quick reference for these users.

For the novices, trying to remember all of the material from the lecture alone was impossible. Also, being introduced to a new piece of software was rather intimidating. This was evident from follow-up discussion after lectures. For these users, the training lectures were meant as a basic introduction to the system. Lecture time spent discussing

advantages and benefits of the system was meant to “sell” these unsure users, and motivate them to learn more about it. The lectures also helped to ease some of the concerns about security, stability, and the like that they may have had. Further discussion of novice training is addressed in the section entitled *Preference for a Training Manual*.

#### ***4.2 Preference for an Individual Walkthrough***

Learning how staff responded to individual walkthroughs was the next goal of the survey. Sixty one percent of the organisation stated they liked individual walkthroughs and only eleven percent disliked the idea. This is a large preference towards individual walkthroughs, but it is not feasible to conduct such a large number of them. Time constraints, on our part and on the Arthritis Care side, prevent individual walkthroughs from being a possible training method for the entire organisation. We were able to walk through the system with a few regional directors, but it was not possible to do so for most of the other staff.

#### ***4.3 Preference for a Training Manual***

Training manuals were the first option we looked at. Forty-three percent of the staff was in favour of training manuals, 22% were opposed, and 35% had no preference. This response suggested that a manual would be valuable since it would be used by a large percentage of the staff. This also told us that we could not *just* create a manual, as 22% of the organisation was not favourably disposed towards learning from such material.

From this information, we decided to develop a training manual that would complement the training presentation and serve as a reference and learning tool. Most advanced users learned much from the training presentation, but had trouble remembering specifics and details. The manual benefited them in that they could easily scan through and find quick answers. For novice users, the training presentation alone would not be enough. The training manual was tailored to these users. The manual begins with a section on the difference between an *Intranet* and an *Internet*. It then goes on to cover the basics of using the Internet, from opening up Internet Explorer to using links and icons. After the first few sections, the manual has covered all the necessary fundamentals needed to navigate the CID. After a general background in use of the Internet has been established, the manual goes into the functionality of the CID, working step-by-step through all of the features, tools, and applications. This treatment is too over-simplified for advanced users, but it proceeds at a slow enough pace for novices. Between the lectures and manual, all user levels have been covered.

#### ***4.3 Preference for a Training CD***

A training CD was not considered to be very important by most staff members. Thirty-five percent liked the idea of having a training CD, and 45% did not care. Even though it was not as popular an option as individual walkthroughs, it was much more feasible. Without a majority against a CD, we decided to produce it.

The training CD serves as storage for the presentation and an electronic copy of the training manual. Producing the CD allowed home-based employees and volunteers to

receive a copy of the material if they do not have access to the Internet. The presentation on this CD is much more in-depth than the presentation used in lectures. This presentation mirrors the training manual, but includes animations and sound for support. This presentation is intended for a novice audience. We decided not to use this presentation in the training lectures because we wanted to keep the lectures as the main training material. Auto-run menus were included to make the use of the CD as simple as possible.

## **5.0 Comments and Feedback**

At the end of the survey we included an open comment box for users to provide any specific comments they may have had. From these responses we learned that many regions had little or no knowledge of the information database. Many had obvious misconceptions about what the system would do or why it would exist. Others expressed concerns whether the CID would work on Macintosh, and also some concerns about the accessibility for handicapped persons. These issues were addressed and Macintosh and handicap accessibility were added to the system. The specific questions can be found in Appendix B.

## **Chapter VI: Conclusions and Recommendations**

### **1.0 Development of the CID**

Design of the corporate information database was completed as a series of independent modules using several different web-programming languages. Programming in modules is very important because it allows pieces of a program to be developed simultaneously by any number of programmers. Each piece is separated into a project that can be taken from the design stage all the way through completion of program debugging without any interaction with other modules. Modularity also allows for greater stability of the system. If one function goes offline, the other modules are not necessarily affected. The CID was broken into four main system modules.

A news section was designed as an organisation-wide bulletin board that enables members from all locations to post news to the rest of the organisation. This news section displays new articles on the main web page, while archiving old messages that could be read at a later time. To address a user concern, we chose to display urgent messages in such a way that they cannot be overlooked. If a message is marked as urgent, the main web page displays it in red and the message will not leave the front page until it is deleted or unmarked as urgent. System outages or other critical information can be displayed as urgent and users will quickly notice any new messages.

The news module maintains a Microsoft Access database with news articles stored by date and urgency. The news also has an administration page that allows an

administrator to add, edit, and delete articles from the database. Extensive error checking and data manipulation are required before a new entry is actually saved into the database, ensuring that corrupt data is not saved to the database. The administration site also ensures that only administrators are allowed to enter. This is done through Windows 2000 folder security system that is based on the user's login information.

One of the main concerns from staff at Arthritis Care was whether the site functions would be hard to learn. Our background research showed that if we could mimic what users currently feel comfortable working with, we would minimize anxiety. By allowing messages to be posted by copy-and-paste, we followed the same method users currently use to post on the main website.

Security was a major concern for Arthritis Care as the system was storing organisation data files on an external server. To tackle this problem we used a solution provided by computer service provider of the CID, which implemented a folder permissions scheme controlled by text files. These text files serve as the location for usernames and passwords of the users allowed to access a specific folder. To manage these text files, active server pages were written that would parse through each text file, adding, removing, or editing entries for users via an administrative form. Due to the complexity of adding new secure folders it was decided that we would provide one private and one secure folder per department and region. The system allows for folders to be created inside each of these sections, but folders have the same security as their parent



folder. For instance, files in Human Resources private folder all contain the same permissions.

The processes of allowing administrators to create new accounts, delete expired accounts, and modify users privileges needed to be as simple as possible. An administrative site was created to maintain and modify these privileges. A user given administration rights can access the administration page and edit the privileges of any user. In an attempt to keep all functions simple, the form was laid out as a series of checkboxes that administrators can simply check or uncheck to allow users access to secure folders.

The document repository module is basically a large file sharing system. It allows users to upload, download, edit, rename and delete files and folders that are shared within the organisation. It is broken down into two major sections, departments and regions. This was done because it reflects the structure of the organisation and users belonging to a particular department or region can presumably post and manage documents for that department or region as they see fit. To address the problem of security, each department and region contains a private folder, which only they have access to. Outside of the private folder, files are "read only" so as to prevent other users from changing their files.

An important issue for the document repository concerned the fate of deleting a file. From our research, we found that people were afraid that if they deleted a file, it would be gone forever. To solve this problem, a recycle bin was implemented. Any

document that is deleted remains in the recycle bin for seven days. This allows users to retrieve any file deleted within that period of time. The document can also be manually deleted from the recycle bin permanently if it is confidential.

The fourth and final module of the CID is the employee directory, or "directory" for short. Two ways of searching this module were implemented to make finding an employee's information easier. There is a quick search option, which searches for parts and pieces of first and last names, and an advanced search option, which allows a user to search by any of the designated criteria listed. The administration section of the directory is very straightforward. It simply displays the names and job titles of all the employees. This list can then be clicked on and employee information can be edited or deleted as necessary. New employees can also be easily added from this simple form interface.

As each module was completed and tested, they were integrated into the site framework. This method of modular design and site adaptation will allow Arthritis Care and possibly future WPI IQP students to create new modules and put them directly into the CID as Arthritis Care begins to use the system and develops new uses for it.

The software was developed in a number of programming languages due mainly to timing issues. In order to complete the site in the very short development time available, the web programmers in the group choose languages that would work together well. The site was to be programmed in ASP if on a Windows system or in Perl if run on

a UNIX platform. As soon as the Windows system was selected, programming began in ASP using both Visual Basic and Java scripting languages

The document repository was written in Perl after a failed attempt to create it from scratch in ASP. Progress was slow due to server and file restrictions on active server pages. In order to finish the project in time we decided to develop the document repository in Perl.

There are no major pitfalls with using multiple programming languages in web applications. In fact it is very common practice for web developers to do this. Ideally all the pages would be written in HTML and Perl or HTML and ASP simply for continuity.

A recommendation for future IQP projects is that Arthritis Care employees be surveyed in four to six months to find out what they particularly like or dislike about the system. Also, during our training sessions we had a number of people say, “This site is very useful; would it be possible to add a...?”. This next IQP group could also determine whether any regions or departments have new ideas they would like to see developed and integrated. A final recommendation would be to analyse the Perl document repository and if needed develop an ASP virtual file system that would allow for more user control of files.

### ***1.1 Changes and Upgrades From Previous Project***

The biggest change from last year's IQP project is that the software developed in this project is fully functional. We were able to secure a platform and proceed directly to working on the code within the first week of our project. In contrast, last year's project group unexpectedly had to change platforms, and thus re-write most of the code, towards the end of their project. Our early focus on pushing the platform decision was an important factor in our success and helped us ensure we could complete and test the code in a timely fashion. Had the platform not been changed on such short notice during the previous IQP team's tenure, we believe that the Intranet would have gone "live" at the end of the previous Arthritis Care project.

Cosmetically, the "look and feel" of the Intranet we developed stayed the same. We decided to keep the "look and feel" of the original project because it had been designed with input from the upper management. We also felt that our time would be better spent working on the functionality of the system rather than on its design. Thus, we were able to salvage the code for the login page and the main page that had been written by the previous IQP.

Though the original code created by the previous IQP was never made live, the Windows code written for the project was more functional than the UNIX code that was made live. Therefore, we were able to salvage some of the Windows-based Perl written for the document repository by the previous IQP team. An estimated 35% of the total

current code for the document repository was taken from the previous project. Beyond that small portion of code, everything from the previous project had to be recoded. We used the same concept for the news section as described in the previous project, but it had to be coded from scratch.

The only security implemented in the previous project was the initial login screen. Beyond that, users had access to any folders in the document repository, and there was no administration control. The security implemented in this version of the Intranet is much more in-depth and thorough.

## **2.0 Status of Integration**

The largest indicator of the success of our project is the question “Will the Arthritis Care Corporate Information Database be used?” This measures not only the usefulness of the Intranet, but also the effectiveness of our integration efforts. In many aspects, the integration was more difficult than actually designing the code. With the code, the environment was static. The language never changed, and, even if the coding was difficult, the parameters and rules were always the same. The same could not be said for training. While training, we faced a range of technical competence backgrounds and a myriad of different questions and comments. Not knowing what to expect made preparations difficult. However, we were well prepared and things went very smoothly.

Unfortunately, we were only on-site for a week and a half after the system went live to the organisation; thus, we could gather only limited data and feedback with which

to conclude whether or not the CID would be used. However, from post-training discussions with Regional Directors and staff, future use looks promising.

Initial reactions prior to the introduction presentation of our project were a bit sceptical, and most people were a bit uneasy with the new piece of software. When presenting to the regions, we were presenting to only 4 or 5 people. We were expecting to stand up, lecture for 25 minutes, and field questions afterwards. However, because of the small size of our audience, our presentation turned into more of a moderated discussion. This actually worked out far better, as people got a chance to get more comfortable with the system, asking questions and making comments as they arose. After the presentation, the attitudes towards the CID had changed noticeably. People were much more interested, asking if it had certain features, or if they could use it do something, etc. There was a good amount of talk amongst the Arthritis Care employees not directed to us, which also demonstrated interest in the CID. After our presentations we were often asked when user accounts would be created and Arthritis Care could start using the new system. This immediate interest has convinced us that the CID will be used and that all our training and designing was worth the time.

After discussing with employees about possible uses of the CID, we can draw general conclusions about increases in efficiency it will bring. For instance, members of the design department expressed interest in being able to post graphics on the Intranet, and distributing them from there, rather than having to e-mail them to people individually. A member of the communications department had the idea to post all of the

arthritis related newspaper clippings to the Intranet, rather than distributing hard copies. The director of the information services department is going to use the document repository to share arthritis-related information with the regions, as opposed to sending it by normal post. These three examples illustrate how the CID will make communication amongst the Arthritis Care organisation more efficient.

Due to time restraints, we could not visit all of the Arthritis Care branches, and had no direct contact with the home users. We were able to reach the North England and Central England branches, but could not get to Scotland, Northern Ireland, South East England and South West England. Our presence in North England and Central England will have a strong positive impact on the initial use of the CID. We sent a training package to each of the other four regions, but expect integration to be a bit slower. It was not feasible for us to train the entire population of Arthritis Care home users and volunteers, mostly due to time restraints and availability issues. This training will be left up to the training managers at each of the regional sites.

Our training strategy was to use the presentation as our main means of training, supported by the manual and CD. We had thought about just distributing the training manual, or just distributing the CD, but our method presentation supported by CD and manual was the most effective option. The option of conducting teleconferenced training presentations supported by a live-guided demonstration via PC-Anywhere was suggested, but time and equipment restraints prevented us from doing this. Because some regions

were on the same wide area network as the Central Office, PC-Anywhere would have allowed us to “take control” of their computers and present the demonstration.

The presentation proved to be our most effective means of training. Because we were able to directly interact with the audience, we could address their concerns more effectively than a training manual or presentation could alone. Our presence helped greatly to stimulate interest. All of the training presentations had a large number of people attend, and most gave very positive feedback.

During our training, we did not encounter any major acceptance problems. Some of our “tech lingo” had to be toned down, but that was easy enough to manage. We had initial concerns about any language barriers that might exist between British English and American English, but no major differences arose in our training sessions. Also, from our surveys, willingness to move to a new system was generally low, so we were expecting the training to be a bit more difficult than it was. However, after each of the presentations, people commented on how easy and simple we had made the new system, and how excited they were to try it out. If the hardware were available, it would have been beneficial to set up hands-on demonstrations.

In designing the presentation, manual, and CD, every aspect of the system was covered. If something was missed, it was negligible. Upon viewing the presentation and referencing the manual, system users had no trouble using the features, or performing tasks.



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## **Appendix A: Data Analysis**

<b>Table A1: Summary Conclusions</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Geometric Mean</b>
Computer Comfort Level	8.26	1.30017301	8.009838716
Browsing Comfort Level	8.29	1.344290657	7.984063561
Internet Comfort Level	7.85	1.6930274	7.317661757
Moving To New System Comfort Level	6.88	2.253269917	6.063365399
Document Storage Priority	5.29	1.578231293	4.760466685
Document Search Priority	5.29	1.522366864	4.758204709
Bulletin Board Priority	4.98	1.321854913	4.566609543
Chat Priority	3.61	1.790039063	2.920432019
Company Directory Priority	5.95	1.118579882	5.537243834
Homepage Creation Priority	4.17	1.697753906	3.563801476
Online Training Priority	5.44	1.386134068	5.025326202

<b>Table A2: Preference Toward a Training Manual</b>		
Likes	28	43.08%
Dislikes	14	21.54%
Indifferent	23	35.38%
Sample Size of Question	65	

<b>Table A3: Preference Toward Individual Walkthrough</b>		
Likes	40	60.61%
Dislikes	7	10.61%
Indifferent	19	28.79%
Sample Size of Question	66	

<b>Table A4: Preference Towards a Training CD</b>		
Likes	23	35.38%
Dislikes	13	20.00%
Indifferent	29	44.62%
Sample Size of Question	65	

<b>Table A5: Preference Toward Lectures</b>		
Likes	27	40.91%
Dislikes	14	21.21%
Indifferent	25	37.88%
Sample Size of Question	66	

<b>Table A6: Preference Toward Presentation Style</b>		
Step by Step	6	9.68%
System Overview	11	17.74%
Step by Step & System Overview	40	64.52%
Any	5	8.06%
Sample Size of Question	62	

<b>Table A7: Desires a Copy of Presentation on CD</b>		
YES	40	65.57%
NO	21	34.43%
Sample Size of Question	61	

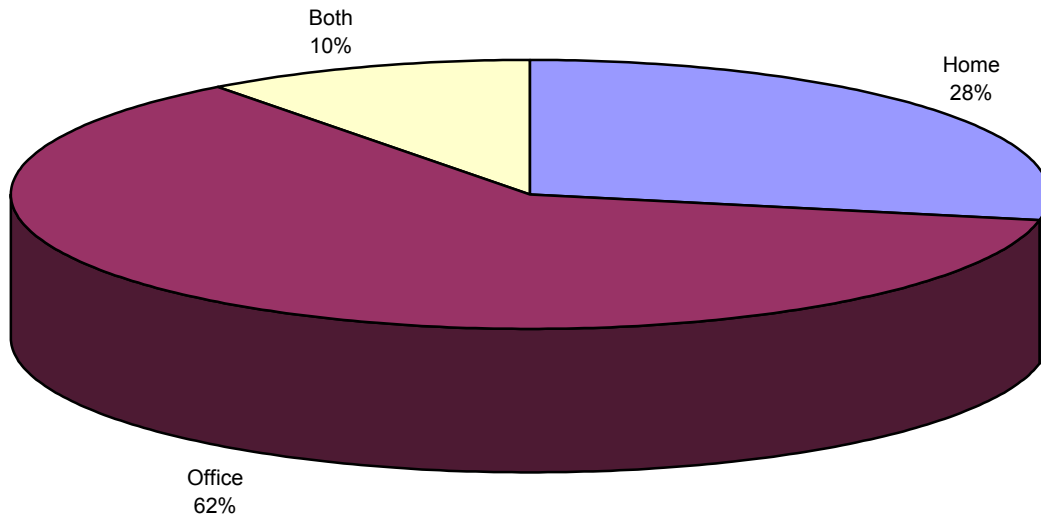
<b>Table A8: Population Statistics</b>	<b>Number of Responses</b>	<b>Estimated Population</b>	<b>% Responded</b>
UK Office	30	67	44.78%
North England	8	14	57.14%
South West England	2	11	18.18%
South East England	9	14	64.29%
Wales	4	10	40.00%
Scotland	10	12	83.33%
Northern Ireland	1	8	12.50%
Hotels	1	4	25.00%
No Location Given / Other	6	14	42.86%
Approx Percentage	71	154	46.10%
% - Estimated Layoffs	71	109	65.14%

**Table A9: Location of Employee**

Home	19	27.94%
Office	42	61.76%
Both	7	10.29%
Sample Size of Question	68	

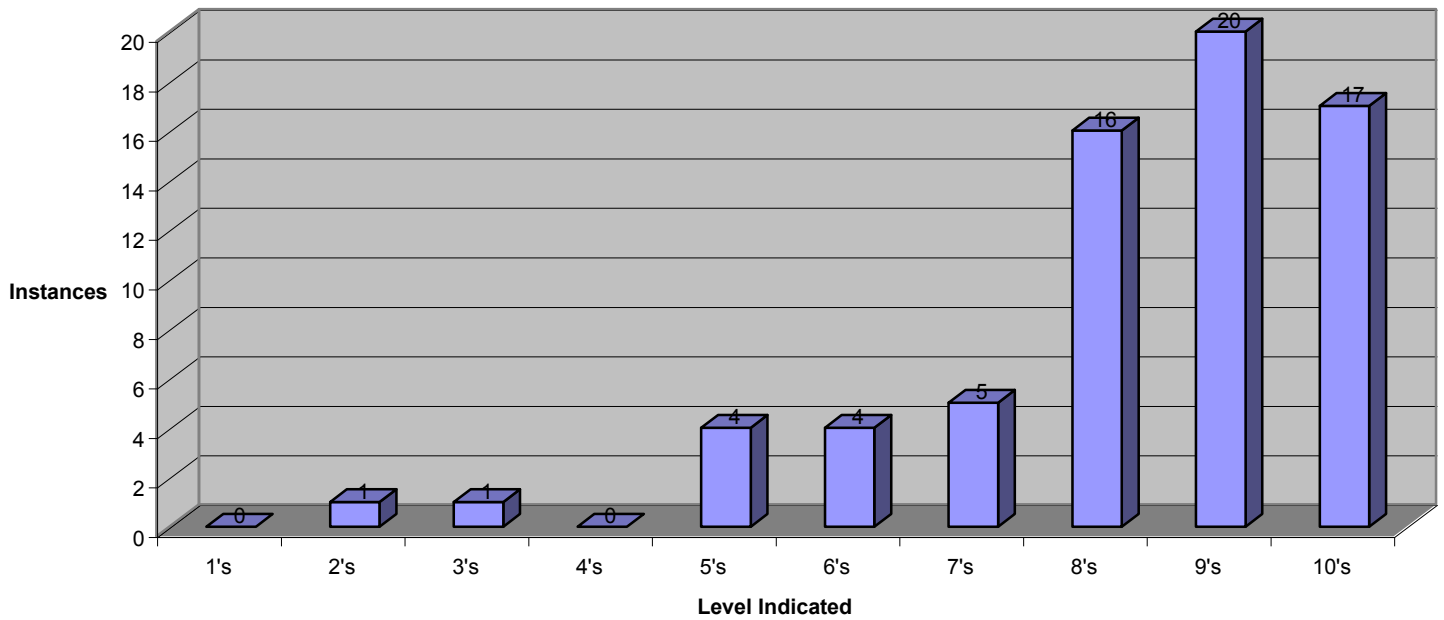
<b>Table A10: Five Number Summary</b>	<b>1st Quartile</b>	<b>2nd Quartile</b>	<b>3rd Quartile</b>	<b>Minimum</b>	<b>Maximum</b>
Computer Comfort Level	8	9	9.25	1	10
Browsing Comfort Level	7.75	9	10	1	10
Internet Comfort Level	7	8	10	1	10
Moving To New System Comfort Level	5	8	9	1	10
Document Storage Priority	4	6	7	1	7
Document Search Priority	4	6	7	1	7
Bulletin Board Priority	4	5	6	1	7
Chat Priority	1.75	4	5	1	7
Company Directory Priority	6	7	7	1	7
Homepage Creation Priority	3	5	6	1	7
Online Training Priority	5	6	7	1	7

**Employee Distribution**  
*Figure 1*

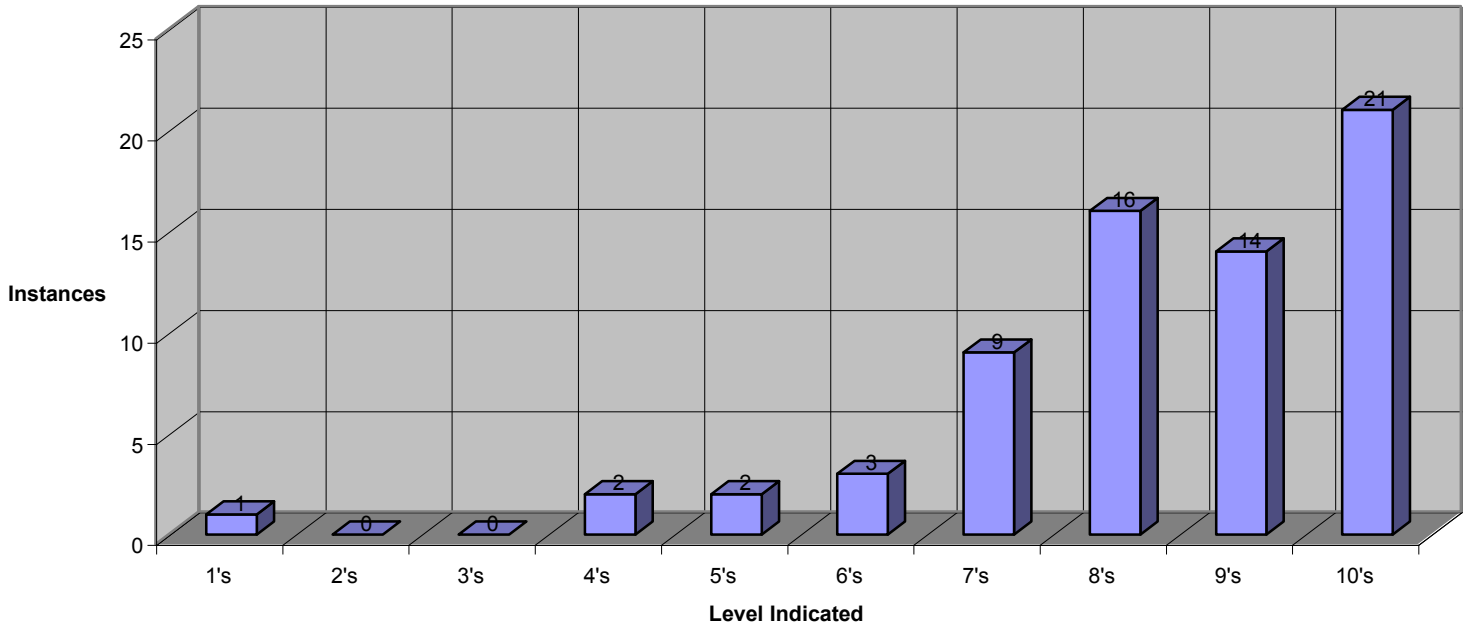


■ Home ■ Office ■ Both

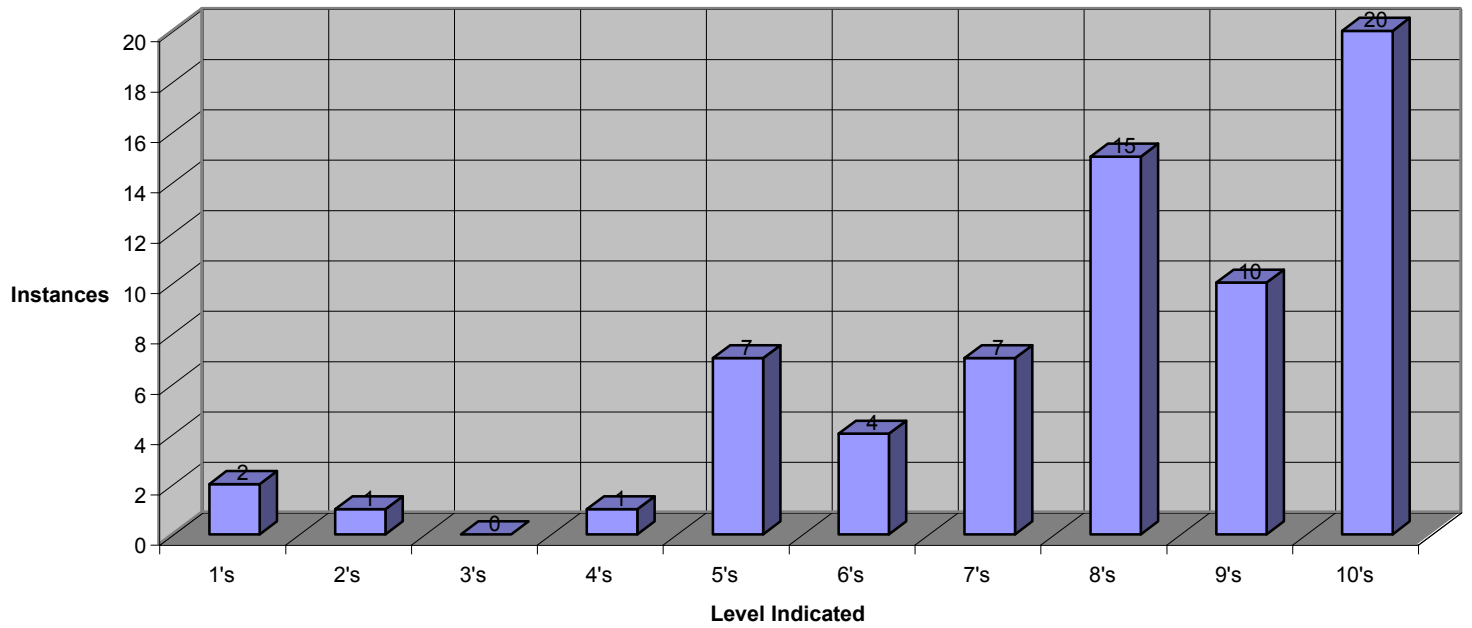
**Distribution Analysis, Comfort Level**  
*Figure 2*



Distribution Analysis, Browsing Comfort Level  
Figure 3

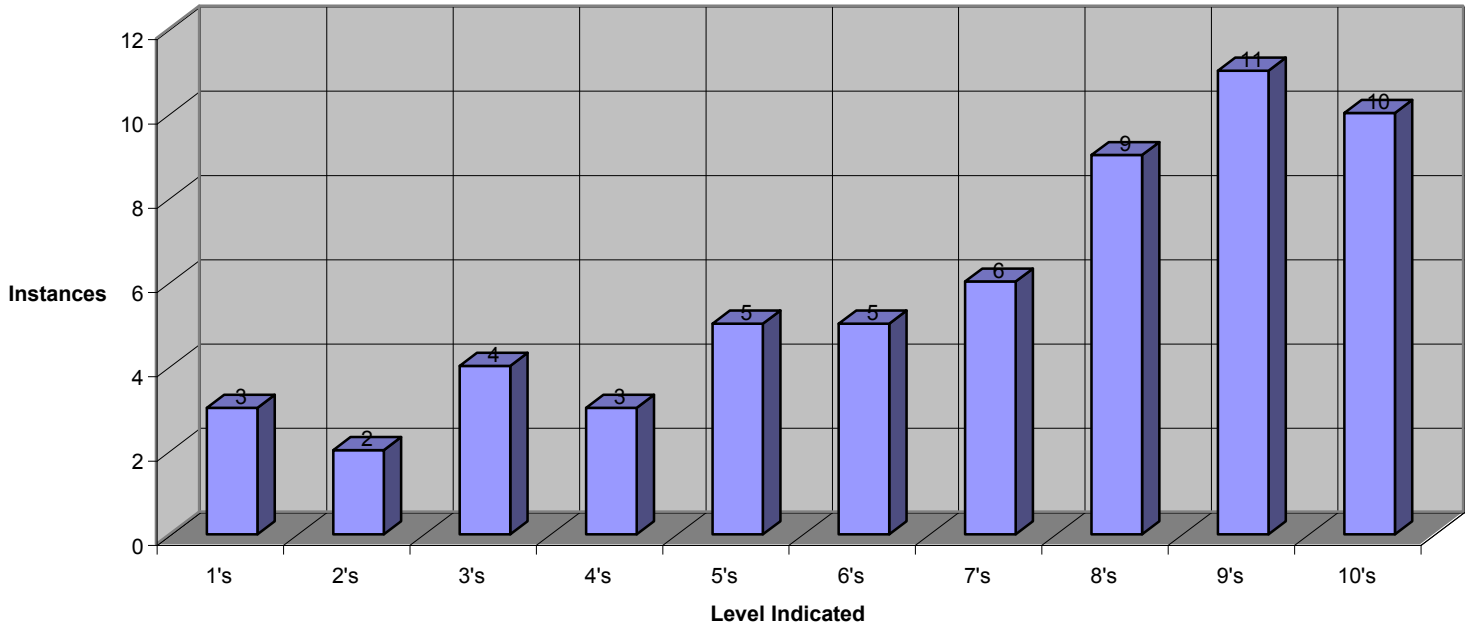


Distribution Analysis, Internet Comfort Level  
Figure 4

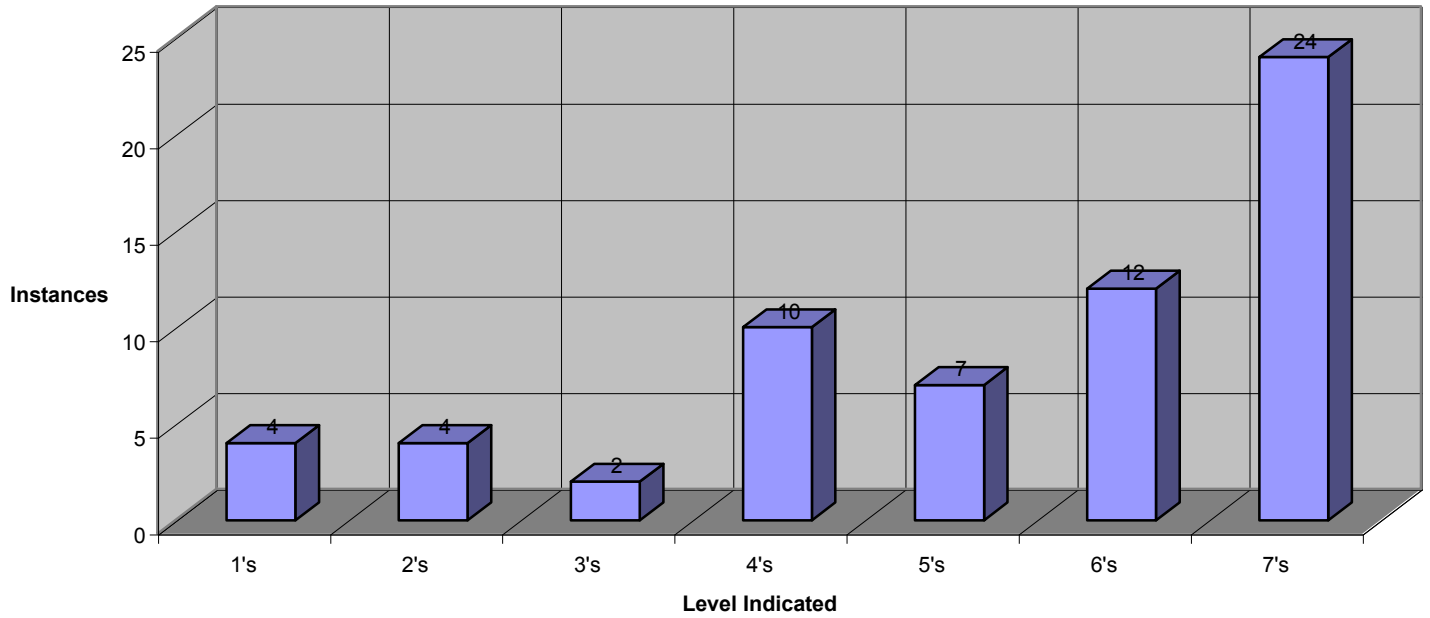




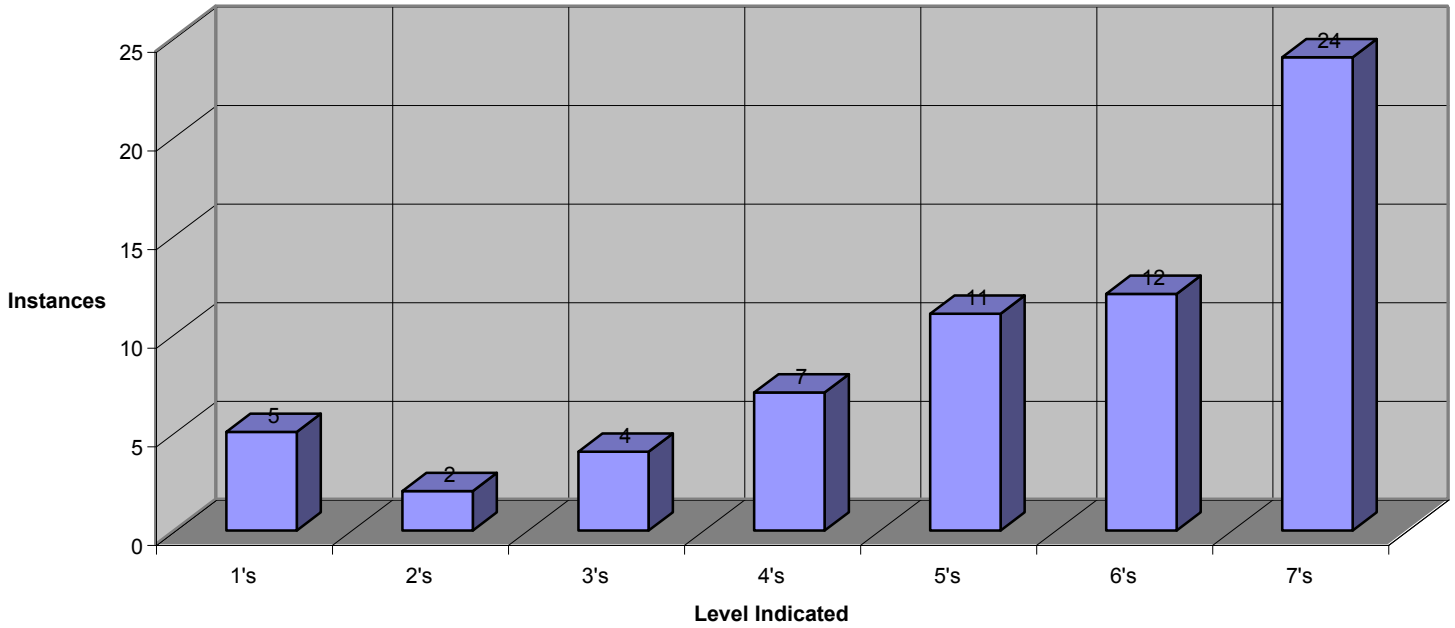
Distribution Analysis, Moving To New System Comfort Level  
Figure 5



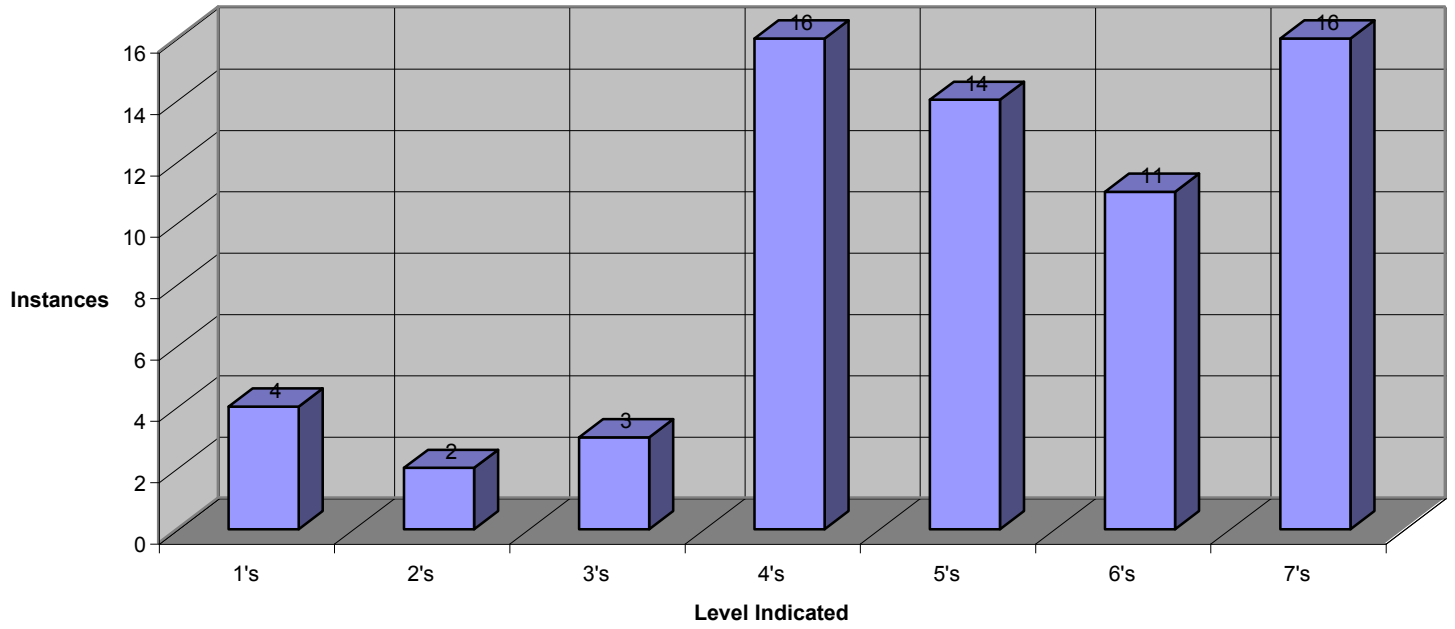
Distribution Analysis, Document Storage Priority  
Figure 6



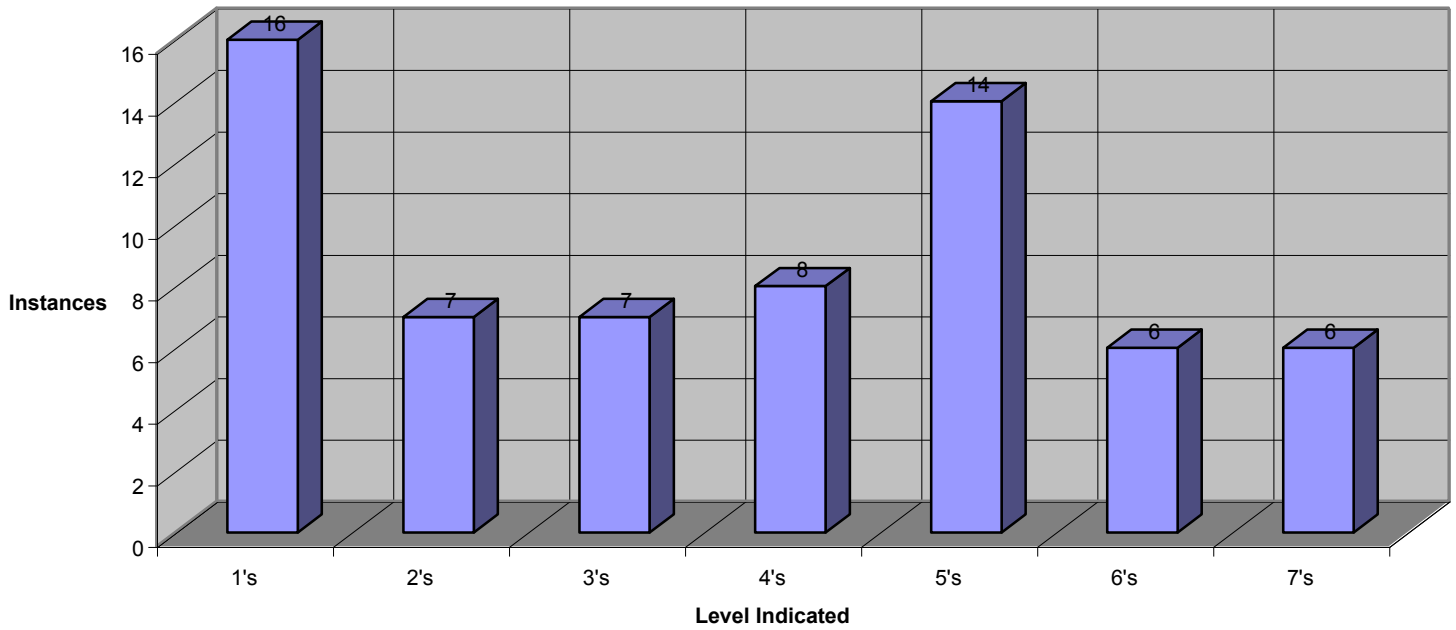
Distribution Analysis, Document Search Priority  
Figure 7



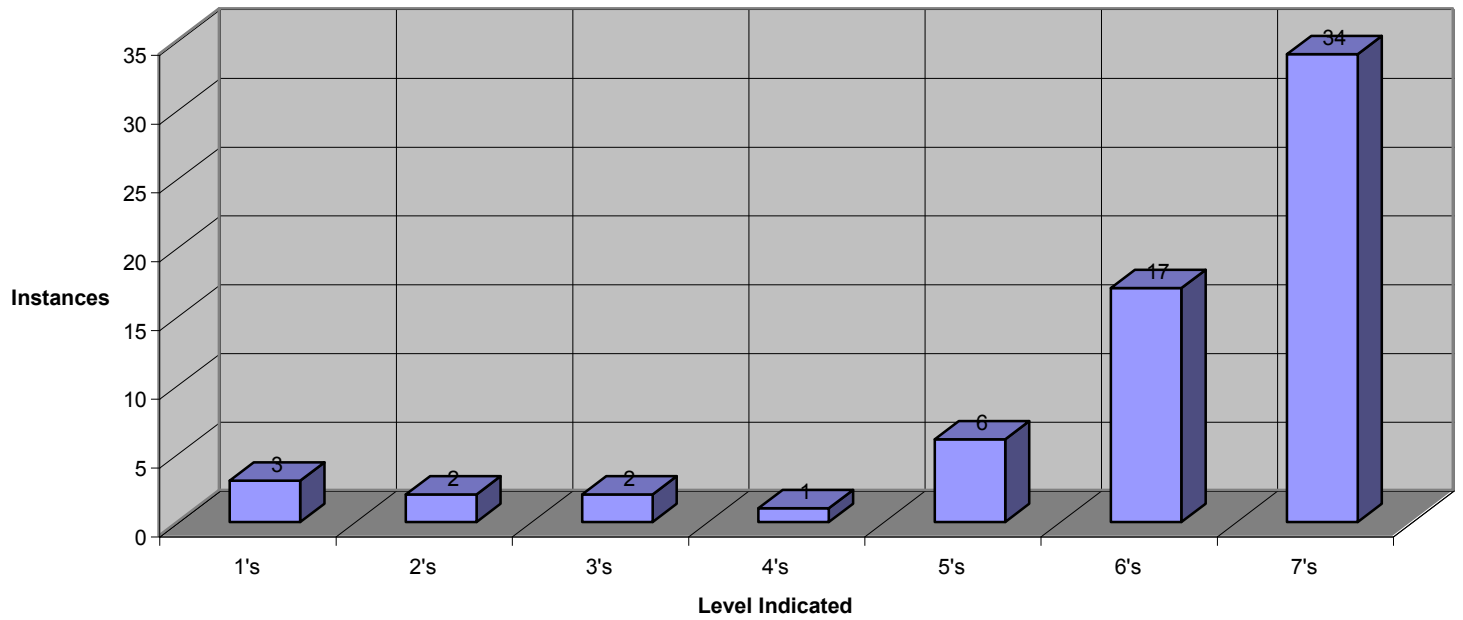
Distribution, Bulletin Board Priority  
Figure 8



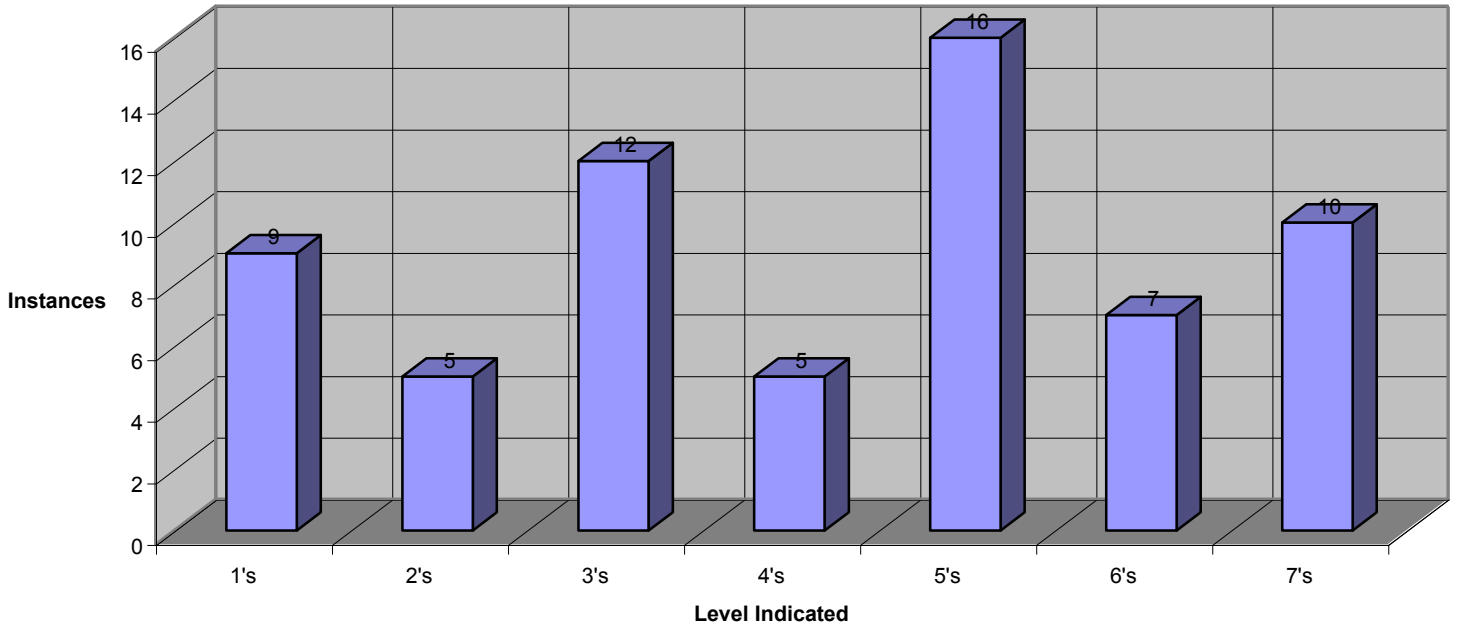
Distribution Analysis, Chat Priority  
Figure 9



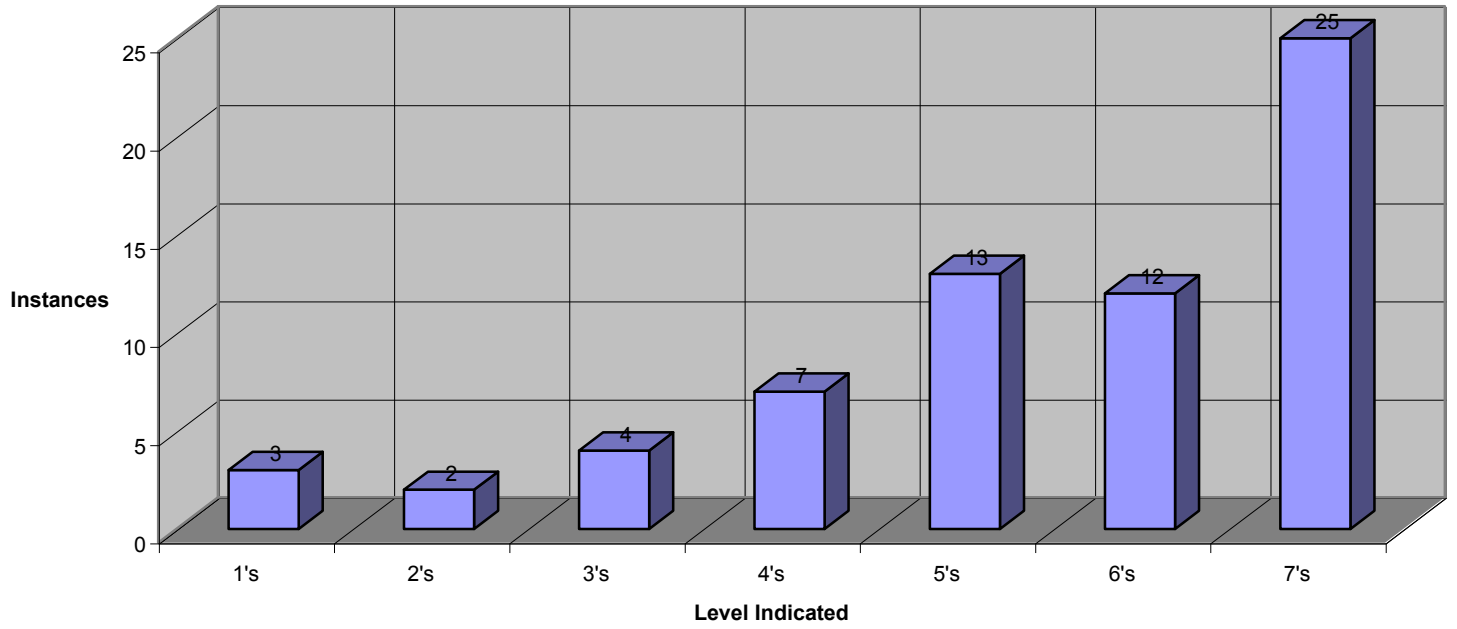
Distribution Analysis, Company Directory Priority  
Figure 10



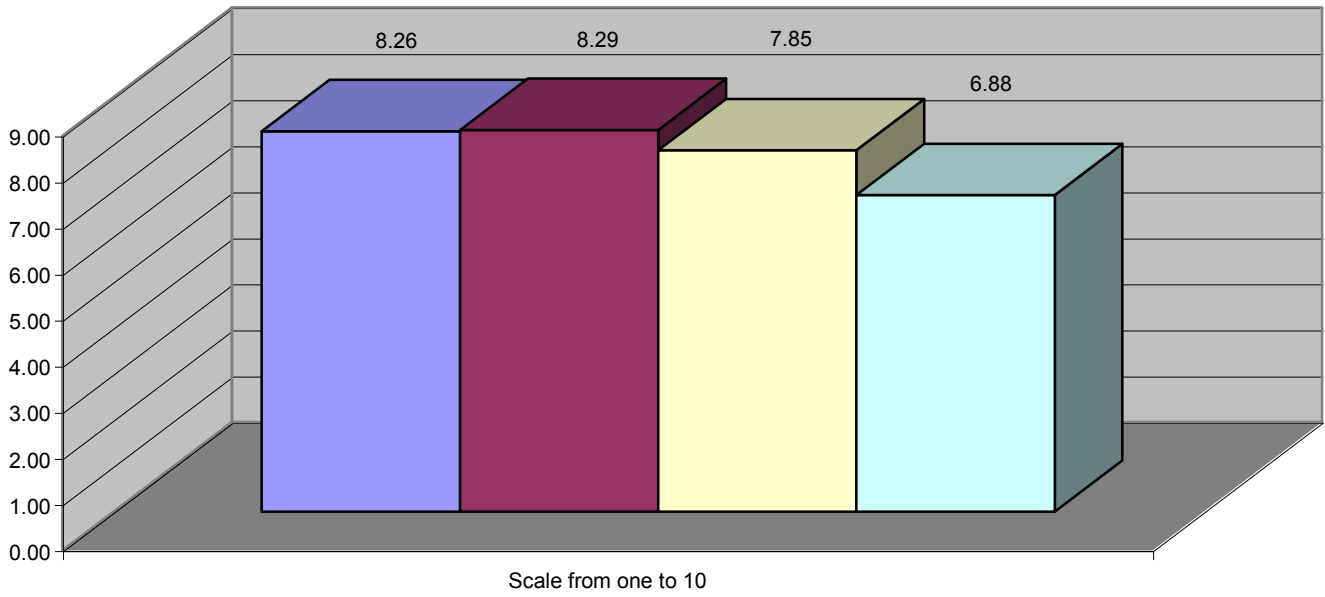
Distribution Analysis, Homepage Creation Priority  
Figure 11



Distribution Analysis, Online Training Priority  
Figure 12

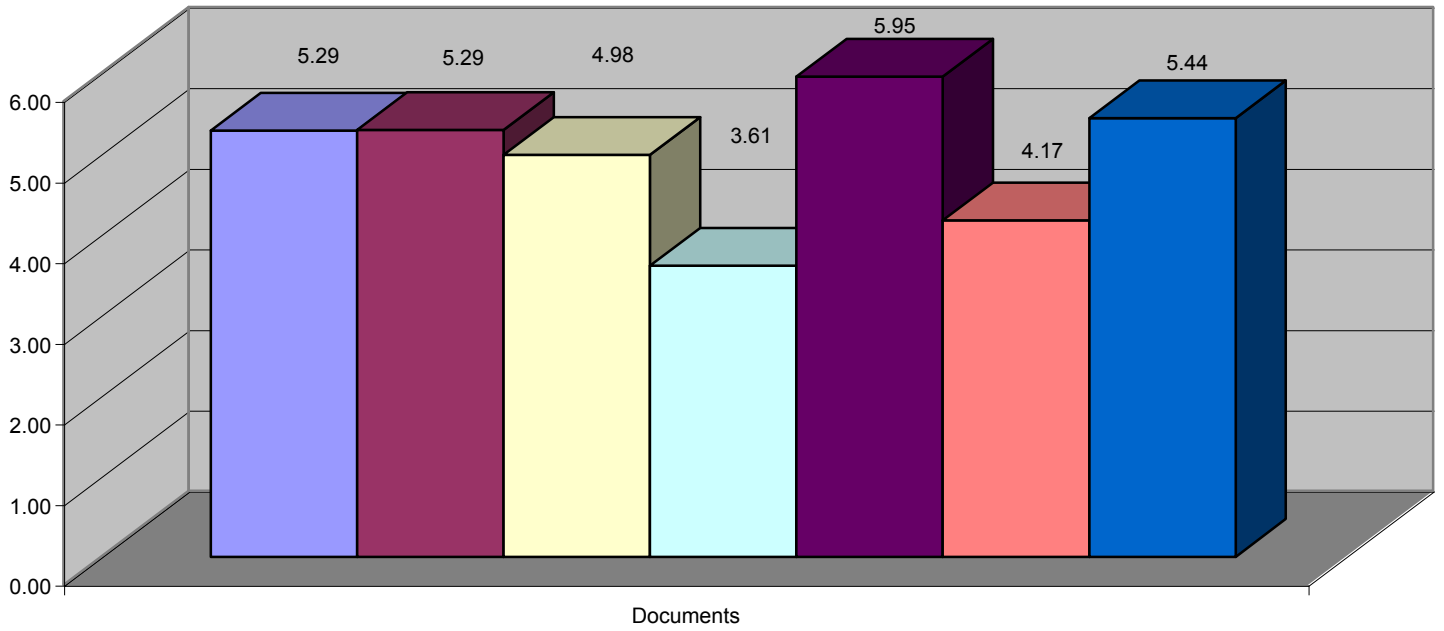


**Average Arthritis Care - Computer Comfort Levels**  
**Figure 13**



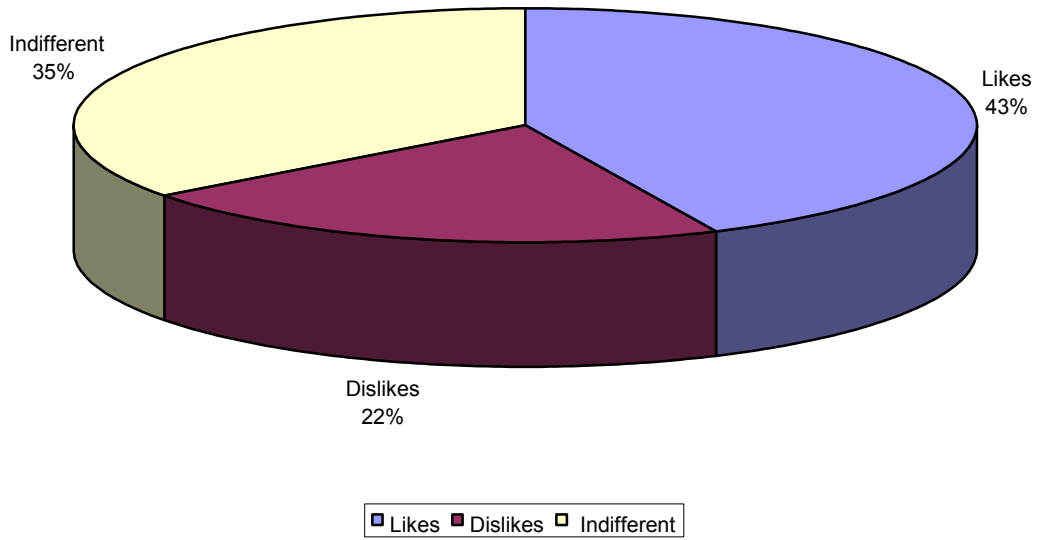
■ Computer Comfort Level 
 ■ Browsing Comfort Level 
 ■ Internet Comfort Level 
 ■ Moving To New System Comfort Level

**Average Arthritis Care - Priorities of CID**  
**Figure 14**

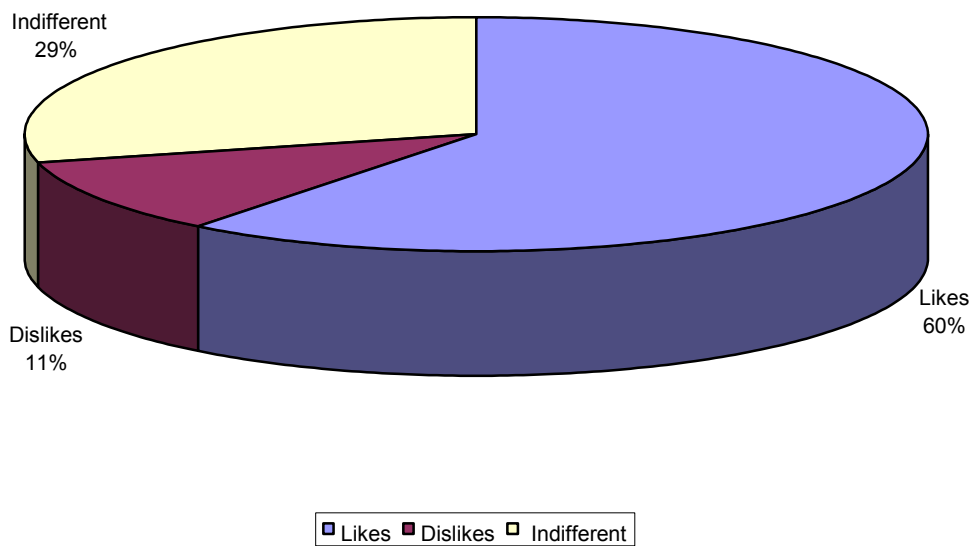


■ Document Storage Priority 
 ■ Document Search Priority 
 ■ Bulletin Board Priority 
 ■ Chat Priority  
■ Company Directory Priority 
 ■ Homepage Creation Priority 
 ■ Online Training Priority

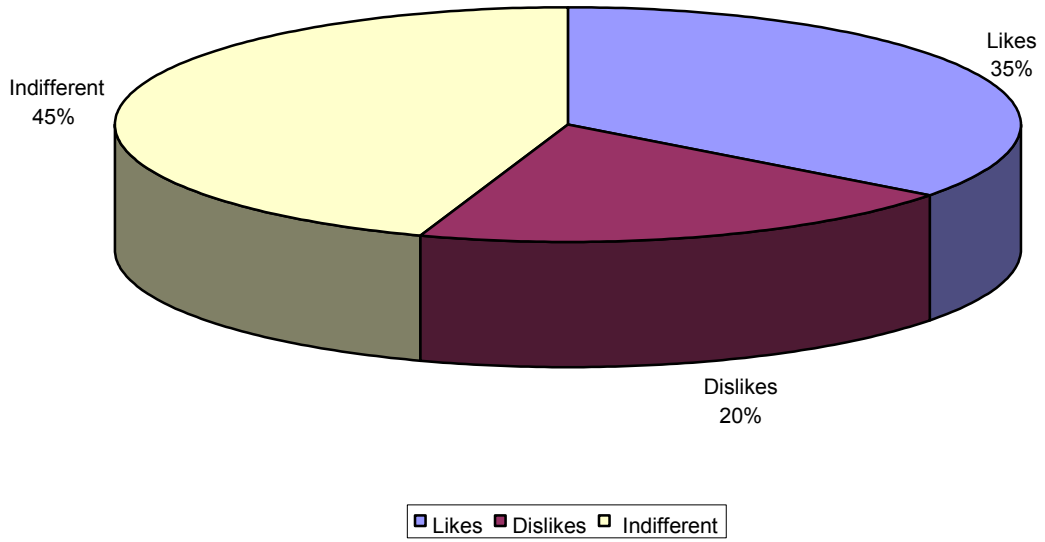
**Preference Toward a Training Manual**  
*Figure 15*



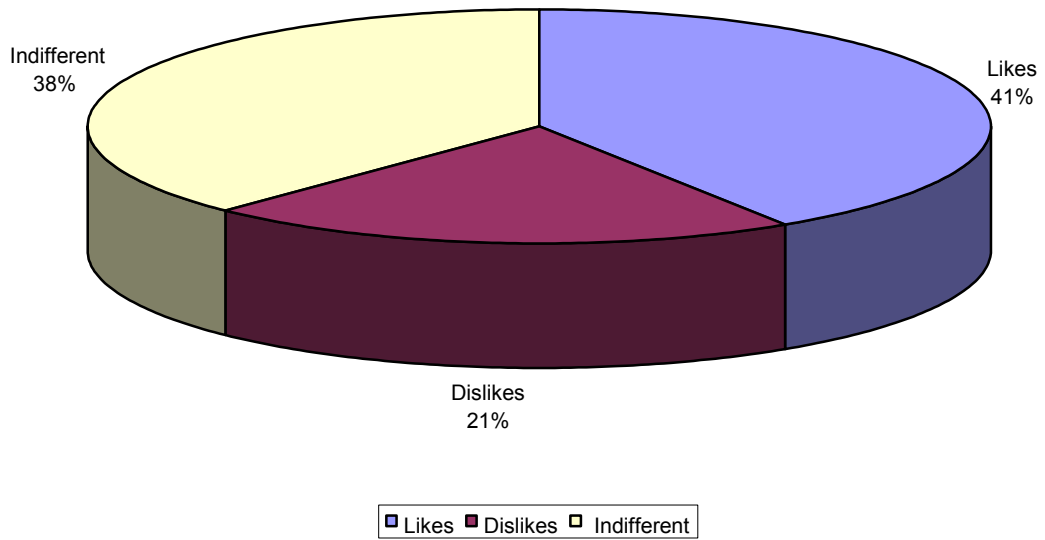
**Preference Toward Individual Walkthrough**  
*Figure 16*



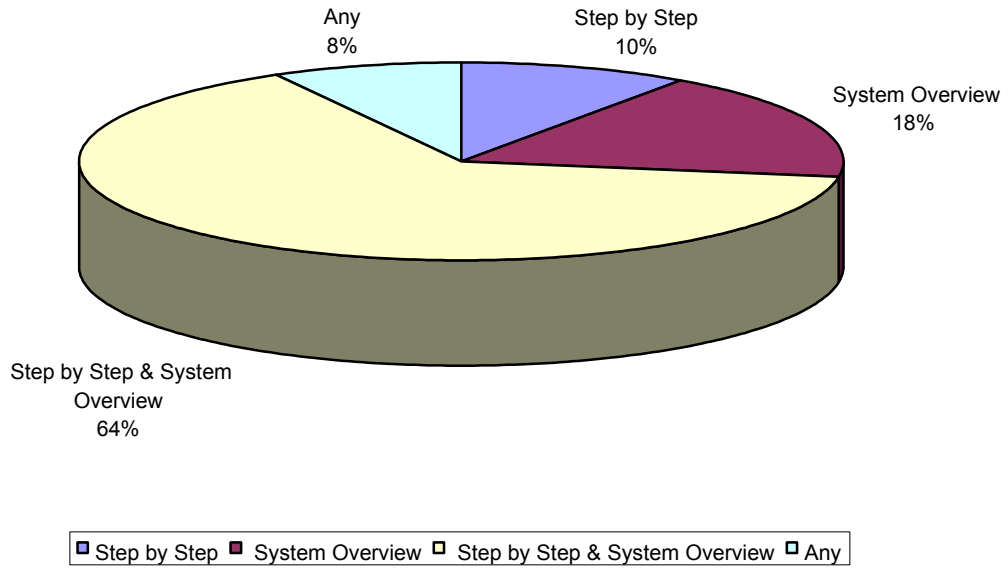
**Preference Towards a Training CD**  
*Figure 17*



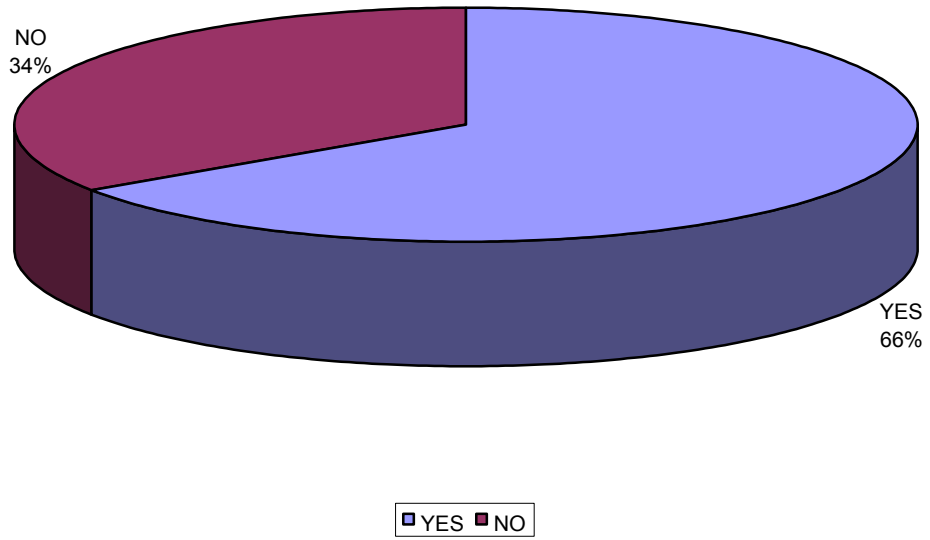
**Preference Toward Lectures**  
*Figure 18*



**Preference Toward Presentation Style**  
*Figure 19*

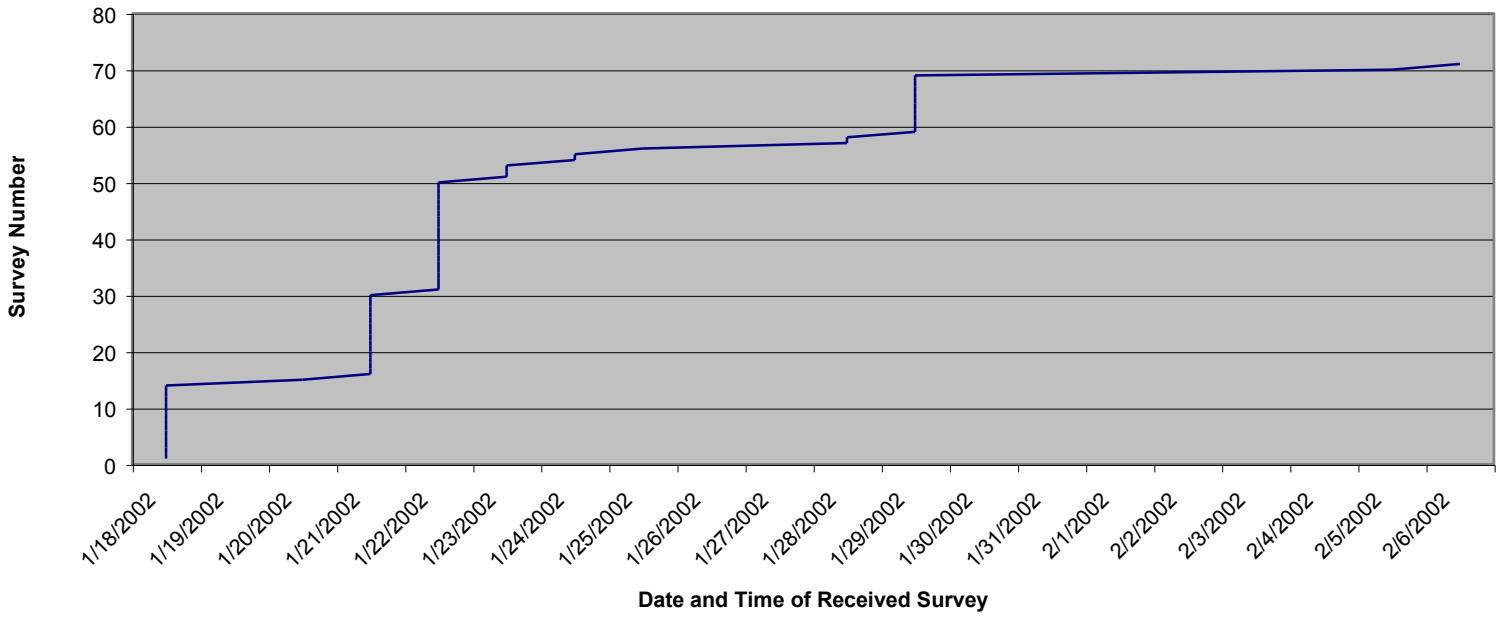


**Desires a Copy of Presentation on CD**  
*Figure 20*





Incoming Survey Times  
Figure 21



## **Appendix B: Comments Received From Survey**

#	Comments
1	KISS
2	Not at the moment
3	What is the new system? & What is WPI Consultant & Why don't I know about it?
4	Not on GroupWise and so Q 9 is not relevant. I think.
5	More support
6	I am not aware of any new system changes at present
7	Please make sure it is also compatible for Apple Macs.
8	I can't think of anything specific, except that it needs to be user friendly - and not too pink please!
9	Please ensure the system is fully functional on Macs as well as PCs
10	It would be very helpful to have a description of the new system so that I could comment.
11	I don't have enough information about the whole proposal to comment
12	What new system is this questionnaire referring to?
13	Must be idiot proof, with simple user friendly instructions
14	As I am not linked to the company Intranet, this has limited relevance for me at present. It would be useful to have a separate filing system for Scotland so that we could share documents - but would be absolutely essential to involve Scottish staff fully in planning for such a development. We would also need additional time to take part in this constructive and this is not an option immediately.
15	What is this new system could you explain in simple terms! Please
16	Would need explanation of the first question in section 9. Am I reading this right and if so what about confidentiality? I assume this would be storage of relevant info only and not files?
17	My Main question is what system? Will it affect my job, which is phone based?
18	Access to a computerized Welsh dictionary would be useful
19	User friendly as a number of staff has arthritis in their hands. Preferably less use of mouse and repetitive strokes made easier.
20	THE NEW SYSTEM TO BE USER FRIENDLY AND SIMPLE IN ITS DESIGN.
21	I am not currently linked up to the new system due to my office location. It seems to cause other staff great difficulties in that it crashes and can be very slow, these "gremlins" need sorting out before the new system is available to all.
22	The system needs to accommodate the needs of the users, not the other way round. This means fully researching the needs of the users before determining both the software to use and the technology to be applied. We also need to ensure that the design / consultation process is realistically accessible to regional users - for example by using site visits at the various office locations.
23	PLEASE INFORM ME ABOUT THE NEW SYSTEM BEFORE I CAN ANSWER THE ABOVE
24	Home workers can feel particularly isolated so I think some shared learning (could be the lectures) would be helpful.

## **Appendix C: Training Manual**



## GLOSSARY

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<sup>i</sup> Corporate Information Database – Communication tool that can be used by a company to access information.

<sup>ii</sup> Intranet – An Internal Website. An Intranet is a website that can only be accessed by users within a business; it is designed and tailored to their needs.

<sup>iii</sup> Hyper Text Markup Language (HTML) – Main code type of the Internet. This code is responsible for how a website looks.

<sup>iv</sup> E-Mail – Electronic Mail, E-Mail is a means of sending letters and documents to other users on the Internet. Email includes a mailbox for each user to send and receive. A typical Email address would look like ([someone@arthritiscare.co.uk](mailto:someone@arthritiscare.co.uk))

<sup>v</sup> Network Interface Cards (NIC) – A computer card that is placed inside a computer that allows it to physically connect to a network.

<sup>vi</sup> Network Cable – Typical form of network cable include Category 5 (CAT5, looks like big telephone cable), BNC, and Fiber Optic. This cable is responsible for connecting a NIC to a hub or other computer.

<sup>vii</sup> Ethernet Hub – Communications Junction for all NIC information. Cables from computers are connected to a HUB; this hub regulates traffic of information and connects all cables together.

<sup>viii</sup> Pentium – Brand of processor, a processor is the part of a computer that does the thinking.

<sup>ix</sup> Windows – Popular Operating System, a operating system is what allows you to navigate and use computer programs on a computer.

<sup>x</sup> The Common Gateway Interface (CGI) is a standard for interfacing external applications with information servers, such as HTTP or Web servers. A plain HTML document that your web browser receives doesn't change. A CGI program, on the other hand, is executed in real-time, so that it can output constantly changing information.

<sup>xi</sup> C++ - Programming Language that is used to make computer programs

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<sup>xii</sup> JAVA – Programming Language that is used to make computer programs, java is a popular program for programs on the Internet.

<sup>xiii</sup> Visual Basic – Programming Language designed to make visual applications

<sup>xiv</sup> UNIX – Operating System that is used on specialized machines. Typical machines include web site servers, and super computers.

<sup>xv</sup> PERL – Programming Language that is specifically designed to make database programs.

<sup>xvi</sup> Bandwidth – Maximum speed allotted for transferring information.

<sup>xvii</sup> Active Server Page (ASP) - A form of website that is interactive and can take input from a user and respond. ASP is mixed inside standard websites and is never seen by the user

<sup>xviii</sup> SQL - A computer language that allows information to be retrieved from a database

<sup>xix</sup> Internet Service Provider (ISP) – An Internet service provider offers Internet to a person or entity. For example to connect to the Internet you use an Internet service provider.

<sup>xx</sup> Direct Subscriber Line – Means of connecting to the Internet that is approximately 50x faster than using conventional phone line.

<sup>xxi</sup> TCP/IP – Protocol of the Internet, this is the format of most communication that is transmitted and received from computers.

<sup>xxii</sup> Microsoft PowerPoint – Program that is designed to make slide show presentations.