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OPTIONS FOR IMPROVING USAGE OF THE GDBA'S ORIENTATION ASSISTING DEVICE

An Interactive Qualifying Project Report
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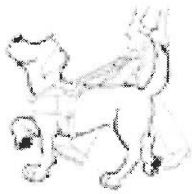


Abstract

This Interactive Qualifying Project was prepared for the Research and Grants Department of the Guide Dogs for the Blind Association (GDBA), a charity organization in the United Kingdom. This project was conducted in order to provide possible reasons for the low usage of the Orientation Assisting Device (OAD) within the organization, as well as ways of improving the usage of the OAD throughout the GDBA and beyond the organization. Possibilities for the low usage and suggestions were formulated through background research, personal interviews, telephone interviews, site visits, and meetings with those associated with the OAD. The suggestions include developing an internal marketing plan, ways to improve technical support, improving the survey methods, improving the installation procedure, and an external marketing plan and other applications for the OAD. These recommendations should help the organization increase client and trainer satisfaction, as well as the usage of the OAD.

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Executive Summary

The Guide Dogs for the Blind Association (GDBA) developed a secondary mobility device to aid visually impaired people. This Orientation Assisting Device (OAD) has been in development since 1987, and has been continually improved over the past twelve years. The majority of the visually impaired users surveyed by the Information and Technology Department expressed profound delight with the OAD and wanted to have it used more often. However, from the lack of feedback from the training centers, it appeared that the trainers were not utilizing the OAD to its fullest, despite the high level of interest from the visually impaired population. The goal of *Options for Improving the Usage of the GDBA's Orientation Assisting Device* was to find out why the trainers apparently were not utilizing the device to its fullest extent.

In order to discover why the trainers were not utilizing the OAD to its fullest, the group conducted research in the form of interviews. Face to face and telephone interviews were conducted with GDBA staff, trainers, and visually impaired users. These interviews were then organized in a database and analyzed by the answers provided. The group looked at percentages of the population with certain responses as well as qualitatively analyzed the responses to the questions.

A list of suggestions was provided to the GDBA in order to improve the usage of the OAD amongst the trainers, as well as creating an internal marketing plan, ways of improving the technical support, installation procedure, and survey method, and finally ways of marketing the OAD externally. Also included are suggestions of places to implement the OAD, ways to expand the GDBA's coverage of the OAD by adding new employees, and possible places to install the OAD.

Two outlines for possible additions to the GDBA website were created to promote the OAD. One was for a set of informational pages with technical support and general OAD information for both clients and trainers. The other was for a set of pages for downloading previously created route information. The information and technology page would consist of a general information page, places where the OAD is installed, an online version of the technical support manual, and answers to common OAD questions. The other web page would contain all the previously created routes and would have a section to search for a specific route and download it onto a memory card via the web. Both web pages would be linked to the main GDBA website.

From the list of suggestions that have been provided, the GDBA should experience greater usage of the OAD throughout the organization. Information was also provided which should promote greater awareness of the OAD internally and also lead to promotion in external markets. From everything provided, there should be significant technological benefits to the visually impaired community.

1.0 Problem Statement

The Guide Dogs for the Blind Association (GDBA) developed the Orientation Assisting Device (OAD) to assist visually impaired clients when training with a guide dog in an unfamiliar area. The device is currently used in two environments, the GDBA Hotels and the Training Centers. The device appears to be readily accepted by the visually impaired users at the GDBA hotels, but is under-utilized by the training staff of the GDBA. The purpose of this project was to determine the underlying problems that cause low usage of the OAD in the organization. After these causes were identified, the IQP group formulated ways to improve the integration process of the OAD. In addition, the group explored the possibilities of marketing this device in the public realm.

2.0 Introduction

The Guide Dogs for the Blind Association (GDBA) is a non-profit organization whose main purpose is to train guide dogs for the visually impaired throughout the United Kingdom. Dog training is not their only goal; the GDBA also seeks to improve the confidence and mobility of the blind through other methods. Some of these methods include the use of the GDBA's Orientation Assisting Device (OAD), training dog owners to use guide dogs, and maintaining a working relationship with the dog owners after training is complete.

The GDBA charges a nominal fee of 50p for the guide dogs and does not receive any financial assistance from the government. For this reason, the organization relies almost exclusively on voluntary support. They rely on donations and fundraisers for money used to feed the dogs, groom them, and buy harnesses and other equipment. These donations also go toward walking and training the puppies, and assisting the guide dog owners with the costs of food and veterinary bills.

The GDBA also maintains hotels and arranges activities, such as adventure touring and educational trips for the visually impaired. The trips have sighted guides that help the visually impaired. During their travels they can stay in the GDBA hotels that cater to their needs. These hotels permit the use of dogs, have resident dog care specialists, and have facilities that are made to accommodate the visually impaired and their guide dogs. They also have an assistance fund for those who would normally not be able to afford these activities, as well as a club that offers discounts at many places for their members. These hotels are also fit with the Orientation Assisting Device, which will be discussed below.

The GDBA developed the Orientation Assisting Device (OAD) to remove the need for visually impaired people to remember route information while training in unfamiliar areas. This secondary mobility device provides directional and orientation information to visually impaired users. This device has been installed at six of the regional training centers, two small training centers, and two GDBA Hotels. Twenty-seven guide dog mobility instructors and four rehabilitation workers have been trained in the use and application of the system at these locations.

The Research and Grants Department distributed surveys, which were to be filled out by the visually impaired after they used the OAD, whether they used it in a hotel or at a training center. The results of the survey indicated that the visually impaired find that the OAD is easy to use, it increases their confidence, and reduces their stress levels. However, feedback was mostly from the hotels and not from the training centers. The Research and Grants Department believes that the OAD is not being utilized at the training centers due to the lack of feedback from them. Hence, the GDBA has investigated why the OAD was being under-utilized at the training centers.

The main objective of the project was to find out why the OAD was not being utilized to its fullest potential at the training facilities. One target of this study was to identify any patterns that explain the difference in usage levels of the OAD at training centers and GDBA hotels. The first objective was to determine the reason for the low usage of the OAD in training centers, as well as to formulate ways to increase usage. The second objective was to review the previous survey method and the results of the questionnaire, and from that information, create a more effective survey method if the original survey was ineffective at gathering proper data. The third objective was to

assess the integration procedure of the OAD in the organization and determine ways of promoting greater use among the trainers and the visually impaired. The fourth objective was to evaluate the technical support service for the OAD and suggest ideas for improving it if necessary. The final objective was to explain if and why clients prefer the OAD to the other similar technological innovations. With this evaluation of the OAD, other applications were suggested to promote acceptability throughout the internal organization of the GDBA as well as externally, outside of the organization.

The culmination of the proposed objectives led to improved methods for evaluating and monitoring OAD usage, improved installation procedures, a better technical support service, and suggestions to market the OAD. The improved methods for evaluating and monitoring OAD usage are important because they identified the specific reasons that the trainers were not readily accepting the device, which led to solutions in increased use of the OAD. The improved installation procedures, technical support, and internal marketing strategies were designed to target the reasons the trainers did not fully utilize the device. Finally, strategies were researched for externally marketing an innovation of a non-profit organization.

Final completion of this project yielded promising results for the GDBA and the use of the OAD. If the information and suggestions provided by the IQP group are utilized by the GDBA, the organization might be able make the most efficient and beneficial use of the OAD in the appropriate environments. This in turn will increase acceptability of the OAD, promoting greater benefits to the visually impaired in the United Kingdom, and with further expansion, possibly the world.

3.0 Background Research

This Background Research is based on material relevant to understanding the problem of the Orientation Assisting Device (OAD) identified by the Guide Dogs for the Blind Association (GDBA). The first section contains information pertaining to the communication and mobility problems of the visually impaired. The second and third sections provide information about secondary mobility devices available today, including the (OAD) that the GDBA developed. The fourth section outlines the steps involved in developing a useful survey. The fifth section includes recent material relating to organizational behavior that is typical during change. The sixth section includes information regarding non-profit organizations. The last section discusses marketing strategies. These seven sections provide background information as well as information in order to assist in solving the problem that is the focus of our Interactive Qualifying Project

3.1 Communication and Mobility Problems of the Visually Impaired

There are many problems that the visually impaired face such as difficulties communicating and moving independently. Communication problems range from not being able to read a newspaper to misunderstanding descriptions of people, places, or things. One helpful communication device is Braille, which allows blind people to read. Raised groups of marks form the Braille language and most major newspapers and publications are also published in Braille, which is a tremendous help to the blind. Although Braille is used in most schools for the visually impaired, it is not very accessible in most other areas, and Braille libraries are scarce. Since the majority of sighted people do not know Braille, communicating with visually impaired people is

reduced to the spoken word. This can also cause a communication barrier between the blind and sighted people (Fitzpatrick, 1993).

In addition to communication problems, mobility problems also affect those who are visually impaired. Travelling across the street or in busy, public areas can be an extremely stressful and intense task for the visually impaired. Hence, there have been laws passed to try to alleviate this problem including Braille on street signs, special grooves on the sidewalk, as well as the advent of guide dogs as a primary means of guidance. Although these solutions have helped, research is still being done to find more ways to help the blind travel stress-free (Blasch and Stuckey, 1995).

The surroundings of the visually impaired are not the only factors that contribute to mobility problems. Other factors such as personality and intelligence affect the orientation and mobility of the visually impaired. These factors come into play in certain situations involving amounts of stress and anxiety. A person's performance in Orientation and Mobility (O&M) training is directly related to the factors mentioned above. People who have a positive disposition and are good at formulating contingency plans perform better in O&M training. Conversely, people with negative dispositions and those lacking the ability to create alternative strategies quickly generally have a lower O&M performance. In order to predict what tasks the visually impaired will excel at, it is important to understand all of the factors involved with O&M (Haymes et al, 1996).

3.1.1 Tackling Basic Problems of Living Independently

The basic ability to be self-sufficient in the home is a big mobility problem confronting the blind. Everyday tasks, such as cooking, cleaning, maintaining finances, and record keeping also affect the visually impaired. Consequently, many household aids

have been invented to allow for the visually impaired to accomplish these tasks. Household aids for the visually impaired include cooking items as well as tools and other helpful devices or innovations. Some cooking innovations include an electromagnetic stove, a liquid-level indicator, and a one-cup beverage maker. The first innovation described heats food without flames or a heating element, as opposed to a regular gas stove, which has a flame. The liquid-level indicator hooks over the top of a cup and beeps as the liquid nears the top of the cup, thus preventing spillage. Lastly, the one-cup beverage maker heats liquids for soup, coffee, and other things. This one-cup quantity is used to prevent overfilling a cup and spilling its contents (Sardegna and Otis, 1991).

Some other innovations include a knife-slicing guide to guide the knife and prevent cuts, as well as elbow-length oven mitts (as opposed to a hand mitt) for the removal of hot plates from the oven. All of these devices help the visually impaired to cook for themselves without worrying about injury. Also the inventions prevent the user from making a mess, thus allowing them to function independently in the kitchen.

Other household items include Braille labeled clothing tags, magnetic padlocks, raised-print telephone dials, self-threading needles, and one-button automatic telephone-dialing systems. A device such as the talking book, which reads to the person, allows visually impaired people to enjoy a book without the use of Braille. There are other talking devices such as scales, watches, timers, thermometers, calculators, and a wallet which identifies bills of $1-$10 denominations. Tools such as rulers, tape measures, and yardsticks may also have raised numbers or Braille markings. There have even been inventions to help the visually impaired manage finances and stay financially independent. These are just a few of the many inventions that are available to help the

visually impaired lead as normal a lifestyle as possible. In addition to these innovations, many other advancements continue to develop in order to help the visually impaired. (Sardegna and Otis, 1991).

Many developments associated with the field of visual impairment have been made since the early 1900s. H. Hanks Levy, himself a blind man, was the first person to create a long cane system in 1872 (Blasch and Stuckey, 1995). One of the first improvements in this field was the long cane foot travel system, created by Richard E. Hoover in 1946. Blind people used canes for many years before the advent of this system, but this was the first system that was universally accepted and incorporated in all O&M programs. This system consisted of a series of sweeping arc movements made with the cane positioned low and in front of the body. A person walking with a cane using this technique would be sure to always keep the cane in front of the trailing foot. This modification from Levy's method allowed for the detection of holes and other obstructions in front of where the next foot was to be placed, reducing the chance of injury. This technique is still one of the integral components of orientation and mobility programs for the blind around the world. With the advent of the cane as a primary mobility device, people sought even better ways of aiding mobility. The guide dog soon became another primary means of mobility (Sardegna and Otis, 1991).

3.1.2 Guide Dogs and Training

The introduction of dogs as guides for the blind was one of the most significant advancements that has helped visually impaired people become more independent. Guide dogs not only help blind people become more mobile, but they also increase visually impaired people's self-confidence by reducing their stress and anxiety. Indeed, a

well-trained guide dog can instill the same confidence in a blind person as a human guide (Blasch and Stuckey, 1995).

The first guide dogs were trained in Germany after World War One to help people blinded during the war in Europe. Gradually, after receiving publicity concerning their successful use, guide dogs were introduced into the United States (GDBA, 1996). With the public recognizing the use of guide dogs as a primary mobility device for the blind, they rapidly became accepted as passengers by the railroad industry and the airline industry in the 1930s. By 1941, guide dogs were common, and were even allowed into post offices to be with blind operators of vending stands. The prominence of guide dogs led to the establishment of training centers (Blasch and Stuckey, 1995).

Guide dog training is a large responsibility for people trying to help the visually impaired. In the early stages of this program, trainers spent many hours with the dogs, which were predominantly German shepherds, only to have many of the animals prove unsuitable as guide dogs. Such reasons for the dogs proving unsuitable included personality problems, or because they were skittish. The problem was alleviated in 1956 with the volunteer "walkers" program. Volunteers would take the dogs in as puppies and walk them, in order to get the puppies accustomed to people and traffic, since traffic has been found to be the largest cause of stress and anxiety among the blind. After being "walked" for a time, the young adult dogs were sent back to the centers to be trained as guide dogs (GDBA, 1996).

German shepherds eventually became replaced by labradors, or labradors crossbred with golden retrievers. This substitution was due to the labradors' ability to learn commands easier, as well as having a more easy-going temperament around people.

It has been found that people-friendly dogs are more accepted by trainers as well as the visually impaired. Some German shepherds are still used today, as well as pure golden retrievers and border collies, but the guide dog mainly used is the labrador (GDBA, 1996).

Some aspects of guide dog training start from the very beginning, when the puppy is only six weeks old. During this first year while the puppies are being "walked", they are also taught commands such as "sit," "stay," and "down." After the walking period is completed, the dogs are then brought back to the training centers to be trained. Trainers teach the dogs certain aspects of being a guide dog such as stopping at curbs and avoiding obstacles. In order to motivate the dogs to learn these aspects, the trainers complete each session by playing a game with the dog. Once these aspects and commands have been mastered, the guide dog is ready to be paired with a visually impaired person, thus making a "unit," or the combination/system of guide dog and blind person. The blind person will go through the same training to get acquainted with the dog and learn the commands. Once the unit is comfortably working together, the guide dog and guide dog owner (GDO) will return to the GDO's residence and are left to learn the basics of the new area. Periodic checks by the trainers ensure that the guide dog and the GDO are problem free (PJ Hogan, personal communication, March 30, 1999).

While there are many innovations and techniques available to help the visually impaired become independent, without proper training, blind people are no better off than they would be without these innovations.

3.1.3 Courses on Orientation and Mobility

There are many programs in existence that deal with the orientation and mobility training of the visually impaired. The majority of these programs are found in schools for the blind. These programs are geared towards individualization of the needs and abilities of the user.

Courses in orientation and mobility usually include sensory training, concept development, motor skills, orientation to surroundings, self-protection, long-cane skills, and the use of a human guide. These courses provide means to help the visually impaired in all aspects of orientation and mobility. Sensory training is used to sharpen the remaining senses, such as hearing and smell, thus making the person more aware. In concept development, the visually impaired learn spatial relationships as well as building or city block layouts. This is important for the person to develop an idea of what surroundings they are navigating. Motor skills training involves learning proper posture and helps with total coordination. Training with respect to the orientation to surroundings involves skills such as using landmarks and shorelines (places where different surfaces meet such as a wall and the floor), as tools to help determine the person's location. Learning self-protection includes learning how to shield the body and head with the arm to avoid becoming injured. The visually impaired learn how to avoid obstacles through long-cane skills training. Knowing where to stand and how to follow a human guide is essential because human assisted guidance is the most dependent form of travel. Other courses are offered at these schools, but the courses vary with each location (Sardegna and Otis, 1991).

Guide dog training and electronic travel aids (ETAs) training (which is discussed in 3.2) are not usual courses, due to the fact that only 1% of the blind population is involved with these methods of travel. As ETAs become more advanced, more accepted, and less expensive course training will become common (Sardegna and Otis, 1991).

Visually impaired people have long argued for more training on how to use all of the equipment that is available to them. Indeed, with such an extensive number of devices in existence, blind people need the proper training to be able to utilize them. Training is especially needed for guide dogs and the new technology involved in electronic travel aids. Carl McCoy, the Director of the Division of Blind Services, stated "instead of giving us the fish, teach us how to fish" (McCoy, 1991). He argued that people need more training in the use of all the innovations and techniques to survive. If adequate training is not provided, the government will need to build many more homes to take care of older blind people (McCoy, 1991).

The GDBA hopes that the development of the Orientation Assisting Device (OAD) (described in Section 3.3) will alleviate much, if not all, of the stress and anxiety which occurs during travel. Also, they hope that the OAD will considerably help with orientation and mobility, making life easier for the blind.

3.2 Secondary Mobility Devices

In addition to understanding the problems and needs of the visually impaired, background knowledge of secondary mobility devices is essential in order to understand why the Orientation Assisting Device (OAD) is not widely accepted. The knowledge of

how other devices work, how easily they are learned and operated, and how they help a person will be useful in determining possible problems with the OAD.

Secondary mobility devices are pieces of equipment used for additional guidance of a visually impaired person. They are not designed to be the only source of navigation, and do not replace primary mobility devices such as the long cane and the guide dog. Secondary mobility devices are designed to be operated in conjunction with a primary mobility device to assist the blind in avoiding obstructions or in navigating their travel route.

3.2.1 Electronic Travel Aids

Since the 1960s, physicists and engineers have developed numerous Electronic Travel Aids (ETAs) for the visually impaired. Anthony Heyes, a Senior Research Fellow with the Blind Mobility Research Unit in Nottingham, UK, defines a travel aid as, "Any portable piece of electronics which can detect the presence of nearby obstacles and alert the user by some non-visual display" (Heyes, 1983, 70). Primary mobility devices for the visually impaired are the long cane and guide dog. Hence, ETAs are regarded as secondary mobility devices. Their purpose is not to replace the primary devices, but to provide more information for the user (Heyes, 1983).

The first ETAs were almost total failures and they often caused more difficulty in mobility. Some devices caused confusion by giving too much information and others weren't accurate and caused accidents. Leonard suggested the reason for this was that scientists had "little intuitive understanding of the needs of the blind traveler" (Heyes, 1983, 68). Primitive ETAs, such as the Laser Cane, Nottingham Obstacle Detector, and the Sonic Guide were regarded as only fairly effective secondary mobility devices

(Heyes, 1983). The Laser Cane used an infrared beam to detect objects. The Nottingham Obstacle Detector was a pulse echo digital device that represented the nearest object distance in terms of the notes of the musical scale. The Sonic Guide was an FM ultrasonic aid. Echo signals of near objects were picked up by receivers and produced audio signals for the user (Heyes, 1983). Advances in technology have led to more effective designs of secondary mobility devices than these first ETAs.

3.2.2 The Sonic Pathfinder

The Blind Mobility Research Unit developed the Sonic Pathfinder in the 1970's as an elaboration of the Nottingham Obstacle Detector. The device uses the musical scale to communicate the distance of an object in front of the user. In its early stages the Pathfinder used a pulse-echo digital device to detect the objects. Later, the Pathfinder used a microcomputer to control the pulse-echo sonar system (Heyes, 1983).

The computer, which controls the sonar system, receives a large amount of information, which is then collected by the receivers. The information is then processed by a hierarchy of decision-making algorithms. These algorithms select only the information that the user needs at that moment. An example of these algorithms is the one that prioritizes, in order, the centrality of the location of objects. Heyes explains, "an object some 2 meters away, but in the direct line of travel, would be displayed in preference to a shore line only one meter away to the side" (Heyes, 1998). The current model of the Pathfinder uses its microcomputer to convert the measured distance into seconds, which the older models did not. Heyes believes that it is important to provide information to the user only about objects that will be encountered within the next two seconds, "given the information processing demands inherent in independent blind travel

and the moment to moment problem solving nature of blind travel" (Heyes, 1998). The reason for this is if the user has too much information at once he will become confused and frustrated (Heyes, 1998).

The Sonic Pathfinder emphasizes simplicity, both in what information is provided and how it is provided. The selective algorithms keep the display information simple. The display is represented through the musical scale, which is a familiar tone that does not interfere with the environmental sounds that are around the user (Heyes, 1998).

3.2.3 The Mobility of Blind People Interacting with Computers Travel Aid

Another secondary mobility device is the Mobility of Blind People Interacting with Computers (MoBIC) Travel Aid (MoTA). This device was recently developed in 1997. The MoTA device consists of two basic components, the MoBIC Pre-Journey System (MoPS) and the MoBIC Outdoor System (MoODS). The MoPS allows a person to plan out his travel route and review maps before making the trip. This is done through special software developed for an ordinary personal computer equipped with special devices to aid the blind. The software contains a database of map information from public sources such as street names, building numbers, crosswalks, and landmarks. Personal information can be added to the database such as system preferences and personal addresses. There is also information about streets that would warn the pedestrian about parking meters, traffic signs, trees, and other possible obstructions. Also, there is information about specific surfaces telling the person where there is pavement, cobblestone, and grass (Petrie et al, 1997).

After planning the trip with MoPS, the user of the MoTA then utilizes the MoODS to actually make the trip. The MoODS uses Global Positioning System (GPS)

satellites and geographical information systems (GIS) to help the person guide himself toward his destination. The GIS provides access to map information from a computer and the GPS gives latitude and longitude coordinates of exactly where the traveler is on the earth's surface. The MoBIC unit contains a GPS receiver, a Trip Management System, an interactive keypad, and an earphone. The Trip Management System uses the GPS and the user specified information from the GIS to decide where the traveler must go. The unit then verbally instructs the person where to go through the earphone. The keypad has buttons that are designated for specific questions like "Where am I?" and "Where should I go from here?" (Petrie et al, 1997).

The MoBIC system is designed to help with the traveler's journey, thus guiding them from point A to point B. The MoTA is a "new type of aid designed to help the blind and partially sighted people with the problems of macro-navigation" (Petrie et al, 1997, 66). Macro-navigation is defined as moving from the starting point to the end point and successfully completing the trip. This device will not be able to pick up such obstacles as fire hydrants, light poles, or garbage cans, but that is what primary mobility devices, such as a long cane or a guide dog, are designed to do. The use of a primary mobility device is essential for a safe and successful completion of a journey with the MoBIC system (Petrie et al, 1997).

3.2.4 Talking Signs and Verbal Landmark

Another type of secondary mobility device is one that does not detect the surroundings of a person, but receives information from surrounding transmitters and gives directions to a desired location. The Talking Sign (TS), and the Verbal Landmark (VL) were tested at the Convention of the American Council for the Blind (ACB) in San

Francisco in 1993. Transmitters installed throughout a building or travel route send directional information to a small receiver carried by the visually impaired person, which aids the user in finding his destination throughout his journey (Bentzen and Mitchell, 1995).

The way that these two devices operate is similar, yet the two mechanisms yield quite different results in terms of satisfaction among users (Bentzen, Mitchell, 1995). The VL device is a small radio receiver that can be clipped to a belt or pocket. It receives radio waves from its transmitters and the receiver plays an audio message giving directions and location information. When the users walk within five feet of a transmitter, an audio message is received, giving them directions to various locations. The TS device is a small hand held device that uses an infrared laser beam in its receiver. When the beam is flashed at a TS transmitter up to 60 feet away, a message will be heard from the speaker, thus giving directional information.

The two devices, though built on the same principle, gave very different directional information to the user and resulted in distinct preferences from the trial users. The TS device was the more popular choice in the test and resulted in higher accuracy in execution of the travel routes, quicker travel times, and the users were less likely to get frustrated or need assistance from sighted people. Some reasons for this were short and simple messages, and by simply scanning their hand around for the sign, they could easily get their orientation. The TS also gave messages saying that the user was moving towards the sign. In contrast, the VL device gave longer messages and more options, leaving the user with more mental work to decide where he wanted to travel. Since he had to be within five feet of a transmitter to hear a message, he had trouble recovering if

he got lost. Indeed, users did not have the ability to scan for a sign like the TS users did (Bentzen and Mitchell, 1995).

Talking Sign users were able to complete their courses in 45% to 70% of the time it took VL users to complete their courses. Talking Sign was generally rated higher than VL when it came to ease of use, ease of comprehension of the messages, and the user's desire to use the device in both familiar and unfamiliar areas. One other important note was that using TS increased the speed and ease of travel whereas VL lowered the speed and ease of travel relative to travel without audio signage (Bentzen, Mitchell, 1995). Through these results, Bentzen and Mitchell (1995) believe that there is a "clear performance advantage for TS" (Bentzen, Mitchell, 1995p.505).

Both devices are easily learned, can service multiple users, and take just a few minutes of instruction. Therefore, more individual use by a traveler will increase the reliability and ease of usage of the devices. The most limiting problem with these devices is that, in order for them to work, they must be used in an area where the service is installed. As of 1995, there were only three buildings that had accommodations for either of these two devices: two in San Francisco and one in New York (Bentzen and Mitchell, 1995).

The VL and TS devices can be compared with each other but it is difficult to compare them with secondary mobility devices such as the Sonic Pathfinder, the Laser Cane, the Nottingham Obstacle Detector, and the Sonic Guide, which are known as micro-navigational travel aids (Petrie et al, 1997). The micro-navigational travel aids help a person to avoid obstructions in their immediate path. However, Blasch (1989), and Foulke (1981) said, they "have not had a major impact on the independent mobility of

blind travelers," as the visually impaired already have a source of micro-navigation from their primary mobility device. Since it is difficult for a person to navigate a travel route by just knowing what lies in their path, planning a trip and receiving instructions on where to go or the user's location can greatly increase the ability of a visually impaired person to make a long journey alone. This would mean that the MoBIC device is an example of such a macro-navigational secondary mobility device. The TS and VL devices would also be considered macro-navigational, as they do not tell a visually impaired person about obstructions in their paths, but instead guide a person along and give them instructions that can help them reach their destination (Bentzen and Mitchell, 1995).

3.2.5 RNIB REACT Device and Pathfinder System

There are two other secondary mobility devices being tested that are similar to the Verbal Landmark but offer some micro-navigational features. The REACT device and Pathfinder System are being tested in public transport facilities to determine the systems' ability to help the visually impaired navigate the public transportation system. The REACT device and the Pathfinder System are two new secondary mobility devices which are not clearly macro or micro-navigational. They are hybrids that aid the visually impaired in navigating a journey as well as avoiding possible obstacles. (RNIB, 1998).

The REACT device and Pathfinder System are similar to the Talking Sign and Verbal Landmark, in that they use a trail of broadcasting transmitters called beacons to tell the user where to go. The purpose of the directional instructions is specifically designed to help the visually impaired person locate a transport by guiding them to a bus stop, train station, or ticket office. They also give information about transport facilities

and provide talking bus stops and train or bus schedules. In addition, they also inform the user about objects in the environment, their location, and the direction the user should take next. These devices are mainly macro-navigational, however, the REACT device and Pathfinder System also give information about permanent obstacles that may be impeding the user's path, such as lamp posts, fences, or trees (RNIB, 1998).

The REACT device beacons are used like a public announcement system. They have loudspeakers that give information to anyone within listening distance. Anytime a beacon is triggered, messages are given that enable the user to find or avoid obstacles or hear information about objects in the environment. The beacon announcements can also be heard by the general public, which some visually impaired users prefer, because nobody can tell who triggered the beacon.

The Pathfinder System transmits audible information via an infrared wave to the visually impaired user's receiver which a cigarette packet-sized device with a speaker and optional earpiece. The receiver receives information from the beacon and instructs the user where to go or lists various options depending on the destination. The RNIB believes that the Pathfinder system has an advantage over the REACT device in that the user receives information personally through the speaker or earpiece.

3.3 Orientation Assisting Device

A secondary mobility device similar to the Pathfinder System and Verbal Landmark is the Orientation Assisting Device (OAD) developed by the Guide Dogs for the Blind Association (GDBA). The OAD is used along with a long cane, guide dog, or by a person with limited residual vision. The OAD was originally created to be an assistant in training with a guide dog in an unfamiliar area, although it also can be used

for establishing routes for people upon returning to the home environment (GDBA, 1998). The OAD through trials conducted by the GDBA, has resulted in "increased confidence and reduced stress among students using the system" (quoted from the GDBA Explorer Newsletter 1997, p.3).

The Orientation Assisting Device is a device that plays back an audible message at important points during a journey, providing all necessary directions, and thus allowing the person to relax and concentrate on learning to work with the guide dog. The OAD consists of three components: the receiver, the beacons, and the PC Recorder. The receiver is a small radio unit that the person carries. The pocket-sized device has two antennas, a loud speaker in the device itself, a remote speaker which can be attached to a shirt collar or lapel, two buttons, and a memory card slot. The person's rehabilitation worker or mobility instructor uses a software package on a standard PC equipped with a standard memory card drive to set up the travel route of the visually impaired person. The information is transferred to a memory card which is placed into the receiver and gives the user instructions during his journey (GDBA, 1998).

The beacons are another part of the OAD that provide the receiver with information. They are small radio transmitters (waterproof and vandal proof) that are placed along the travel route, generally high up on light posts. Furthermore, they are battery powered and the batteries have a life of approximately one year. The beacons do not contain information themselves, but simply trigger the receiver to give a message specified in the memory card. In order for the OAD system to be fully functional, all three components are required to be available and working. Currently, the GDBA has installed OAD beacons at the GDBA centers in Exeter, Leamington, Middelsbrough,

Forfar, Bolton, and Redbridge, the small centers in Southampton and Liverpool, and at the Cliffden and Windermere Hotels. It is expected that all GDBA-run facilities, including hotels and training centers, will have the OAD system installed by the end of 1999 (GDBA, 1998). With this expectation, the GDBA has run into a serious problem. It is assumed by regional controllers and staff at the Head office in Reading that the trainers are not accepting the OAD system for unknown reasons, and, therefore, it is not used effectively in the training centers. The GDBA hopes to have organization-wide use of the OAD by the end of 1999, but the regional controllers and staff at the head office presume that the trainers are hindering this goal. It is necessary to explore survey methods, in order to effectively discover the underlying reason why the trainers are resisting the device.

3.4 Survey Methods

The GDBA currently believes that the trainers are under-utilizing the OAD, a device that is well received by the visually impaired. This information was gathered through a questionnaire that the Research and Grants division of GDBA sent out to users of the OAD at both the training sites and the hotels where the device had been installed. Dillman and Salant (1994) describe surveying as an extensive process which includes choosing the type of survey, being cognizant of the errors that affect survey accuracy, and deciding who the target population is. Also, understanding exactly what information is needed from the population and designing the questions appropriately to eliminate bias and vagueness are important topics to consider.

In order to engage in a detailed discussion, some terms related to surveying must be defined. The people surveyed are referred to as respondents, the population pertains to

the group of people that the researchers need to survey, and a sample is a subset of the population that is surveyed (Dillman and Salant, 1994).

3.4.1 Types of Surveys

According to Dillman and Salant (1994) there are three types of surveys. The first type is a needs assessment survey, which is used to obtain the public's opinion about community problems and their ideas for solutions. A marketing survey is used to measure the nature and level of demand for particular products or services. The third type is an evaluation survey, which is used to determine the impact of public or private programs and policies. The researchers must be aware of the four types of errors inherent in surveying, after the type of survey is decided on (Dillman and Salant, 1994).

3.4.2 Four Types of Errors that Affect Accuracy

Dillman and Salant (1994) discuss four major types of errors that affect the accuracy of the survey. These errors include coverage, sampling, measurement, and nonresponse errors. Coverage error occurs when members of the population that the researcher surveys do not have equal chances of being selected for the sample. An example of coverage error is the use of a telephone directory to get a sample of names and addresses for a mail survey. The telephone directory is not an accurate document to randomly sample from because many residents do not have their phone number listed in the phone book or a family may be listed under one first name. Another type of error is sampling error, which usually occurs when the sample is too small to correctly indicate the general opinions or views of the population. In order to avoid sampling error, Appendix C1 (Dillman and Salant, 1994, p. 55) shows sample sizes needed for different population sizes in order to maintain a certain percent of permissible error. Yet another

type of error is measurement error. This kind of error occurs when the respondent's answer is not accurate or precise, or cannot be compared in a useful way to other respondents' answers. For example, open-ended questions may produce measurement error because the vast range of answers cannot be compared in a useful way. The last type of error is nonresponse error, which occurs when many people do not respond to the survey. Many mail surveys can be subject to nonresponse error because respondents will not fill out the survey and return it to the researchers. All four of these errors must be kept in mind when designing a survey. In addition to these errors, deciding what information you need is extremely important (Dillman and Salant, 1994).

3.4.3 Identifying the Purpose of the Survey

"Making sure the survey will provide useful information means raising two specific questions: What *problem* are you trying to solve? And what new information do you need to solve it?" (Dillman and Salant, 1994, p25). The problem needed to be solved is the one at the core of the need for the survey. The purpose of the survey is to get new information about the problem. It is very important to be precise about the information that is needed. In order to obtain the necessary information, the questions that are asked of the respondent should not be vague, biased, or critical. If the questions are vague, the objectives are vague and better definition is needed. Bias occurs if the researcher has preconceived ideas about what the survey should show.

> People (researchers) who already know the answer to their questions almost always make mistakes that lead to biased results. They write leading questions pick respondents who are sympathetic to their position, and ignore results with which they disagree" (Dillman and Salant, 1994, p. 26).

Uncritical questions gather useless information and are a waste of time for both the surveyor and the respondent. The surveyor must keep in mind that the purpose of the survey is to gather information that leads to new insights and solutions to the problem. Another way to make sure that the information to be gathered is useful, is to use a focus group (Dillman and Salant, 1994).

3.4.4 Focus Groups

The focus group is a small group of the population that participates in a discussion about the problem in order to stimulate interest about the specific topic. Their responses are not to be used to solve the problem; instead they provide information regarding the best way to go about gathering the information and what questions to ask. In order to obtain the most useful and accurate survey questions and methods a focus group is used to pre-test the survey method and the questions. One benefit of focus groups is that they provide insight from a very small portion of the population. Another benefit is that the focus group can also encourage people to support the study through open discussion (Dillman and Salant, 1994).

3.4.5 Survey Methods

After the problem is defined and the information needed is identified, the next step is to choose a survey method. Dillman and Salant (1994) describe three types of survey methods; mail surveys, email surveys, telephone interviews, and face-to-face interviews. Each method has both advantages and disadvantages including varying sensitivity to the four different kind of errors. Before deciding what method to use, it is important to identify what resources are available for the research. The resources include how many people are available to work on the survey, whether they are paid or volunteer,

how much time is allocated to produce results, whether someone with survey experience can help and for what price, what facilities are available, with respect to telephones and computers, and finally how much can be spent on the study. After these factors are considered and decided, it is necessary to choose the method (Dillman and Salant, 1994).

3.4.5.1 Mail Surveys

Mail surveys are the most common form of surveying. The greatest strength of mail surveys is that they demand the least amount of resources. No interviewers are required and only clerical skills are needed to file and sort the collected information. Primary tasks include designing the interview, mailing the questionnaires, crossing names off the mailing list, and processing the incoming surveys. Mail surveys provide privacy to the respondent, who can complete it at his or her convenience and privacy. They are less sensitive to biases that may come from an interviewer. The two biggest problems of mail surveys are that this type of survey is very sensitive to noncoverage and nonresponse errors. The example above illustrates that the lists that mail surveys often sample from eliminate possible respondents thereby rendering the survey inaccurate. In the case of telephone directories, people who do not have a phone or whose number is unlisted are excluded. Another downfall of the mail survey is that some people cannot read the survey and cannot respond, and many people simply do not reply, both issues cause nonresponse error. Another problem of mail surveys is that researchers have little control as to how the respondents interpret the questions or who actually fills them out. For instance, it could be that a survey is intended for the owner of a business, but instead the secretary fills it out. Respondents also may not reply to all of the questions and cause item nonresponse. Surveys are best where a reliable address list is available, an immediate turnaround is not

necessary, and where money, staff, and professional help are limited (Dillman and Salant, 1994).

3.4.5.2 Telephone Surveys

Telephone surveys are another method. Their greatest strength is the rapid turnaround of results. As compared to mail surveys, interviewers have more control. They can encourage the respondent to answer all of the questions and make sure the respondent is interpreting the question correctly. The costs incurred with telephone interviews are higher than mail surveys because of long-distance charges (if necessary) and labor charges, but they are certainly less expensive than face-to-face interviews as far as time efficiency is concerned. Errors may result from telephone interviewing because not everyone has telephones and telephone directories are incomplete. A knowledgeable supervisor is required to answer questions from the interviewers about different situations surrounding the interviews. Telephone interviews are also subject to measurement error. The respondents have to understand what the interviewer is communicating vocally and they can easily be influenced by a leading question the interviewer may ask. Telephone interviews are most appropriate when most of the population have telephones, questions are straightforward, experienced help is at hand, and a quick turnaround is necessary (Dillman and Salant, 1994).

3.4.5.3 Face-to-Face Interviews

The third method of surveying is the face-to-face interview, which is the best in regards to error. This method avoids the problem of finding a complete list of the targeted population, but it may incur the highest costs of the three methods because of the labor costs and the amount of effort and time that goes into personally interviewing

respondents. Although the costs are high, sometimes a face-to-face interview is the only logical choice. For example, a list of addresses may be impossible to retrieve or the people to be surveyed have low-wage jobs and do not have telephones. Another time consuming aspect of face-to-face interviewing is that the interviewers must be trained in the problem of the research and must know what data must be collected to aid the study. A supervisor is also necessary for face-to-face interviews. Temptations to cut costs have many errors associated with them. For example, decreasing the sample size to save time and money will lead to sampling error. Measurement error may result if the interviewers are unskilled and do not know how to avoid biased questions. Despite the associated disadvantages, face-to-face interviews have many strengths. The interviewer can explain the importance of the study and assure the respondent of confidentiality, therefore, increasing the possibility of participation in the survey and decreasing nonresponse error. Face-to-face surveys are best for studies where there are no lists for the population to be surveyed, when respondents cannot be reached by telephone, when people are not likely to respond to mail surveys, the questions are complex, and finally when the project has a wealth of resources and money to fund the study (Dillman and Salant, 1994).

Until the 1970's, the face-to-face survey was the only survey regarded as scientific. There have been many developments that have led to advancements in mail and telephone surveys. High labor costs have also caused an increase in use and dependence on the other two methods. All have benefits and handicaps. To find the suitable method, one must weigh what is needed with what the survey can offer, taking into account the downfalls of the survey method and how much the survey could be affected by them (Dillman and Salant, 1994).

3.4.6 Importance of Sample Size

Aside from the survey method, Dillman and Salant (1994) regard the sample size as an important aspect of the survey. If there is not an adequate number of responses, the survey results may not be representative of the population from which the sample was drawn. Sample size depends on three aspects; how much sampling error can be tolerated, the size of the population, and how varied the characteristics of interest are in the population (Dillman and Salant, 1994). Refer to Appendix C1, as mentioned before, to determine appropriate sample size.

3.4.7 Question Design

Good questions are "questions that respondents can understand and answer objectively" (Dillman and Salant, 1994, p. 77). The first step in creating a good question is to identify what kind of information is needed. There are two types of information; one type includes respondent behavior or attributes, the other includes the respondents attitudes or beliefs. It is easy to mistakenly ask for one type of information when another type is really desired. Determining what kind of information is needed will lead to better questions.

The next step to develop good questions is to determine what kind of structure is most beneficial to obtain the data needed, see Appendix C2 (Dillman and Salant, 1994, p.86) for examples of the different types of questions. The opened-ended question takes the least time to write, but has many drawbacks. One difficulty is that the question is very demanding for the respondent (see 3.4.8 The Social Exchange Theory). Another problem is that open-ended questions produce a plethora of different answers, which rarely leads to focused measurements. It requires an enormous amount of time to enter into the

computer. If the researchers have little knowledge of the topic, open-ended questions are a good approach to avoid the need to specify answer choices. Open-ended questions are also beneficial at the end of a survey to see if anything has been overlooked. The close-ended with order choices question is beneficial, because it is very easy for the respondent, since all they have to do is find the most appropriate answer. These questions are very specific and they may be beneficial or detrimental to implement depending on the context of the research study. Close-ended questions with response choices listed in a random order are harder than close-ended with ordered responses because the respondent has to process information discretely, instead of continuously as is done in ordered response questions. Partially close-ended questions give the respondent the choice to pick from the answers provided or add in their own individual answer. Choosing a type of question structure for the survey is important. The researcher should weigh the advantages and disadvantages of all question structures and keep in mind the knowledge that the research team has about the study (Dillman and Salant, 1994).

After the structure of questions is chosen and the questions are developed, it is important to review the order of the questions.

> In a mail survey, respondents may read only the first few choices ... in a telephone or face-to-face survey, interviewers are likely to read the last few choices before respondents have committed the first few to memory (Dillman and Salant, 1994, p. 85).

The order of questions will affect measurement error, so lists of answer choices should be kept short. If the information is about abstract issues, a series of questions should be used rather than just a single question (Dillman and Salant, 1994).

Dillman and Salant (1994) believe it can be very hard to obtain good results if the study requires a survey in which the respondents' attitudes and beliefs are measured.

Conversely, obtaining data about respondents' behavior and attributes can be straightforward. For example, asking their age, sex, or race is simple. If they are asked the same question tomorrow, they are very likely to give the same answer. However, respondents' answers about their attitudes and beliefs may vary from day to day. This must be kept in mind when surveying (Dillman and Salant, 1994).

The final stage in writing a good survey question is to focus on the wording of the question. Dillman and Salant suggest, "be specific, use simple words, don't be vague, keep it short, don't talk down to respondents, and don't be too specific" (Dillman and Salant, 1994, p. 91). It is also important to word the questions so that they are not suggestive or persuasive to the respondent, in other words so the question does not sway the answer of the respondent (Dillman and Salant, 1994).

3.4.8 The Social Exchange Theory

Aside from the actual questions, the way in which the interviewer presents the survey to the respondent is extremely important because respondents make a mental cost-benefit calculation when they are asked to participate in a survey or interview. This calculation is known as the Social Exchange Theory (SXT). In this calculation, the respondents ask themselves who wants to know, why should I care, why am I chosen, and is this confidential? If these questions are not answered in the beginning of the survey process, non-response is likely. In order to keep the respondent involved in the survey, the interviewer must ensure that the previous questions are answered. Hence, it is important for the interviewers to introduce themselves, tell the potential respondent who they are doing research for and why they are doing it, explain to the respondent how they were chosen for the survey, and that the information they provide will be kept

confidential. The respondent will be less likely to respond accurately, truthfully, or completely if they are unaware of what will be done with their responses or who will see them (Dillman, 1978). In order to prevent a respondent from responding ineffectively, the interviewer must be sure to explain the benefits to the respondent to ensure that the benefits outweigh the costs. For instance, if students are conducting random surveys in a subway station, they should express to their respondents that the survey will only take a few moments and it will be very helpful to a specific cause. For the majority of people in a subway station, the cost of a random survey is time and, by ensuring a brief survey, the cost is decreased. If the potential respondent cares about the specific cause, the emotional involvement they feel will outweigh the cost of taking time to fill out the survey (Dillman, 1978).

Another major cost that may affect the reliability of a respondent's answer is the fear of embarrassment or reprisal from an authoritative figure or peer. This cost can be classified as risk. The risk of disclosing information must also be outweighed by costs. If respondents fear that this information they discuss can be used against them, they will be likely to avoid sensitive topics by declining to answer them, or lying. For example, employees may be afraid their boss might find out about their remarks and they may lose their job as a result. Thus, the respondents may answer vaguely, decline to answer, or say things that aren't true to their feelings so they are not at risk of reprisal. One way to avoid this situation is to make sure that, again, the respondent understands that their responses will be kept confidential and to assume that confidentiality will be maintained.

3.4.9 Finalizing the Survey

After the questions are written and the Social Exchange Theory is incorporated, the whole survey must be arranged. For a mail survey, respondents should be told in a cover letter what the study is and why they should participate in a short simple format. The cover design should emanate the survey's theme and attract interest. Questions that are interesting and relate to the topic should be at the beginning of the survey. Pertinent questions that may be offensive should be placed at the end so as to not deter the person from filling out the survey. Dillman and Salant (1994) also suggest grouping the questions about the same subject together, in order to make the cognitive processes of the respondent simple. The first question is always the one that people criticize the most. This question should be simple and should not ask something embarrassing or personal about the respondent. Dillman and Salant do not recommend using an open-ended question first. Page design is also important in mail surveys. Like the questions, the pages should be formatted consistently and kept simple. "Remember that white space is a virtue" (Dillman and Salant, 1994, p. 120). Telephone surveys follow some of the same guidelines, although some different aspects must be considered.

"Telephone questionnaires...must sound rather than look professional" (Dillman and Salant, 1994, p. 121). Questions should be short and simple. If there are too many choices or the question is long, the respondent is not likely to give accurate data because too much cognitive processing is required. The interviewer should give an introduction containing their name, the organization and city they are calling form, a sentence describing the survey, and an estimate of how long the survey will take. The order of the questions in a telephone survey is basically the same as a mail survey. The first question

should be close-ended with no more than two or three choices to pick. The second or third question should be open-ended so that respondents set their own pace of the survey and feels more comfortable sharing their views. The same guidelines apply to face-to-face interviews (Dillman and Salant, 1994).

Although face-to-face interviews are much like telephone interviews, there are some advantages that the interviewer can use. Visual aids such as flashcards for different categories can be used. Complex questions can also be used because they are easier to follow in person than over the phone (Dillman and Salant, 1994).

Now that the process of surveying has been covered, it is also important to explore the area of organizational behavior specific to change.

3.5 Resistance to Change

Change is resisted once it threatens the basic human needs of security, social interaction, status, or self-esteem (Davis and Newstrom, 1989). This resistance is an inevitable response to change, since "People naturally rush to defend the status quo if they feel (that) their security or status are threatened" (Maurer, 1996). Resistance of individuals may lead to the chain-reaction effect. The chain-reaction effect is a situation where, "a change that directly affects only one or a few persons may lead to a reaction from many people...because of their mutual interest in it" (Davis and Newstrom, 1989, p. 90). The resistance of a few individuals spreads throughout the group and the resistance is characteristic of the group as a whole.

According to Flaum (1997), resistance to change "consists of the three C's: complacency, convention, and comfort. They add up to the fourth 'C,' no customers" (Flaum, 1997). Questions such as "Why are workers rejecting technology that may make

their jobs easier?" (Greengard, 1998). Workers need incentives for learning to change and change is not easy. Therefore, people naturally have an innate resistance to change (Greengard, 1998). This could explain the problem the GDBA had with its trainers, since feedback indicates that the majority of visually impaired users like the OAD. The results also leaned towards the trainers not liking the product, or even refusing to use the product (GDBA, 1996). This resistance to change needs to be dealt with, and ways or incentives need to be determined to ensure the complete integration and acceptance of the OAD.

3.5.1 Group Response to Change

Davis and Newstrom (1989) believe that groups instinctually try to maintain an established equilibrium. When this equilibrium is altered by outside forces, such as a manager or management department, the group develops responses in order to return to their previous ways. This self-correcting characteristic is referred to as homeostasis. Homeostasis is the characteristic in which the group tries, "to establish a steady state of need fulfillment and to protect themselves from disturbance of that balance" (Davis and Newstrom, 1989, p. 287). This characteristic leads to resistance, which increases if the change does not fit the values of the group (Davis and Newstrom, 1989).

3.5.2 The Innovation-Values Fit

According to Klein and Sorra (1996), a group's commitment to the use of an innovation is a function of the perceived fit of the innovation to the group's values. The members of an organization share values because of their common experiences, but the values of different groups in the same organization may differ. Functional and hierarchical groups such as, managers and supervisors are more likely to have contrasting values than the other groups in the organization. The reason that their values may differ is

a function of the different characteristics in every group, including the variant roles, interactions, experiences, backgrounds, and character traits. An excellent fit between a new innovation and the values of the managers may exist, but this fit may be poor in other sectors of the organization. This fit describes the degree to which the users perceive the innovation will aid in the fulfillment of their values (Klein and Sorra, 1996).

3.5.3 Resistance in the Non-Profit Sector

The innovation-values fit dilemma can be applied to all organizations, but non-profit organizations like the Guide Dogs for the Blind Association experience resistance in a different manner. Dartington (1998) links resistance in non-profit organizations to the primary task of the non-profit organization and the psychological ownership that the workers possess. The primary task of any organization is the task it has to perform in order to survive. Dartington (1998) defines psychological ownership as, "when people have the perception of something as theirs, even when they do not have the formal authority." In order to understand how resistance is linked to both primary task and psychological ownership, it is important to recognize that any organization is developed through the realization of an idea or need. Someone realized a need and developed the organization in order to do something to address that need. Dartington (1998) explains that the difference between non-profit and public or private organizations lies in the original idea of the organization. Non-profit organizations give greater legitimization to the original idea than private or public businesses, which may overlook the original idea if a better opportunity arises. In non-profit organizations, the primary task stays closely connected to the original idea. If the primary task seems to shift or its definition becomes unclear, resistance will occur. Resistance will also occur because of the psychological

ownership the workers uphold. The volunteers of a charity do not own the organization, as opposed to employees of a public or private business who may be stockholders in the business. Therefore, there is a clash between the psychological ownership that the volunteers feel toward their work and the lack of real ownership or control that they actually have over the organization. Dartington (1998) provides an example of the psychological ownership that triggers resistance. He explains that *some* citizens of a town feel much psychological ownership of the town and its organizations, such as the church and school. If the local church started charging an entrance fee, the citizens would band together as a homeostatic group and do something to return to equilibrium. Both primary task and psychological ownership contribute to the resistance of change in non-profit organizations. Resistance, whether in non-profit, public, or private sectors of business, creates both tangible and intangible costs (Darington, 1998).

3.5.4 Costs and Benefits of Change

Costs are likely to occur during change, according to Davis and Newstrom (1989). These costs are economical as well as psychological. A simple example of an economic cost associated with change may be new equipment that must be purchased. Psychological costs include decreasing productivity that results from the stress of the employees. Most changes involve psychological costs because there is strain and stress that people feel as they try to adapt. Both economic and psychological costs must be paid in order to experience the benefits of the change (Davis and Newstrom, 1989).

Change is not always desired depending on the extent of these costs. "The organizational goal always is (to keep) benefits greater than costs" (Davis and Newstrom, 1989, p. 287). A detailed cost-benefit analysis is required to determine whether the

benefits outweigh the costs. There is no reason for the change if the total cost is greater than all of the benefits (Davis and Newstrom, 1989).

3.5.5 Benefits of Resistance

Although resistance is not desired during change, there can be some benefits to resistance (Davis and Newstrom, 1989). If the employees resist, management may be encouraged to further inspect the proposed changes, thus discouraging management from making poor decisions regarding change. If resistance indicates the specific areas where change causes difficulties, management may be able to take action before problems occur. Employees' resistance is described, "as a check and balance to ensure that management properly plans and implements change" (Davis and Newstrom, 1989, p. 292). Usually these benefits of resistance do not motivate management to welcome resistance, therefore the knowledge of how to implement change effectively is vital in order to reduce resistance.

3.5.6 Implementing Change Effectively

Management is often called a change agent because its role is to implement change and help make it work, but it is the employees who control the final success of the change. According to Davis and Newstrom (1989) there are three stages of implementing a change. The first stage is the unfreezing stage, during which the manager focuses on loosening the attitudes of the employees' so that they may be more open-minded to the idea of change. The second stage is the transition stage or changing, where the change is gradually implemented. This stage is the time of most confusion and despair. The final stage is the re-freezing stage. In this stage, the new improvements are reinforced through policy changes. There are also 13 principles that are to be focused on at different times

during the three-stage process. See Appendix D1 (Iskat and Liebowitz, 1996) for an outline of this three-stage process, including the 13 principles. In order to implement change effectively, it is important to know what techniques are useful, but it is just as helpful to know what strategies are not useful.

Many organizational researchers such as Mariotti, 1996, and Maurer, 1996, believe that some tactics are *not* useful in managing change. These tactics include using power and force (which only increases resistance), getting rid of those who disagree, applying the force of reason, and ignoring the resistance. All of these approaches "assume that your way is the right way, and that others must be persuaded or forced to go along" (Maurer, 1996). In order to effectively implement change, the three-step method must be applied. The tactics previously mentioned should be avoided as well. Also, it should be kept in mind that the learning curve for change will hinder a smooth transition.

3.5.7 Learning Curve for Change

This curve as described by Davis and Newstrom (1989) shows the effectiveness of the employees over a period of time before and after the change is implemented. It illustrates that there is a decrease in the effectiveness immediately following the change. This occurs because employees need time to understand and adapt to the change. They have to lose old habits (unfreeze) and learn new ones (refreeze). Communication patterns are disrupted and procedures are changed. Conflicts may develop because of these changes, problems arise, and it takes time to resolve them. "Things are likely to get worse before they get better" (Davis and Newstrom, 1989, 296). See Appendix D2 (Davis and Newstrom, 1989, p.296) for an illustration of this curve. The cooperation of

the employees is vital to the success of the change, therefore building support for the change is important.

3.5.8 Building Support for Change

In order to reduce resistance to change, management must help employees see the need for change, let them participate in the change, and gain from it. If change is not handled properly, it exposes itself in slowdowns (Davis and Newstrom, 1989). Davis and Newstrom outline some activities that help to build support from employees (1989, p. 297). See Appendix D3 for these activities.

3.6 Nonprofit Organizations

Understanding what the Guide Dogs for the Blind Association can do financially is an important topic to the project. Since the GDBA is a charity, this would encompass understanding the basis of a nonprofit organization, or "charity," as it is called in the United Kingdom. A nonprofit organization is an organization that does "not primarily exist to generate profits for (its) owners" (Salamon, 1992, p.5). There are several different types of nonprofit organizations, including ones in the charitable sector, the independent sector, voluntary sector, tax-exempt sector, and the private nonprofit sector. The charitable sector is the most common sector associated with the term nonprofit because it is a very broad category and there are a large number of popular charitable organizations in operation (Hopkins, 1993).

The GDBA is considered to be in the charitable sector, as they promote the advancement of the visually impaired and strive to make them more independent. There are many types of charities, including those that focus on the relief of poverty, the advancement of education, and the advancement of science. Also considered to be

charitable organizations are those that promote health, medicine, environmental conservation, and social welfare (Hopkins, 1993). The GDBA's effort to ease the difficulties of navigation for the blind is a combination of medical advancement and the promotion of social welfare, therefore they are a charity.

Maintaining a charitable organization requires some financial income, and many organizations gain that money solely from private donations and fundraisers. Nonprofit organizations are allowed to generate profits in a given year, but must use the money for the purposes of the organization (Salamon, 1992). An example is the Girl Scouts of America, who annually sells cookies to help fund their activities of social welfare among young girls (Hopkins, 1993).

The GDBA currently has a trading company to handle all the financial aspects selling items to the public and earning a profit. However, this trading company is not needed when dealing with any item for sale that benefits a population with a disability. Anything dealing with the above-mentioned group of people falls under a zero tax exemption, in other words Value Added Tax (VAT) will not be placed on the device. So if the OAD was to be sold to an outside corporation, such as a shopping center or railway station, the receiver and beacon would not need to go through the Trade Company. The only part of the OAD system that would be charged VAT and hence need to go through the trade company would be the personal computer that is used in conjunction with the system. The GDBA could make a profit on the personal computer portion and this profit could then be re-circulated throughout the organization and put back into paying for cost of producing the OAD for their centers. So in theory, the GDBA could supply OADs

externally at no cost to the organization whatsoever (Janet Marshall, personal communication, March 29, 1999).

3.7 Marketing

Since it is assumed that some of the trainers do not accept the OAD, management must develop an internal marketing plan to "sell" the innovation to the trainers. After the device is sold internally, the GDBA can explore ways to market this device within the public realm (subject to prevailing laws). Marketing involves research of the potential consumers, the development of creating a need in the minds of the consumer, as well as developing ways to reach the consumer. Marketing research is defined as "procedures and techniques involved in the design, data collection, analysis, and presentation of information used in making marketing decisions" (Stevens et al, 1997, p.2). In order to keep up with the ever-changing market, strategic marketing research must be employed. Strategic marketing research is very important in reducing error in management decisions, helping to create a better overall marketing scheme (Stevens et al, 1997).

Stevens says that the main component of market research is decision-making. Four steps in decision-making are outlined in Appendix E (Stevens et al, 1997, p.3). These steps can be used for both external as well as internal marketing situations. Good decision making can lead to excellent acceptance of the product, as well as promote high sales. Therefore, good decision-making is based on in depth market research and correct analysis of that research. But, decision-making is not a straightforward process. A simple straightforward situation involving alternative A making $100 and alternative B making $500, creates a basic decision-making problem. However, business decisions must be made under conditions of uncertainty. Current market research can reduce the

uncertainty in decision making and help to determine if alternative A will do better than alternative B. Good decision-making can produce much profit and produce a feeling of accomplishment throughout the organization. Poor decision making can result in poor sales of product and produce a feeling of hostility toward the product by the consumer (Stevens et al, 1997).

In a consumer-oriented market, an organization needs to ask itself four questions, also known as the 4Ps. The 4Ps are Product, Place, Price, and Promotion. What product is currently in use, where is that product bought, how much is the consumer paying for that product, and what advertising ways are appealing right now make up the 4Ps. A company's ability to answer the 4Ps will determine the successfulness of its product (Blythe, 1997).

Marketing strategies are dependent on the product, the domain in which the product will be sold, consumer interest, and consumer need. Without the consumer, marketing would not exist. Persons involved in marketing have the task of determining if they can create demand among consumers and utilize the correct promotional resources in order to guarantee sales. This task is important because there are no guarantees in marketing and people's attitudes and opinions can change at any time. Therefore, it is important not to become complacent with a marketing scheme. Hence, market research should be conducted at all times, not just when a new product is being integrated, or when a product's sales are declining. Market research can potentially help a product sell well and maintain that level of sales if the research and decision making are done correctly (Blythe, 1997).

In order to successfully market the OAD, the GDBA needs to answer the four questions stated above (4Ps). The GDBA hopes to market internally, or in other words, persuade the all of the trainers to use it and diminish their resistance to the OAD, and eventually have an external market for it.

The GDBA has identified two of the 4Ps as being constant, and two variables, for internal marketing. The constants are place and price. The places include the training centers and hotels, and as long as the GDBA doesn't expand anymore, those will not change. The price of the OAD is determined by the cost of producing the device. The cost is rather high now, but to produce large quantities of the OAD would result in reduction of cost. Product and promotion are the variables for the GDBA.

The product, the OAD, is not a variable in itself, but changes will always be made to it to upgrade its efficiency and generally make the OAD a better O&M device. These changes will not be drastic, only certain modifications may be found necessary to improve the quality of the OAD system to reduce malfunctions and instill a greater sense of confidence in the users.

The last of the 4Ps, promotion, has been the least dealt with at the GDBA. There has been no major promotional campaign to promote the usage of the OAD within the GDBA itself, although the OAD has appeared on Breakfast TV on the BBC. In order to successfully promote the OAD within the organization, the GDBA may need to sell the benefits of the device to the trainers better.

External marketing strategies have not been established or even discussed within the company yet. Suggestions of places to market the device have been compiled, but there has been no steps taken to try to market the OAD outside of the organization as of

yet. The first priority of the GDBA is to establish acceptability of the OAD throughout the organization, and then address the issue of external marketing.

4.0 Methodology

This section describes the methods and steps that were utilized in order to solve the problem proposed by the GDBA. It was believed that some of the trainers did not integrate the Orientation Assisting Device (OAD) into the training of the visually impaired clients, although the visually impaired expressed that they did benefit from using it. In order to increase the use of the OAD, the different environments that it was used in were considered.

The trainers used the OAD in conjunction with a guide dog or long cane to teach orientation and mobility skills to the visually impaired. The visually impaired used this device in orientation training as well as at the GDBA hotels, with or without the aid of a guide dog, in order to become familiar with their surroundings.

The Information and Technology Department of the GDBA surveyed the visually impaired users about the OAD. The feedback, or lack thereof, led to the problem described. The WPI project team reviewed the previous survey and designed its own interview questions, and administered them to the respondents. The respondents were the creators and initiators of the OAD, the trainers (including Small Center Managers (SCM), Area Team Supervisors (ATS), Rehabilitation Workers (RW), Rehabilitation Service Managers (RSM), and Guide Dog Mobility Instructors (GDMI) who have been trained to use the OAD), and the visually impaired who used the device. This interview contained lower bias as compared to the survey administered by the Information and Technology Department, because the WPI project team was not directly related to the GDBA. Better answers were obtained, because the employees of the GDBA did not respond falsely in

order to continue amicable relations with their business associates or to save their jobs. Therefore, the WPI IQP group found the reasons for resistance to this technology.

In order to gain a greater understanding of what it means to be visually impaired, the project group traveled to the GDBA's Folly Court site in Wokingham where they participated in blindfolded training, simulating the training session of a blind person. They also took part in a blindfolded lunch. During this training session the group learned what it is like to be visually impaired and experienced the stress and anxiety of a training session. This experience furthered the groups' understanding of the needs of the visually impaired during a training session. See Appendix I for greater detail.

4.1 Interview Process

In order to evaluate the OAD and its usage, the project team gathered pertinent information regarding the OAD from people that have direct experience with it. These people had different opinions about the OAD, and provided data that helped find the underlying problems in the training centers. Information that was gathered included reasons for liking or disliking the OAD and suggestions for improving the it and its implementation. These questions made up the basis of the interviews. The population, or people involved with the OAD, were interviewed by the project team and from the information gathered, conclusions were reached, such as why the OAD was not fully utilized by the trainers and how to improve the situation.

In order to begin the interview process, the target population was defined. This population included four subgroups. One subgroup included the 27 trainers who were instructed by David Thompson to use the OAD. The people included in this subgroup noted as "trainers" are Guide Dog Mobility Instructors (GDMI), Rehabilitation Workers

(RW), Technical Officers (TO), Area Team Supervisors (ATS), Rehabilitation Service Managers (RSM), and Small Center Managers (SCM) that worked at the training centers where the OAD was installed. The IQP team interviewed 16 trainers. The second group contained 79 visually impaired people who used the OAD at the hotels in the past two years and filled out a survey giving the GDBA consent to contact them about the device. The IQP team interviewed 24 people from this subgroup. The third group consisted of 23 visually impaired people who were trained at the GDBA training centers using the OAD device. The team interviewed 12 people from this subgroup. These people were contacted and interviewed over the telephone or in person. The fourth group included five individuals at the GDBA that developed and initiated the installation of the OAD. This group included David Thompson, the creator, as well as Clare Evans, the Research and Grants Manager, Paul Master, the Guide Dog Training Director, Alan Brooks, the Regional Controller of Exeter, and Chris Burrell, an outside contractor who helped design the OAD.

The interview method was tailored to the four groups that the IQP team interviewed. Since the members of the four subgroups were located all over the UK, both telephone and face-to-face interviews were conducted, as well as focus groups with the staff trained to use the OAD. The staff members were interviewed individually at the sites that the IQP group visited. It would have been ideal to interview all of the trainers face-to-face, however time and money did not allow this. The project team traveled to one of the eight training centers that had the OAD installed. The questions that were asked during the interviews can be found in Appendix F1.

While interviewing the training staff, the IQP group used methods described in the Social Exchange Theory (SXT) (see section 3.4.8) in order to gain the participation and emotional investment of the respondents. The group explained that the respondents' views were confidential. Advantages of participating in the survey were also explained. One advantage explained was that the trainers could improve their working environment toward what they envisioned for their clients or students, the visually impaired.

In the second subgroup (the visually impaired users at the hotels), telephone interviews were conducted as well as analyzing David Thompson's survey. This subgroup of 79 was reduced to 26 for interviewing purposes due to the inability to contact everyone and incorrect phone numbers. The SXT was also applied to these respondents, where the advantages of participating were explained at the beginning of each interview. One advantage for the respondents was that their participation could help to increase widespread mobility of other visually impaired individuals. The respondents who participated could also contribute to improving the hotels for their future visits. The questions asked in the interview can be found in Appendix F2.

The third group (the visually impaired users at the training centers) was interviewed via telephone as well as analyzing David Thompson's survey. All 23 of David Thompson's surveys were analyzed but, due to the inability to contact everyone, this subgroup was reduced from 23 to 12 for interviewing purposes. The same advantages for the previous subgroup were explained to these 12 respondents in order to implement SXT. The interview questions can be found in Appendix F3.

Lastly, the fourth group (the creators and initiators of the OAD) was interviewed by telephone and in person. The individuals in this group were anxious to discover the

problems surrounding the trainers' acceptance of the OAD and therefore, were very interested in participating in the interview. Thus, the SXT was already implemented in this subgroup. These interview questions can be found in Appendix F4.

The project team formulated the questions, and practiced its interviewing skills (with people related to the field of blindness) in the United States before arriving in the UK in order to gain interviewing experience as well as knowledge of blindness and O&M training. In the UK, the project team pre-tested the questions in order to correctly modify the questions to obtain useful information and remain unbiased. For the interview of the first group, the trainers, Andy Fell, an employee of the GDBA who was a trainer and was trained to use the OAD, was pre-tested. The second and third group interviews were pre-tested by a randomly selected respondent from each population. The interview of the last group, the creators and initiators, were pre-tested by Clare Evans.

4.2 Hypotheses

The IQP group formulated hypotheses in order to create proper questions for interviewing, therefore obtaining information needed to assess the problem. One hypothesis was that the trainers were resisting the OAD because they felt that the OAD could result in redundancy. The trainers also might have felt that by relying on the OAD, the visually impaired would guide their dogs, instead of letting the dog guide them. That would defeat the purpose of having a guide dog. Another hypothesis was that the original surveys sent out and the method the IT department used to collect them were insufficient at gathering correct information and needed to be changed. Also, the group thought that maybe there was not sufficient training for the staff at the sites where the OAD was

installed, and that might have caused resistance among the training staff. The questions in the interviews were formulated in order to determine if these hypotheses were correct.

4.3 Compilation and Analysis

The project team manually evaluated the qualitative data collected from the interviews. The data were organized categorically in a database so that the information could easily be retrieved for review. This was important because it allowed all opinions to be visible and then considered in the conclusions. Responses to each survey question were separated into subgroups of similar responses. Once the data were collected, the team compared the opinions of the visually impaired, the trainers, and creators in order to detect the problems associated with the OAD.

4.4 Marketing Possibilities

Laws in the UK governing charitable organizations are much like laws in the United States. Charitable organizations are not allowed to make a profit on anything they do; the Charities Commission sanctions this. In order to market the OAD, the GDBA will have to go through their trading company, which in turn will be able to control the marketing aspects of the OAD. The GDBA would be able to sell the OAD to other O&M organizations at cost, thus making no profit. Other marketing possibilities were investigated, such as utilizing the OAD in public venues. If these companies want to use the OAD, the GDBA can charge a handling fee, which the trading company would automatically donate back to the organization. These funds could then be used to conduct more O&M research and improve the OAD and its quality support. The goal of this would be to create a zero balance on the cost of producing the OAD. Thus, the external market would fund the internal one.

In order to accomplish this task of creating an internal and external marketing plan, the group met with the finance and marketing departments (See Appendix J) of the GDBA to discuss ways a charity organization would go about it. From interviews with the four subgroups, information for creating the marketing plan was collected. The group learned from the initiators how they intended the OAD to be utilized. The visually impaired users gave the marketing plan substance. Without their support of the OAD, as consumers, they could impede sales of the device. From all of this information, an internal marketing plan was developed to increase the trainers' awareness of the benefits of the device, which should increase their acceptance, and overall usage of the OAD.

4.5 Contingency Plan

A contingency plan existed in case the interviews did not provide acceptable results or some other problem occurred. The plan consisted of focus groups, which would be composed of a few respondents from each of the four subgroups. The focus group would meet for a few hours with the WPI project team and the group would answer questions from the interviews designed by the team. Then the team would use the information gathered from those respondents to formulate the solutions of the stated goals. These focus groups, while not as reliable as the completed interviews, would give the general feelings of the group towards the OAD and its implementation. The focus group was a back-up plan in case problems arose, but was not used since ample interview data was obtained.

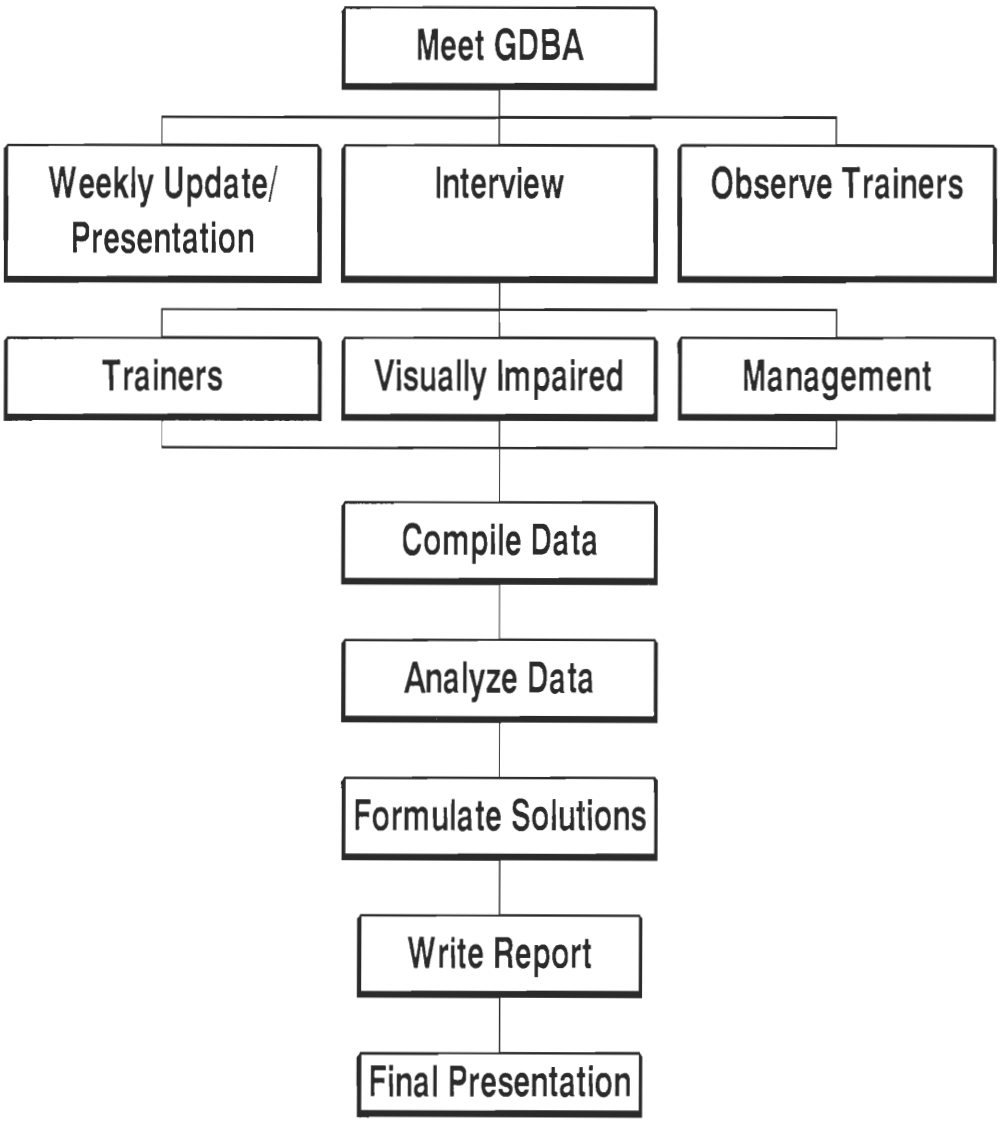
4.6 Summary

This evaluation led to a suggested plan regarding the future use of the OAD in the training centers and hotels, and the possibility of marketing the device externally. The

purpose of interviewing the four subgroups was ultimately to identify any patterns that may explain the training staff's apparent lack of use of the OAD as opposed to acceptance by the visually impaired users. The purpose also was to discover any other improvements or changes that the GDBA could make to the device or implementation method. After these patterns and problems were identified the project team formulated an internal marketing plan for the organization, which addressed solutions to all the goals previously mentioned. These solutions included the improved survey method used to evaluate the four subgroups, suggestions regarding the installation procedure, technical support, and the trainers' usage of the OAD. Finally, the project team explored the options for marketing the OAD to the public according to the laws pertaining to charities in the UK, aspiring towards the greater mobility of the visually impaired population.

4.7 Work Plan

4.7.1 Flow Chart



4.7.2 Pert Chart

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Meet the GDBA							
Observe Trainers							
Pretest Interview							
Survey Trainers							
Survey Users							
Visit Sites							
Collect Information							
Analyze Information							
Presentations							
Write Report							
Formulate Solutions							

 = 1 Day Spent Working on Task

5.0 Data and Analysis

5.1 Data

The data for this section were obtained from surveys and interviews with trainers, visually impaired users, and creators and initiators of the OAD.

5.1.1 Data from David Thompson's Survey

(See Appendix O for a copy of David Thompson's survey)
Survey of visually impaired users of the OAD at the hotels and training centers

- Overall Rating as a New Mobility Device

Category	Very Good	Good	Fair	Average	Poor	Very Poor
All Users	74/104 71.2%	23/104 22.1%	6/104 5.8%	1/104 0.9%	0/104 0.0%	0/104 0.0%
Hotel Users	60/79 75.9%	12/79 15.2%	6/79 7.6%	1/79 1.3%	0/79 0.0%	0/79 0.0%
Training Center Users[1]	13/23 56.5%	10/23 43.5%	0/23 0.0%	0/23 0.0%	0/23 0.0%	0/23 0.0%

- Ease of Use Rating

Category	Very Easy	Quite Easy	Neither Easy or Difficult	Quite Difficult	Very Difficult
All Users	82/104 78.9%	20/104 19.2%	0/104 0.0%	2/104 1.9%	0/104 0.0%
Hotel Users	65/79 82.3%	13/79 16.4%	0/79 0.0%	1/79 1.3%	0/79 0.0%
Training Center Users[1]	15/23 65.2%	7/23 30.4%	0/23 0.0%	1/23 4.4%	0/23 0.0%

- Do you feel more or less concerned about getting lost or disoriented on unfamiliar routes? (Four types of users: Those who have always been concerned about getting lost or disoriented, those who often do, those who rarely do, and those who never do.)

Category	More Concerned	Less Concerned	No Different
All Users	4/104 3.9%	88/104 84.6%	12/104 11.5%
Always or Often	2/72 2.8%	65/72 90.3%	5/72 6.9%
Rarely or Never	2/32 6.2%	23/32 71.9%	7/32 21.9%

[1] 31 of David Thompson's surveys were returned by training centers to the GDBA. However, 8 of them were completed by trainers or sighted people and, therefore, were not included in the data analysis.

- Would you like to see the use of the OAD extended e.g. Shopping Centers, Home environments etc.?

Category	Yes	No
All Users	103/104 99%	1/104 1%
Hotel Users	71/71 100%	0/71 0.0%
Training Center Users	22/23 95.7%	1/23 4.3%

- Visually Impaired users' suggestions for uses of the OAD:

Category	Transit Systems	Shopping Malls	Training Centers	Town Centers	Home Areas	Banks
All Users	21/104 20.2%	48/104 46.2%	----- -----	19/104 18.3%	7/104 6.7%	3/104 2.9%
Hotel Users	12/79 15.2%	33/79 41.8%	37/79 46.8%	16/79 20.3%	6/79 7.6%	1/79 1.3%
Training Center Users	8/23 34.8%	14/23 60.9%	----- -----	3/23 13.0%	1/23 4.4%	2/23 8.7%

5.1.2 Data Concerning the Number of David Thompson's Surveys Returned

Training Center	**Guide Dog Students 1998**	**Rehab Students 1998**	**Month Installed**	**# Surveys Returned**
Bolton*	103	138	February 1999	0
Liverpool*	24	NA	Plan. May 1999	0
Exeter	78	107	April 1997	1
Forfar	88	106	June 1998	0
Leamington	140	131	November 1997	3
Middlesbrough	115	134	February 1998	8
Redbridge	89	101	January 1998	5
Southampton	14	19	September 1996	14
Totals**	**651**	**736**		**31**
Without *Centers	**524**	**598**		

*It must be noted that the Bolton and the Liverpool Training Centers installed the OAD in 1999, and therefore, the number of the students trained at these centers as compared with the number of surveys returned (0 for both centers) did not indicate anything of significance in relation to the problem of obtaining information from the training centers about the OAD.

**Although 31 surveys were returned from training centers, 8 were from staff or sighted people and therefore were not included in the analysis of responses from those surveys.

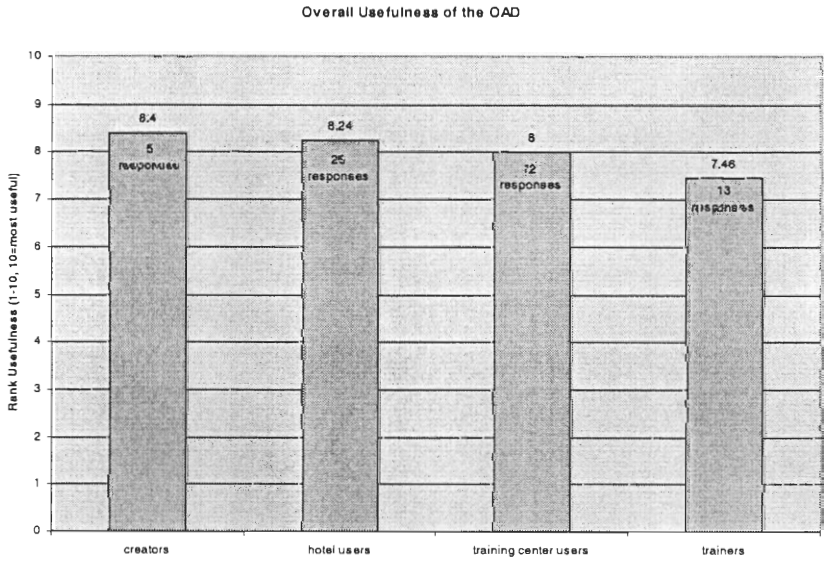
The survey response rate from the training centers compared to the number of students that attended the centers analyzed because the number of surveys returned was

so small. Alternately, the hotel surveys were not analyzed in this manor because over 75 hotel surveys were returned to David Thompson, therefore, the IQP group determined that this was an adequate amount of data to determine the perceptions of the hotel users.

5.1.3 Data from Interviews Conducted by the IQP Group

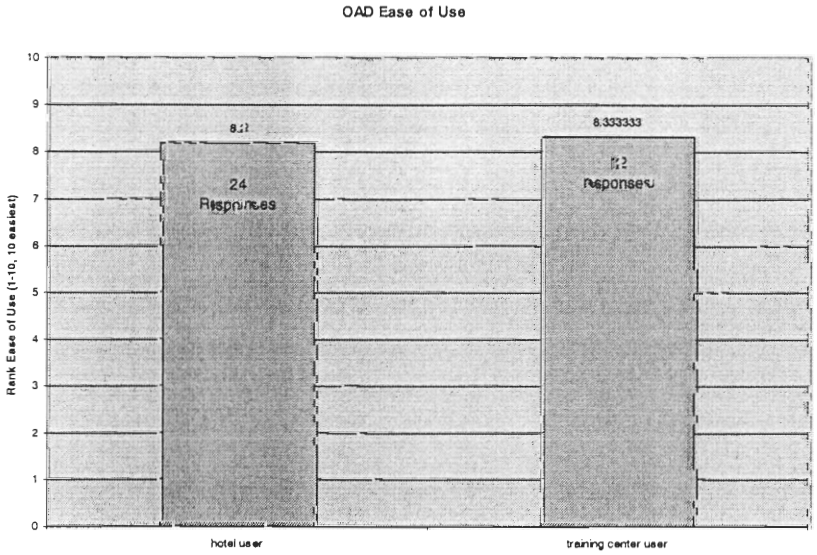
Bar Graph A

The following figure illustrates the responses of the four populations when asked to rank the overall usefulness of the OAD on a scale from 1 to 10 (10 being the most useful).



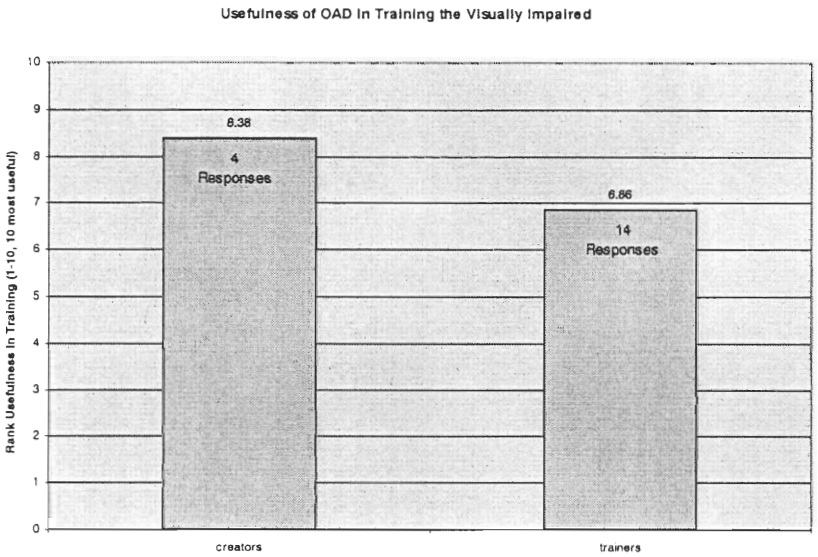
Bar Graph B

The following bar chart displays the opinions of the visually impaired users of the OAD at the hotels and the training centers when asked about its ease of use.



Bar Graph C

The following bar chart exhibits the responses of the training staff and the creators of the OAD when asked to rank the usefulness the OAD in training of the visually impaired.



5.1.4 Data from Interviews with Trainers conducted by the IQP Group

The following data were gathered from interviews by the IQP group with the instructors and other training staff members at various GDBA training centers.

- Suggested disadvantages to the OAD

Technical issues, reliability	Time, set-up, and extra work	Computer skills needed	Limited equipment	Causes dependency	Beacons must be sequential
7/16 43.8%	6/16 37.5%	3/16 18.8%	3/16 18.8%	3/16 18.8%	1/16 6.3%

- Suggested advantages of the OAD

Concentrate on dog/ no remembering route	Increased confidence, reduced stress	Independence from trainer	Trainer can observe from afar	Can teach a person a new route	Give warnings	Saves time
5/16 31.3%	6/16 37.5%	1/16 6.3%	3/16 18.8%	2/16 12.5%	1/16 6.3%	1/16 6.3%

- Who gets offered the OAD?

All	Those with problems remembering routes	Less capable students	More capable students
1/16 6.3%	4/16 25.0%	7/16 43.8%	1/16 6.3%

- Other questions

Felt their training to use and teach the OAD was sufficient	Said OAD aided in training	Suggested using it in the home area
12/16 75.0%	16/16 100%	7/16 43.8%

5.1.5 Relevant Data Pertaining to the Visually Impaired in the United Kingdom

- UK population - approximately 58 million
- UK visually impaired population - approximately 1.4 million
- Approximately 2.4% of the population in the UK is visually impaired
- However, 350,000 or 25% of the visually impaired people are registered blind.
    - Registered blind means that someone is unable to complete a job or daily task that requires vision.
- London population - 7 million.
- London visually impaired population - 169,000
- Approximately 2.4% of the London's population is visually impaired

(Department of Health, Report of Registered Blind and Partially Sighted People, March 1997)

5.1.6 Current Production Prices of OAD Components

- 1 Beacon (in bulk of 50) £149
- 1 Receiver (in bulk of 50) £242.12

(David Thompson, Personal Communication, 19 April 1999)

5.1.7 Money Spent by the GDBA on the OAD

- Original Development £156,277
- Additional Development £100,000
- Installation in GDBA centers and hotels that currently have OAD £17,521
- Projected cost to install in rest of GDBA centers (planned for end of 1999) £48,110
- Total amount spent by the end of the 1999 £321,908
    - Note that this total number does not include the number of employee hours spent as well.
- Including employee hours spent on development, the total amount spent on the OAD is over £500,000.

(Clare Evans, Personal Communication, 6 April 1999)

5.2 Analysis of the Data

The following section includes the IQP group's analysis of the previous data in Section 5.1.

5.2.1 Criteria for Analyzing the Survey and Interview Data

The project team decided before analyzing the data that the following percentages would be necessary in order to operationally define characteristics of the OAD as well as what the population feels about the OAD:

- At least 75% of all users must choose "Very Good" or "Good" for the overall rating of the OAD as a new mobility device in order to determine that the OAD is indeed a good mobility device.
- At least 75% of all users must choose "Very Easy" or "Quite Easy" as a rating for the ease of use of the OAD in order to say the OAD is easy to operate.
- Less than 10% of all users must say that the OAD causes them to fear getting lost or disoriented more in order to say the OAD does not cause confusion to users.
- At least 75% of all users must say the OAD causes them to fear getting lost or disoriented less in order to say that the OAD is effective in relieving those worries.

- At least 75% of all users must say they would like to see the OAD extended into public use in order to say the population wants to see it used in public.
- The average of the subgroup responses of the overall usefulness of the OAD must be at least 7.5 in order to determine that the subgroup believes OAD is useful.
- The average of the subgroup responses of the ease of use of the OAD must be at least 7.5 in order to determine that the subgroup believes that the OAD is sufficiently easy to use.
- The average of the subgroup responses of the usefulness of the OAD in training the visually impaired must be at least 7.5 in order to determine that the subgroup finds the OAD is useful in the training sessions.

The reason the team chose 75%, or 7.5, for most of the criteria above was that, with 75%, well over half the population had chosen one option, and only 25% of the population disagreed. Therefore, a 75% agreement should give the perceptions of the population as a whole. As for the 10% of users feeling more concerned about getting lost with the OAD, the team wanted to ensure that only a small part of the population felt uncomfortable using the OAD for it to be considered reliable, safe, and helpful.

5.2.2 Analysis of David Thompson's Surveys

Upon analyzing the data from David Thompson's survey (See Appendix O) issued to users of the OAD at GDBA training centers and hotels, the project team utilized its criteria (explained in section 5.2.1) to determine the users' opinions about the OAD. First, 71.2% of all users rated the OAD as being overall very good. In addition, 22.1% rated it as being overall good. These two ratings sum to 93.3% of the population, which is higher than the necessary 75% determined by the team and therefore, it was concluded that the visually impaired like using the OAD. The team also determined that the OAD is an easy product to use as 78.9% of the population said it was very easy to use and 19.2% said it was quite easy to use.

Among all of the users, 84.6% of the population said the OAD made them feel less concerned about getting lost or disoriented. Only 3.9% said it made them feel more concerned about getting lost and 11.5% said it didn't change their feelings. In addition, of the group whose feelings did not change, 58.3% rarely feared getting lost even without the OAD. Therefore, they may not have been able to improve in that category. Also, among those who said that the OAD made them feel more concerned about getting lost, 50%, or 2% of the users interviewed, had encountered some kind of technical problem during their route. The technical errors in the OAD may have been what caused them to feel uncomfortable. Therefore, from the analysis of the surveys, it was determined that the OAD was helpful to guiding the visually impaired through an unfamiliar place as long as it functioned properly.

Finally, from David Thompson's survey, the team also found that the visually impaired would like to have the OAD used in public places. 99% of all users said they would like to have the OAD used in public places, including all of the hotel users. The most suggested place to implement the OAD was in shopping malls, as 46.2% of all users suggested it. Also, 20.2% of all users said they wanted to see the OAD installed in public transportation systems, 18.3% wanted it to be used in town centers, 6.7% wanted to have it used around their home, and 2.9% wanted it used at banks and other government buildings. Another interesting point is that 46.8% of the hotel users said they would like to have it used at the GDBA training centers. This led the team to believe that, in general, the visually impaired wanted to have the OAD used in mobility training. This also leads the team to believe that the GDBA should keep encouraging the use of the OAD and implementing it throughout all of the training centers.

Section 5.1.2 displays data that concerns the number of surveys received from the training centers with the OAD, as well as the number of guide dog and rehabilitation students trained at the centers over the past year. There were a total of 651 guide dog students trained at the eight centers with the OAD in 1998, along with 736 rehabilitation students that received training at those centers as well. However, Bolton and Liverpool were not included with the totals because these centers only installed the OAD in early 1999 and haven't had the chance to use it yet. The total number of students trained in facilities where the OAD was operational was 1122, 524 guide dog students and 598 rehabilitation students. That was an extremely large number in comparison with the 31 surveys David Thompson received over the past year. Furthermore, each center had at least 2 receivers. On average, a typical guide dog training class consisted of 12 students, therefore, there were approximately 44 guide dog sessions conducted in 1998. With this information, the minimal number of students who could have used the OAD was 88, had the OAD been offered just once during the three-week session. With the calculated minimum number of people who hypothetically could have used the OAD, only 35.2% of them responded to the survey. This percentage of surveys received is too low to accurately determine the views of the visually impaired students who could have used this device as a whole. However, the group analyzed this data and found that this subgroup's responses reasonably compared with the responses of the hotel users.

5.2.3 Analysis of the IQP Interviews

In order to establish whether the OAD was accepted among the different subgroups, there were two questions the project team asked about the usefulness of the device. The answers to these questions were on a number scale, 10 being the most

useful, 1 being the least useful. The group set a cut-off point of 7.5 as the determining factor. See section 5.2.1 for detailed explanation of criteria for this analysis.

From Bar Graph A, the trainers perception of the OAD was slightly below the minimum ranking for usefulness with a rank of 7.46, but still close enough to 7.5 to be considered useful by them. However, 100% of the trainers said that the OAD could or did aid in training and most added that it was not necessarily being used in the best way for them. The creators perceived the OAD as most useful out of the four subgroups with an average rank of 8.4. The users at the training centers as well as the hotels felt basically the same about the OAD, ranking it around 8 for both subgroups. Bar Graph B illustrated that the training center users and the hotel users found the OAD easy to use, and both gave it about the same rating of around 8. Bar Graph C demonstrated that the trainers and the creators of the OAD had different opinions about the usefulness of the device in training the visually impaired. According to the criteria set forth by the group before it began collecting data, the trainers did not find the OAD useful in training their visually impaired students, while the creators thought the device was useful.

The interviews with the trainers provided more useful data beyond what was apparent from the bar graphs (see Appendix N for more detailed summary of interviews). Although they said it was not very useful, all of the trainers interviewed said that the OAD did aid in training for certain people. These people were generally people of low capability or with poor orientation skills. They also mentioned that they thought the device would be useful on unfamiliar routes.

The trainers also mentioned several benefits of using the OAD. Five out of the 16 trainers (31.3%) interviewed said that the OAD allowed the student to concentrate on the

dog training so they did not need to remember route information. Six trainers (37.5%) mentioned that it increased the student's confidence. Three trainers (18.8%) pointed out that it allowed them to observe from afar. One trainer stated that the OAD saved time, increased independence and support for the user, and decreased stress. Finally, seven trainers (43.8%) mentioned that the OAD would be beneficial if used in the client's home area to help them with difficult walks.

The trainers also expressed disadvantages of the OAD. About 38% of the trainers mentioned that technical issues such as battery malfunctions were a problem. A quarter of the trainers said that it was difficult to set up routes because it required PC skills. Three trainers stated that problems getting permission to use the beacons from the local authorities could cause difficulties. Two of these trainers were from Bolton, where this problem actually occurred. Three trainers also said another disadvantage of the OAD was that it was overly time consuming and the previous two disadvantages may contribute to that drawback. Two trainers mentioned that there were problems setting up the device, due to it being unreliable. One trainer stated that the OAD is limited because the system is sequential, meaning the route must be followed exactly as programmed to avoid problems. One trainer also mentioned that vandalism to the beacons could cause problems and one training center cited problems with several vandalized beacons. When asked about the OAD training that the trainers received, 12 replied that the training was sufficient and four said they would have liked more instruction or practice.

The trainers were also asked if they offered the device to all of their clients. In response, only one trainer said that he offered it to all clients. However, he was only involved with the hotels and did not actually train any students. Trainers at the training

centers said they would only offer it to clients who they felt needed it or those with orientation problems and learning disabilities. It was expressed in various interviews with instructors and rehabilitation workers that they did not want to teach the guide dog owners to depend on the OAD if it was not reliable. They also did not want to plan their training sessions around the OAD only to have it fail and waste time. Only the trainers at one training center mentioned that they offered the OAD to the students with better mobility, but that is because they feared that if a technical problem occurred, students with the best mobility would be able to complete the route.

The creators and initiators provided useful data as well. The original purpose of the OAD was mentioned by 3 of the 5 interviewed. The summary of the interviews with creators and initiators in Appendix K provides a detailed explanation of the original purpose of the OAD. One creator explained that the OAD has been in development since 1987 and the original plan was to use the device in the client's home area in order to provide support and information to the student, as well as relieve some of the trainers' workload. This purpose drifted when the OAD was installed in some of the training centers as a demonstration route for the trainers, so that they knew how to use it before it was installed at the client's home. The creator's focus for the OAD shifted when there seemed to be benefit in installing the OAD at the training centers. Because of this, the device was rarely placed it in a client's home area. As a whole, the creators did not feel it was effectively used in the training centers and linked the problem to fear of technology, extra time for route setup and computer programming, and worrying about the safety of the students using the device. The creators also wanted to see the device used in public places. They mentioned having a leisure route set up at the centers so that the students

could work their dog around another route besides the one used during the training sessions. They also wanted to see the students in every session use the OAD at least once. Although they said it was presently ineffective at the training centers, they felt it was effectively used at the hotel, though one of the respondents thought its use at the hotels needed to increase.

Four of the initiators and creators said no training staff member with problems or praise about the OAD approached them. David Thompson was approached about minor technical issues, such as changing the batteries or using the software, since he was the technical support for the device. David was also responsible for the surveys he hoped would monitor the usage of the OAD. He distributed them to every training center and hotel with the OAD and the trainers were supposed to fill them out with the visually impaired user after they used the device. Due to the low response rate, the GDBA could not detect problems and help improve the usage of the OAD earlier.

The creators' and initiators' visions for the future of the OAD included the use of the device in all the training centers as well as in public places such as transit stations. One general feeling from this subgroup was aggravation from the slow rate of implementation of the OAD. Finally, every creator envisioned the OAD available to the public and prevalently used in the training centers.

The data presented in this chapter was the basis for the conclusions and suggestions provided in the following chapter.

6.0 Conclusions – The Future of the OAD

The main objective of this project set forth by the GDBA was to find out why the OAD was apparently being under utilized at the training centers. The IQP group investigated, through interviews with the training staff, visually impaired users, and the initiators and creators of this device, to discover if the OAD was under utilized at the training centers. The group also sought the reasons why it was underutilized as well as the subgroups' outlooks on the value of the device. The following main points were discovered through the interviews:

The visually impaired users, as stated earlier, were very receptive to the device and wished to have the device available in public venues. They generally found the device easy to use and felt comfortable using it. In addition, they felt less worried about getting lost or, for people with better mobility skills, had no negative effects.

One reason the trainers were not using the OAD at the training centers was that they felt the OAD was unreliable. Many of the trainers had complaints about technical problems associated with the OAD, and therefore were more reluctant to offer the OAD to their clients. Technical reliability is a major issue that needs to be investigated in order for the OAD to be fully accepted and utilized to its fullest potential. Also, trainers expressed concern for the safety of the visually impaired users. If the device fails while a person is in the midst of a route by themselves, he or she could become lost and wander into a dangerous situation. This concern can also lead to liability issues and problems with insurance, such as high insurance costs.

Another reason for the lack of use of the OAD has to do with the trainers' reluctance to use the routes that were set up by David Thompson. The OAD was set up

at the training centers on routes used by the trainer to train the student and guide dog, and by the time a student was issued an OAD, they have already memorized the route and do not need the device. Due in part to this, the OAD was not offered to all students. The trainers felt that if other routes were set up, especially more difficult routes, they would be more apt to offer the OAD to all of the students. Another issue that led to the under-utilization of the OAD was that the trainers were only offering the OAD to certain clients. Besides one site, all other training centers said that they offered the device only to those students with poor mobility or those having trouble remembering routes. In order to encourage the trainers to offer the device to all students, the above-mentioned issue of new routes needs to be addressed. Included in this is the production of more beacons to accommodate new routes at all of the centers.

Still another issue involved dependency. A few trainers felt that a student using the OAD could become dependent on the device, especially in familiar territories. This could cause them to lose some mobility skills or not utilize their guide dog properly. Some trainers did not use the device for this reason.

Approximately one-third of the trainers cited setup time as a reason for not utilizing the device to its fullest. The trainers were not creating the routes that they would like to use with all the students because they did not have the time to change the routes or set up new ones. Finally, a few of the trainers stated that the need for computer skills and lack of equipment, such as beacons and receivers, were reasons for their low usage of the device. These problems could be rectified with more training and more available equipment at the training centers.

The following plan that the IQP group developed for the future use of the OAD has many different component parts. The sections below were compiled from interviews and research done over the past four months. The data discussed in the previous section was analyzed qualitatively and quantitatively in order to reach the suggestions that follow. These parts include technical reliability, technical support, the survey method, installation procedure, use of the OAD in the training centers, hotels, and client neighborhoods, marketing internally as well as externally, other applications of the OAD, and a proposed on-line database for the OAD. These components should be completed in phases in order to ensure that the procedures will be progressive, rather than uneconomical and ineffective, for the GDBA.

6.1 Phase I - Technical Reliability

As apparent in Section 5, the biggest problem with the OAD that the trainers cited was its technical unreliability. This should be taken care of before proceeding to install more OAD systems in order to expand with a well-run base of operation. Therefore, the GDBA should concentrate on the centers that have the OAD installed and work to minimize technical problems with the device itself as well as increase the usage among the trainers in their training sessions. The common technical difficulty mentioned by the trainers as well as the users was the failure of the batteries in the beacons and receivers. To fix this, the IQP group suggests that other power sources be utilized, such as the power lines for permanent outdoor routes, or indoor power sources for indoor routes. In order to further increase technical reliability, the IQP group suggests a more thorough technical support staff and a better method of monitoring its use.

6.1.1 Technical Support

Improving the technical reliability as well as support of the OAD is a necessary step to increase the acceptance among the guide dog mobility instructors. In order to get the trainers to use the OAD they must feel confident that it will not fail and also know that they will receive prompt assistance fixing the occasional problems. Improved technical support should ensure that the OAD functions when necessary and problems are tended to quickly, so as to not hinder the training sessions.

The technical support staff consisted of only the creator, David Thompson. Mr. Thompson oversaw all OAD installations, answered telephone calls regarding the OAD, and tended to all problems with the OAD at all the GDBA sites that used the device. Mr. Thompson was not able to tend to all the problems and provide assistance because the locations of the hotels and training centers in the United Kingdom were too far for immediate on-site assistance when necessary. Therefore, the centers did not have accessible and timely help for the technical aspects of this device. Thus, it is important to have a technical support staff that will manage the OAD. There are several models in which this technical support can be set up.

The technical support model preferred by the IQP group consists of a Resident Expert located at each hotel and training center. The position of the Resident Expert can be defined two ways. A trainer already employed at the site that expresses interest in technology and is proficient with computers could fill the position. The workload pertaining to the training of guide dogs and students could be decreased so that the trainer could take on the additional duties of the Resident Expert of the OAD. The other way to fill the position would be to hire someone to work with the OAD and the training staff.

Either way, the employee would be responsible for regular preventive maintenance of the beacons in order to keep them working before problems arise. In addition, the employee would work with the trainers to set up routes around the facility and make repairs on larger problems. These Resident Experts would go through extensive training by David Thompson before they begin work at the center and will ultimately be his technical support staff. The local placement of the Resident Experts should promote the use of the OAD consistently throughout the organization by monitoring the use of the device locally as well as removing prolonged technical problems

Another option for the technical support structure is to have Regional Experts. The four GDBA regions of the United Kingdom would each have one person responsible for the set up of beacons and routes, technical problems, training of employees, and monitoring the use of the device. Like the previous model, David Thompson would extensively train the Regional Experts and the group would meet periodically to assess the use of the OAD, as well as any problems that need to be addressed or ideas about the improvement of the device. Regional Experts, again, could be new employees or existing workers with additional duties.

Incentives to work as a member of one of these first two models should be considered by the organization in order to motivate the individuals to do their job competently. If existing employees of the organization are chosen for one of these positions, they may need to be compensated through a small raise in salary or additional vacation days to account for the extra work involved.

A third option is a roving technical support team that would to do any on-site work and answer telephone calls for verbal support. This staff would expand or contract

depending on how popular the OAD becomes and how much money is available for technical support. It would deal with installation, maintenance, and answering questions from instructors as well as travel to each site to do any manual work involving the OAD.

Regardless of the model chosen for technical support, the support staff chosen should design an operators manual outlining how to integrate the OAD into the training sessions. This manual should include when the trainer should introduce the device to his or her students as well as how the trainer should incorporate the device into the training sessions. The presence of written guidelines could increase regular and consistent use of the device throughout the organization. Additionally, the manual for technical support designed by David Thompson is sufficient as a written manual for technical support and use of it should be continued.

In summary, technical reliability was a disadvantage mentioned by 44% of the trainers. To promote the safe use of the OAD in varied locations, these problems must be addressed quickly. The support staff solely David Thompson that was available was not sufficient and it is concluded that more individuals and regular on-site assistance is necessary to increase confidence in the OAD and therefore use of the device. While the technical support is established, the use of the OAD should be monitored in order to receive feedback about the device and make adjustments and changes accordingly.

6.1.2 Monitoring the use of the OAD

In the first phase, the use of the OAD should be monitored using the surveys David Thompson designed in order to obtain feedback and calculate exactly how many visually impaired use it at each center. However, as mentioned in the data and analysis section, there were few surveys returned from the training centers in comparison with the

amount returned from the hotels. In order to improve this situation, two aspects needed to be looked at; one was the survey itself and the other was the method in which the GDBA went about filling in the survey and collecting them. The IQP group designed its own surveys for the visually impaired users at the hotels and training centers (see Appendices F2 and F3) using qualitative survey methods explained in Section 3.4, before it saw David Thompson's survey. The survey designed by David Thompson is much like the survey that the group created. Therefore, the group suggests that the original survey remain the same, as should the procedure used at the hotels to fill out the survey. This method worked well according to the number of surveys returned by the trainer there. However, the procedure for completing and collecting the surveys at the training centers should change. This change is an integral part of the technical support options suggested previously in this section. The Resident Expert will be able to physically monitor the usage of the OAD, and therefore the survey does not need to be distributed after each person uses the device. Collection of the surveys should happen on a periodic basis. For example, an equal sample of visually impaired users from each training center and hotel could be surveyed every six months, and promptly sent for analysis. The usage manual should outline how and when to complete the survey with the user. If there is no structure and it is not part of the job description, unofficial duties such as this may be neglected. If trainers do not have the time during the training sessions to fill out the surveys with the students, another time should be set aside for the surveys, e.g. after dinner. The Resident Experts, Regional Expert, or OAD staff along with the trainers should determine this. The manner of conducting the survey needs to be written down in the usage manual in order to reinforce the duty.

6.2 Phase II- Internal Expansion

Once the OAD is fully utilized in the training centers and is functioning without technical problems, the process of expanding its usage in the other centers, hotels, and client home areas can begin.

6.2.1 Use of OAD in Training Centers

As mentioned in section 5.2, the visually impaired found the device beneficial, regardless of their orientation skills, however, most of the trainers only offered it to specific students. The group suggests that the OAD be installed in all the centers and that all students are introduced and allowed to use the device on routes described below. After the technical problems of the device are dealt with in the first phase, the trainers should not need to worry about the students using it, and, therefore more of the visually impaired can independently practice with their guide dog, as well as use the device in Long Cane and rehabilitation training. Then, in order to appease the trainers, as well as get the blind to use the OAD in training centers, additional or leisure routes should be added at each training center. These routes should be separate from the route that the trainer uses to train the guide dog-student units, and within the center grounds.

It is an unwritten rule among the training staff of the GDBA that students cannot take the dog off the grounds by themselves until the student has completed the training. A second rule is that the student and dog may walk around the grounds by themselves but the dog must be on a lead and not in a harness. This means that the dog is not actually working as a guide dog, and is only out for a leisure stroll with the student (David Thompson, Personal Communication, 27 April 1999). The alternate routes around the center will enable the visually impaired person to practice by themselves in a relaxed

atmosphere without becoming dependent on the device, thus satisfying the trainer as well as the user. Therefore, this should prompt the trainers to offer the OAD to all of the clients, not just those that fit their criteria. Students can use these leisure routes during the evening hours, with or without their dog, to take an independent walk.

There has also been interest in the OAD from the rehabilitation workers at the training centers. They have stated that the OAD can be used in rehabilitation in the same manner as in guide dog mobility instruction. It can be used and shared by both GDMIs and RWs without any problems. Therefore, it should be offered to the rehabilitation students, if it is not already, at each training center.

Also from analysis of the interviews with the visually impaired that used the device, they said that it did increase their mobility capabilities as well as their independence. If this device was incorporated into all training sessions, the confidence and progress of the students may increase and produce a stronger student-dog team.

6.2.2 Insurance Issues

There have been some insurance issues cited by trainers who believed that the student and guide dog could not leave the training site during the training session, because they have not completed the training and are not covered by insurance outside the GDBA training center grounds. This is not true. There was nothing on paper that states the above-mentioned restriction. The only insurance issue that exists is the issue of liability if a student that is not ready goes out on their own with a guide dog and becomes injured or lost. To cover this problem and still allow students out of the training centers, guidelines need to be written with the insurance company. These guidelines should

contain a waiver that the student must sign before leaving the center grounds for an independent walk (Jill Farrar, personal communication, 20 April 1999).

6.2.3 Use of the OAD in Hotels

From the analysis of the data, it was evident that the users of the OAD at the hotels enjoyed using the device. Due to the overwhelming response of the visually impaired, it was concluded that the OAD should continue to be provided at the hotels. It has been mentioned that another charity organization, Action for the Blind, may take control of the hotels in the near future. It is also suggested that the OAD be kept in the GDBA hotels after this change of management and also should be installed at the two existing Action for the Blind hotels, the Russell Hotel and Lauriston Hotel.

In order to further the expansion of the OAD, other hotels should be solicited to install the OAD. These hotels include two run by the RNIB, the Century Hotel and Palm Court Hotel, as well as the Ovingdean Hotel, run by St. Dunstans. With the successful use of the OAD in these hotels, other hotels will see the usefulness of the OAD and want to install the device in their facilities.

6.2.4 Use of OAD around the Client Neighborhood

The original purpose of the OAD was to use the device around the neighborhood and town of the recently trained guide dog student (Paul Masters, Personal Communication, 14 March 1999). This is known as domiciliary training. From the analysis of the data, both the trainers and the visually impaired suggested the OAD be used around the home areas of the recently trained students, if needed, or of clients who moved to a different area. This use of the OAD can benefit both the trainers as well as the students.

A student typically needs 10-12 months after their training is complete to get fully acclimated in their home environment. The dog needs to get comfortable in its new home and the person and dog need to learn each other's habits and traits. In addition, the person needs to relearn their home routes. A GDBA trainer visits the student's home and helps the student-dog unit become mobile around their home area. Over time, the dog learns common routes out of habit and often guides the person along the route. This causes normal routes to be altered and they must be re-learned with a new guide dog. Also, many people only travel with a sighted person to take them where they have to go. Both of these reasons can cause a person to not know routes in their home area. Hence, the OAD can help in the domiciliary training, or home training, of the visually impaired. It can be temporarily installed in a person's home area so that they can use it to become familiar with the routes. After between 2-4 weeks, when the student is comfortable travelling, they will no longer require the OAD for guidance. At that point the OAD can be removed and installed in another student's neighborhood.

The training staff at one Regional Training Center has recently used the OAD in domiciliary training. It was used in four clients' neighborhoods. They said that it was very effective in helping three of the four people in learning their routes. It also increased the trainers' time for other duties as they did not need to travel as frequently to the homes of these people. The trainers said it helped three people learn particularly difficult sections of some routes in their home area. In one case the OAD was needed for only a few weeks. In another case the OAD was set up for five months. The trainers also said they used anywhere from two to six beacons to make these routes.

It is recommended that domiciliary training be conducted by each training center eventually. Additional beacons and receivers will be necessary in order to do this and will have to be supplied to the training centers. Recently, David Thompson told the group that a budget was approved for nine beacons, one receiver, and one laptop computer for each training center for domiciliary training. Since the training staff previously mentioned had successfully installed routes with no more than six beacons, nine should be a suitable number to help one or more persons at a time. The trainers also said that having a laptop computer with them greatly increased the ease of installation and decreased set-up time. This was because they did not have to return to the training center to program changes made to the route. It is recommended by the IQP group that this project is followed through as it will help ease the burden of the trainers and help the clients become more mobile in their home environment.

6.2.5 Installation Procedure

From the interviews with the trainers, it appears that the installation procedure of the OAD at the training centers is sufficient. Currently David Thompson visits a site and spends about 1½ days going through all aspects of the OAD, including the actual setup of a route with the trainers. The trainers are taught how to use the PC Recorder software and are given a user manual for the OAD. Basic technical problems are explained and the remedies are given for each.

The Resident or Regional Expert should be given more extensive training in the technical aspects of the OAD and should be well versed in the device's capabilities. See section 6.1.1 for a more detailed explanation.

One suggestion that the group had was to have a refresher course once or twice a year, depending on the site, for all trainers or Resident Experts. This refresher course could be included in the Annual Trainers Conference (see section 6.2.5.3) or done by Mr. Thompson while making his rounds. Technical problems seem to be the major problem associated with the OAD, so as much education as the trainers can get for fixing these problems will result in more use.

6.2.6 Costs and Benefits of Installation of the OAD

Since the GDBA has already spent over £500,000 on developing and installing the OAD, it does not seem logical to stop now. The cost of installing the OAD at the rest of the training centers had been estimated by the GDBA at £48,110, which is less than 10% of what has been spent thus far on the device. This cost includes installing the system at the remaining training centers and rehabilitation schools plus allotting an extra set of beacons, receivers, and a laptop computer to each site for domiciliary training. After weighing the nominal cost of completing this installation plan with the perceived benefits of the OAD, the necessary expenditure is justified by the benefits.

As stated before, this total cost covers the installation of all necessary equipment for all of the training centers. In addition, a total of £65,631 was budgeted for all of this and £17,521 has been spent thus far on installation. This means that the GDBA has already determined that they can afford the remaining £48,110 to finish the installation. The IQP group believes that the spending of this money can be justified in order to achieve the benefits of the OAD.

The use of the OAD in all of the GDBA training facilities and hotels will increase the services that they can offer to their clients. It can also help ease the burden of the

trainers travelling long distances for home training. Home visits for aftercare will still be necessary, but repetitive visits to work on one route or one part of a route can be very time consuming. The OAD can remove the need for this extra travel by helping the students to learn difficult places on their own. By saving time, the trainers can attend to other students more often. This can also cut down on travel costs and the wages lost for paying a trainer to drive to student's homes rather than training students. After time, it is possible that the money saved from eliminating the aforementioned costs may recover some of the money spent on the new equipment.

6.2.7 Internal Marketing Plan

In order to promote greater usage of the OAD internally, an internal marketing plan should be established. After talking with David Holding, the Public Relations and Marketing Manager at the GDBA Headquarters in Reading, it was discovered that there were no steps taken to utilize the GDBA's marketing department to promote the OAD. David Thompson personally visited the different sites, presented the OAD, and was the only contact for technical support. The only promotional activity the GDBA conducted for the OAD occurred when David made contact with the centers and hotels. The IQP group developed a proposed internal marketing plan for the GDBA in the form of suggestions.

It was established that the marketing department had a full workload and could not take on any aspects of marketing the OAD from talks with David Holding. David said, "Our staff is 2 ½ people down. Our schedule is very full right now, so we would not be able to expand to cover the OAD." In order to promote and market the OAD effectively, the marketing department needs to be expanded or someone from another

department must take on promotional duties (David Holding, personal communication, 19 April 1999).

6.2.7.1 Visibility

The group spoke informally with some employees of the GDBA who knew little or nothing about the OAD. However, it has been developed and funded since 1987. This demonstrates the lack of communication about the device throughout the organization. The OAD should be more visible in the daily work of the employees of the GDBA in order to increase their curiosity and awareness about the device.

In order to increase visibility, the GDBA can utilize *The Leader,* which is a bi-monthly internal publication (distributed to employees), as well as the *Forward,* which is a monthly external publication (distributed to employees, clients, and supporters). The GDBA should publish an article formally introducing the OAD 2000 (the latest version). An article also should be published which shows the results of the analysis of the surveys that were completed by visually impaired clients and notes that the users find the device very beneficial. An article specifically about a client who enjoys the OAD would also increase interest. Once a month, an article about the progress of the OAD in a specific center or hotel could be published in order to create subtle rivalry between the centers. These publications are widely read throughout the organization and may be the most direct link to both the clients and staff of the GDBA.

The marketing department can create promotional devices, such as posters and brochures, to raise employee and client awareness of the benefits of using the OAD. These brochures need to be created with text and graphics as well as in Braille. The brochures should be distributed with all of the initial paperwork in the beginning of

training sessions as well as hotel visits. Scheduled walks with the OAD can be set up at certain times during the week to encourage usage as well.

The marketing department in conjunction with David Thompson can also organize a press campaign over the radio as well as the BBC to give the OAD more exposure. Thus, creating more awareness that can lead to greater usage both inside and outside the organization.

6.2.7.2 OAD Informational Web Page

A web page specifically designed for the OAD would be beneficial to the expansion of the organization's, as well as the clients', knowledge of the device. By creating a link from the GDBA homepage to this OAD page, anyone can access the information contained within the pages with an ordinary web browser. Certain pertinent information that would be included in the OAD pages would be a write-up of the device itself, technical aspects and technical support information, an online version of the instruction manual, and any product upgrade or redesign information. A template of this web page design has been created and is included in Appendix P so that the GDBA can consider adding it to their web site. A soft copy will also be made available.

The online write-up of the device can be made from previous write-ups that appear in papers such as GDBA newsletters. The group has provided their write-up of the OAD as a sample. This write-up can also include information on the device itself such as size, instructional information, what it actually does for a person, and its restrictions or limitations. Having this information readily available could possibly interest a new group of people as well as keep previous users aware of the existence of the OAD.

Technical data on the device should be included along with information on technical support for the OAD, and an online version of the operator's manual. This data would be beneficial to the trainers more so than the visually impaired because it would offer updated information on how to fix any problems associated with the OAD. It could also remind trainers how to program new routes, which should encourage them to create new ones.

Another section should incorporate product upgrades and redesigns. This is for people who have used the device before and possibly had some problems with it. These people can read this section and see if the problems they experienced have been fixed. There should also be contact information for sending suggestions, complaints, or any comments to the GDBA regarding the OAD. This will allow for a blind person to communicate with the GDBA anything they might think about the OAD.

6.2.7.3 Annual Trainers Conference

From interviews with trainers and staff, it appeared that the benefits of the OAD were not communicated to the staff well, and a greater effort in this area would be beneficial to increase usage of the device. One suggestion is to organize an annual 1-day conference that includes all of the trainers, or at least all the Resident Experts, from all the centers and hotels. This conference could include other issues relevant to the training staff. In addition, this would be an ideal time to have a presentation about the latest changes in the OAD. The presentation would then be followed by a panel of visually impaired users who would talk about their experiences with the OAD as well as new applications and changes they would like to see develop with the device. After the panel discussion, the trainers can be put into groups, mixed by center location, to talk about

their problems and receive suggestions from other center trainers about how to solve them. In general, the conference can be used to promote and increase communication about the device between the centers, and therefore promote usage and quickly detect problems with the OAD.

6.3 Phase III- External Expansion

6.3.1 External Marketing

From the analysis gathered from David Thompson's survey, it was established that 99% of the visually impaired users wanted the OAD available in public areas. This number is extremely high and suggests almost total acceptance of the OAD by the blind. These visually impaired users represent a willing market, which is the first step in developing a successful product. To promote future usage of the OAD, marketing and promotional plans need to be established. From analysis of the data collected from interviews and research, plans have been set up to further advance the OAD outside the GDBA.

6.3.1.1 External Marketing Plan

Most of the respondents that the group interviewed, including the visually impaired (99%), the training staff, and the initiators of the OAD (100%), believe that the OAD can be very useful in public places as well as for other people aside from the visually impaired. Options for external markets would benefit the organization. The organization is in the process of redefining their purpose and mission, part of their new focus is to "expand and develop its [The GDBA's] core services in the field of mobility and related rehabilitation" (Geraldine Peacock, CEO of GDBA, personal communication, 15 March 1999). The external marketing and implementation of this device would expand the services of the GDBA and provide aid to more people on a daily basis.

Section 6.3.3 contains suggestions for places to implement the OAD in the public realm and the other groups of people that may benefit from external implementation of the device. Public locations, such as large shopping areas and transit stations should be targeted. The approximate cost of installing the OAD system must be determined. Then one transit station or shopping area should be used to test the effectiveness and user market of the device. If successful, the group then suggests that an employee be hired to focus on the public marketing of the OAD.

In order to convince the authorities and private companies of the benefits of establishing the OAD at their site, marketing analysis needs to be conducted prior to contacting the site. Certain benefits need to be emphasized. Many companies would be eager to use the OAD because the company would like to be seen doing something good for the disabled and this device will help aid the disabled who visit their shop or transit station or town center. This device should also be marketed by the sales representative as a device that can aid the general public, not just the visually impaired. The owner of the system can put any message they want to be received, for example, messages in different languages, advertisements, travel information such as warnings, train schedules, or store information could be utilized. One of the biggest benefits of this device for businesses serving the public is the fact that any message can be recorded. See section 6.3.2 for other locations and people that would benefit by using the OAD.

6.3.1.2 External Demand Analysis

The GDBA has already spent over ½ million pounds on the OAD. From the users' perspective, ninety-nine percent of the visually impaired that have used the device would like to see it used in public areas. Also, the government added a provision to the

Disability Discrimination Act, to begin during 1999, that requires service providers to make reasonable adjustments to make their services accessible to the disable customers or service users. From the perspective of the business community, this act will motivate companies to seek services for those with disabilities (United Kingdom Disability Rights Commission, 20 July, 1998).

In 1997 and 1998, Buckingham Research Associates conducted market research for the GDBA in order to determine the appeal of the OAD. They interviewed people in a university, shopping mall, hospital, city council, outdoor park, tourist attraction, and large production facilities. The research group found that there was general enthusiasm to discuss the application. The private sector invests large amounts of money to address problems of moving people around and the estimated costs of the OAD are not restrictive. However, the public sector has a very small budget to develop their services. Tourist attractions are large retail developments and the cost of providing information for visitors is very expensive, and the OAD would not be excluded as an option. Universities have a high budget to spend on capital investments, specifically technology and they are receptive to new concepts. The large production facilities anticipated some security issues with the device because they would not let a visitor go around the building by him or herself and expected problems with the sequential aspect of the OAD. Shopping Centers also welcomed this idea, however they were concerned with the sequential characteristic of the device. The most positive reaction to the OAD was from a city council that liked the flexibility and fast modification of the device. The various shops (mainly high profile retailers) could pay for the expense of the device. Hotels were concerned about the use of the device in the event of a fire, because it may lead OAD users in the wrong direction.

The sites where the OAD seemed to have most appeal were shopping centers, universities, parks, and tourist attractions (Buckingham Research Associates, January 1998).

From the responses of both the visually impaired users as well as the external market, that could use the device for the visually impaired or the general public, the device has a market and potential demand. This justifies the need for external marketing. The OAD can be modified to use a non-sequential set-up for certain places, such as museums and parks. Programming changes could also include the ability to search ahead for more than one beacon, preventing a skipped beacon from nullifying the OAD.

6.3.2 Locations for Installing the OAD

With a device such as the OAD, there can be many applications outside of the GDBA. The ability to help a blind person maneuver in unfamiliar territory can be a potentially beneficial advantage in a number of areas. Through many interviews as well as collaboration, the group has organized a list of potential places where the OAD can be installed effectively. Reasons why the OAD would be effective in these locations are explained after each site.

Other Guide Dog Schools: There are 72 guide dog schools around the world that belong to the International Federation of Guide Dog Schools (Sheila Wilkinson, Secretary to International Federation, Personal Communication, 27 April 1999). This federation is set up to offer advice and makes sure all the schools are operating up to certain standards. The larger schools that may have the necessary funding may be interested in the device. The following are the schools in the Federation that train over 50 units (guide dog and student) a year:

1. Scuola Nazionale Cani Guida per Ciechi- Italy
2. Fundacion ONCE del Perro-Guia- Spain
3. Guide Dogs for the Blind Inc.- San Rafael, California, USA
4. Leader Dogs for the Blind- Rochester, Michigan, USA
5. Seeing Eye Inc.- Morristown, New Jersey, USA

If other guide dog schools were to use this device, it is apt to be used in more public areas around the world.

Shopping Centers: Installing beacons in key locations throughout shopping centers can allow a visually impaired person to set up their own routes of certain stores in the center or have a pre-made route of the entire center readily available, thus making finding the correct shops much easier. This was by far the most suggested place to implement the OAD, with 46.2% of all users mentioning it.

Bus and Railway Stations: Installing the OAD at these stations could increase the independent mobility of the visually impaired, especially in the United Kingdom, where the bus and railway systems are common forms of travel. This was the second most requested area of implementation for the OAD, with 20.2% of all users mentioning it.

Town Centers: Installing the OAD in the town center could be beneficial where the center is a travel destination or home to many visually impaired. Directions could be given as to the whereabouts of certain stores, restaurants, and sites that are around the general area. This was the third most suggested place of implementation by 18.3% of all users.

Banks, Post Offices, and other Government Buildings: Having the OAD available in such buildings as these will make everyday chores easier for the visually impaired user. 8.7% of training center users suggested installing the OAD in these places.

Hospitals: Installing the OAD in hospital entrances and on each floor can provide the blind person with information on the whereabouts of different wings and rooms in a hospital. This can make it possible for a blind person to maneuver himself or herself around a hospital without the aid of someone else and become more independent.

Parks: Installing the OAD in parks can allow for a leisurely stroll around the pond, easy access to anything else the park might have such as horseback riding, picnic areas, etc., and finding such places like food stands and restrooms. The beacons, if placed correctly, can allow a visually impaired person to enjoy a day in the park totally on their own. This can also benefit the guide dogs, by allowing the dogs to have a free run in the park while the blind person travels around the park, maintaining his or her orientation through the OAD.

College Campuses: The many advantages associated with the OAD on college campuses include the ability to label each classroom building and where it is, as well as arenas, park areas, cafeterias, and dormitories. Having the OAD can help people learn the routes much faster and not have to go through the initial stress and anxiety of finding their way around a crowded college campus. This would save time spent with the blind person learning the routes around the school.

Tourist Attractions: Installing the OAD in museums, theme parks, exhibits, and city tours would allow tourists, with or without visual handicap, to wander through the exhibits or museums and discover the area for themselves without the need of an human

guide to give them a tour. These types of devices are used at many tourist attractions currently, however some are not as user friendly as the OAD. For example, the tourist attraction, Stonehenge, has electronic guided tours. The device there looks like a large cellular phone. In order to receive messages, the user must find a number in the area where they are walking and press that into the keypad of the device. If the OAD were installed, all the user would have to do was turn the receiver on and then walk around the henge, the beacons and receivers would do all the work.

6.3.3 Other Groups and the OAD

From conversations with visually impaired users, as well as trainers, and collaboration amongst the group, applications for the OAD outside the needs of visually impaired people have been developed. There are a few groups of people that the OAD can benefit just as much as the visually impaired. Listed below are the different subgroups, followed by an explanation of how the OAD can benefit them.

Alzheimer's Patients: The OAD can benefit patients suffering from Alzheimer's disease by serving as a reminder of directions as well as reasons for travelling to certain places.

Sighted Tourists: Even sighted tourists can benefit from the OAD. By plugging in routes to certain vacation spots, a tourist, especially one in a foreign country where the language is unknown, can have a "talking map". This can prevent the visitor from getting lost and finding everything that he or she wanted to find. The OAD can be offered on museum tours and city tours as well as made available in various languages for foreign tourists. Therefore, the user can enjoy a more relaxed and pleasant trip.

Learning Disabled: The OAD could be especially helpful to people with learning disabilities. It can help people get around without getting lost, and also act as a backup in case the person does become lost or disoriented. The OAD can dramatically reduce the stress and anxiety of a person with a learning disability because that person will not have to spend so much time concentrating on the route, and can listen for immediate instructions instead.

6.3.4 Other Applications of the OAD

6.3.4.1 On Line Database

If the OAD becomes widely accepted and is offered publicly, the IQP group suggests that an online database linked to the GDBA web site could be installed that would give users access to pre-programmed memory card instructions for the OAD. This is a proposed outline of the OAD's public use and how the end user can access the information.

6.3.4.1.1 Public Use of the OAD

Should the OAD become popular and marketed properly, the system could be sold at cost to other visually impaired institutions, such as the RNIB and other O&M training centers across the world. They could also be sold to businesses that service the public, such as shopping malls, museums, and hospitals. Each institution would create several memory cards containing instructions to guide the person through the location. These memory cards would be issued with the OAD receiver at the location and both the receiver and card would be returned when the VI user is finished. Eventually, if the OAD becomes widely used, users could also purchase their own OAD receiver and use only the supplied memory cards. By having pre-programmed instructions available, the user

would not have to go through the painstaking process of creating instructions for an unfamiliar place with unknown beacon numbers.

Another possibility is that the user of the OAD may want to create customized instructions for these public locations if he or she is familiar with the areas. They may not want to use all of the instructions provided in the memory card supplied by the institution nor would they want to create instructions from scratch. For example, the user may want to go the mall and only go to specific stores rather than take a tour of the whole mall. If the user had access to the memory cards, they could make changes to the existing instructions by omitting some steps. An online database would allow a person to browse the available instructions, download them, modify them, and put them on their own memory cards for use with the OAD.

6.3.4.1.2 Use of the Database

The database would be installed on the existing GDBA web server and would grant read-only access over the World Wide Web to anyone who wants to download pre-programmed memory cards. The GDBA web site would have a section devoted to the memory cards, which would allow the user to browse the available memory cards by region or by type of location. Examples of how this may be laid out are in Appendix Q. For example, if users wanted to know which facilities had the OAD in Berkshire County, they could browse by county and see what was available there. They could then browse more specifically by city or town. Alternatively, they could browse to see if there were shopping malls that have the OAD and then find where the malls are. Once finding the location they wish to visit, they could obtain a listing of the different instruction cards available and read a description. From these instructions, the users could then determine

if they want to use an existing card, customize one, or make their own from scratch. Then by downloading the information, a memory card they desire would be created, free of charge as well as painlessly accomplished.

6.3.4.1.3 Set-up of the Database

David Thompson created the PC Recorder software, which allows for the creation of all aspects of route design. The functions of the program are fairly basic and straightforward, according to trainers who have used the software. The program allows for creating the route according to specifications such as beacon number and trigger distance from the beacon. It also permits the user to verbally record the instructions that are heard over the receiver. The activation information organized in a database can be transferred to a memory card for use in the OAD receiver.

The online database would be updated and maintained by the people who run the GDBA web server and web site. Creating and updating the database would consist of adding to the database a list of the available memory cards, descriptions of their instructions, and their location information such as city, county, region, and location type (mall, museum, park, etc.). Everyone could then access the information on the GDBA web site by using an ordinary web browser.

The database would be accessible on the World Wide Web to whoever wants to download the instructions. The web pages would have a search engine that would allow the user to search for OAD locations by typing in a keyword. The web pages would also have links that allow the user to browse OAD locations by type or by geographical location, as previously mentioned. Once a person finds the OAD location of choice, either by browsing or through a search, a web page would display the relevant

information about that particular location. This information includes the address, directions to the location from various points, and a list of the available memory cards for the location. It is possible that the location may have just one card to offer or it may have multiple cards. For each card there will be a description of where the memory card takes the user, specifically, and possibly recommendations of which card would best suit certain people. Once the users have decided which card they want they would click on a link to download the instructions directly to the memory card drive on the user's computer. From this point the users can either use the card or, if familiar with the specific area, they can modify the messages with the OAD PC Recorder.

The web page would need to be updated on a regular basis. Each time a new route is created, it would need to be added to the database and the information would need to be added to the web page. This updating would be done by whoever runs the web site.

6.3.4.1.4 Components

The OAD PC Recorder software would be sold separately from the OAD and will work on any Windows 95 or better computer. The receiver would be sold individually or packaged with beacons. Each individual institution would work with a GDBA representative to determine how many beacons are necessary. Additional beacons and receivers could be sold at a later time as needed by the customers.

6.3.4.1.5 Summary

In summary, the OAD has the capability to be used as a standard secondary mobility device across both the UK and the world. It can be sold to facilities run by organizations for the visually impaired or it can be sold to publicly or privately owned institutions where guidance for the visually impaired can be helpful. If widespread use of

the OAD occurs, an easy method of accessing instructional information for various locations will make traveling easier for the visually impaired who use the OAD. As long as a universal standard is accepted a way of accessing this information is over the World Wide Web using a web browser and downloading the desired information to a memory card.

A way of organizing this information for displaying on the web and also for administrative purposes is a database. The database would store information about each location that has the OAD installed, descriptive information about the available memory cards at that site, and keywords for that site which can be used for the web based search engine. This can make the job of adding new memory card information easier, as well as updating previous memory cards if the route has been changed or modified.

6.4 Phase IV - Creation of an OAD Operations Department

If the OAD becomes popular among the different training centers and public places such as malls and transit stations, an expansion within the GDBA should be considered. In order to cope with the expansion of the OAD, the GDBA would need to establish an OAD Operations Department. This department would be based at GDBA Main Headquarters, as a centralized base of operations. The reason behind setting up this department would be to better organize all aspects of the OAD system. The more widespread OAD use, the more attention it must be given in order to maintain to provide better service and greater expansion. The following is a plan of the pilot OAD department that could be established at the GDBA.

The first part that should be incorporated into this OAD department should be a sales representative. This sales representative would be the key in the expansion of the

OAD into the public and private domain. The sales representative would travel to various locations and present the OAD and the data obtained from David Thompson's surveys as well as this group's surveys and try to convince organizations to use the OAD.

Along with a sales representative, there should be a Marketing and Public Relations representative. This person would handle all of the promotional aspects of marketing the OAD as well as continue the development of the OAD marketing plan through marketing research. The marketing would continue throughout the GDBA, and filter out into the public domain, according to the popularity of the OAD.

The technical support staff, mentioned in section 6.1.1, would have their base of operations located in the OAD Department. Some of the support staff would be spread out among the different geographical locations to quickly aid the respective sites in that area. The staff would be provided with cellular phones in order to provide a technical support phone line for problems and questions about the operation of the OAD. All employees of the technical support staff would report to this department, regardless of where they were stationed. This department would also be in charge of updating the OAD informational web pages as well as the downloadable route page.

In order to justify the creation of an OAD Department, a preliminary cost analysis needed to be conducted. After some research, approximate entry-level salaries were determined for each member of this OAD Department. A sales representative would cost approximately £20,000 a year, while a marketing representative would cost £15,000 a year, and finally a trained technician would get about £20,000 a year. These figures are approximate. It should also be noted that these figures do not include the 38% that the GDBA has to pay in addition to the salaries for pension and taxes, etc. If an OAD

Department were created, with one person from each sector to start, the average annual salary expense would be approximately £76,000 a year for the employees. Even by adding the typical 50% to this figure for overhead, the total comes to £114,000. When this figure is compared to the approximately £500,000 that the GDBA has already spent on developing and installing the OAD.

An OAD Operations Department would be very beneficial to the OAD development program. It would allow for one unit to cover all aspects of the OAD in an organized fashion. It would also allow for quicker and more efficient technical support. An OAD Department should be established if the GDBA would like to further the expansion of the OAD into the public realm and also keep track of the OAD within the organization effectively.

6.5 Conclusions

The main objective of this IQP was to evaluate the usage of the OAD within the GDBA. It was speculated that there were problems with the usage of the OAD at training centers. The group investigated this problem through interviews with the training staff and the centers, the visually impaired users at the centers as well as the hotels, and the creators and initiators of the device. Through its research, the IQP group learned about a paradox in society today, that is the technology that is developed. Much of this technology is very helpful and makes ordinary tasks easier, more efficient, and more economical, however the end user is reluctant to change their ways and use the technology. The creators of the technology, who are comfortable with technological changes do not comprehend why the trainers, who the device was developed for, are not using the device. The users are not comfortable with the technology and the solution to

this lies in the method that the technology is presented. Time and guidance for the users to learn and use the device will help them to become comfortable with it and understand what it does.

The OAD's technology allows for a visually impaired person to become more independently mobile, and also relieves stress and anxiety along the way. This technology has many benefits to the trainers in addition to the visually impaired. The OAD can also reduce the time the trainers need to spend with a blind person if used correctly. Despite these perceived benefits, some of the trainers still resist using this technology. Reasons for this range from reliability issues to technophobia. However, Through research and interviews, the IQP group formulated suggestions to increase the usage of OAD throughout the GDBA, which in turn would benefit everyone involved with the OAD.

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Appendix A: Sponsor Information

The Guide Dogs for the Blind Association (GDBA) is a charitable organization that trains guide dogs to assist the visually impaired. They also train the visually impaired to use guide dogs as well as manage special hotels that focus on the needs of the blind. In addition to working directly with the visually impaired, the GDBA is one of the financial contributors to ophthalmic research in the United Kingdom. Besides training dogs and making donations, the GDBA provides financial assistance to those who can't afford guide dogs, and they have developed electronic devices to aid the blind travel more independently.

The Guide Dogs for the Blind Association is the largest producer of working dogs in the world, as they are responsible for over 7,000 dogs. This includes over 4,500 active guide dogs, over 850 dogs in training, and nearly 1,000 prospective puppies. They also have nearly three hundred dogs that continually give birth to new prospects.

For information about the GDBA, contact:

The Guide Dogs for the Blind Association

Burghfield Common

Reading RG7 37G

United Kingdom

Telephone: 0118 983 5555

Fax: 0118 983 5433

Clare.evans@gdba.org.uk

Appendix B: Glossary of Acronyms

GDBA – Guide Dogs for the Blind Association
OAD – Orientation Assisting Device
O&M – Orientation and Mobility
ETA – Electronic Travel Aid
MoBIC – Mobility of Blind People Interacting with Computers
MoTA - Mobility of Blind People Interacting with Computers Travel Aid
MoPS – MoBIC Pre-Journey System
MoODS – MoBIC Outdoor System
GPS – Global Positioning System
GIS – Geographical Information System
TS – Talking Sign
VL – Verbal Landmark
ACB – American Council for the Blind
JMU – Joint Mobility Unit
RNIB – Royal National Institute for the Blind
SXT – Social Exchange Theory
4Ps – Product, Place, Price, and Promotion
UK – United Kingdom
SC – Small Center
RTC – Regional Training Center
SCM – Small Center Manager
ATS – Area Team Supervisor
RW – Rehabilitation Worker
RSM – Rehabilitation Service Manager
GDMI – Guide Dog Mobility Instructor
GDO – Guide Dog Owner
VI – Visually Impaired
TO – Technical Officer

Appendix C1: Table of Sample Sizes

Sample size for the 95 percent confidence level.

Table 5.1

Final sample sizes needed for various population sizes and characteristics, at three levels of precision

	Sample size for the 95 percent confidence level					
	±3% sampling error		±5% sampling error		±10% sampling error	
Population size	50/50 split	80/20 split	50/50 split	80/20 split	50/50 split	80/20 split
100	92	87	80	71	49	38
250	203	183	152	124	70	49
500	341	289	217	165	81	55
750	441	358	254	185	85	57
1,000	516	406	278	198	88	58
2,500	748	537	333	224	93	60
5,000	880	601	357	234	94	61
10,000	964	639	370	240	95	61
25,000	1,023	665	378	234	96	61
50,000	1,045	674	381	245	96	61
100,000	1,056	678	383	245	96	61
1,000,000	1,066	682	384	246	96	61
100,000,000	1,067	683	384	246	96	61

How to read this table: For a population with 250 members whom we expect to be about evenly split on the characteristic in which we are interested, we need a sample of 152 to make estimates with a sampling error of no more than ±5 percent, at the 95 percent confidence level. A "50/50 split" means the population is relatively varied. An "80/20 split" means it is less varied: most people have a certain characteristic, a few do not. Unless we know the split ahead of time, it is best to be conservative and use 50/50.

Numbers in the table refer to completed, usable questionnaires needed for various levels of sampling error. Starting sample size should allow for ineligibles and nonrespondents. Note that when the population is small, little is gained by sampling, especially if the need for precision is great.

Remember! Sampling is just one of the four sources of error and is the only one whose effect we can usually estimate with confidence (see Chapter 2).

(Dillman and Salant, 1994, p. 55)

Appendix C2: Survey Question Structure

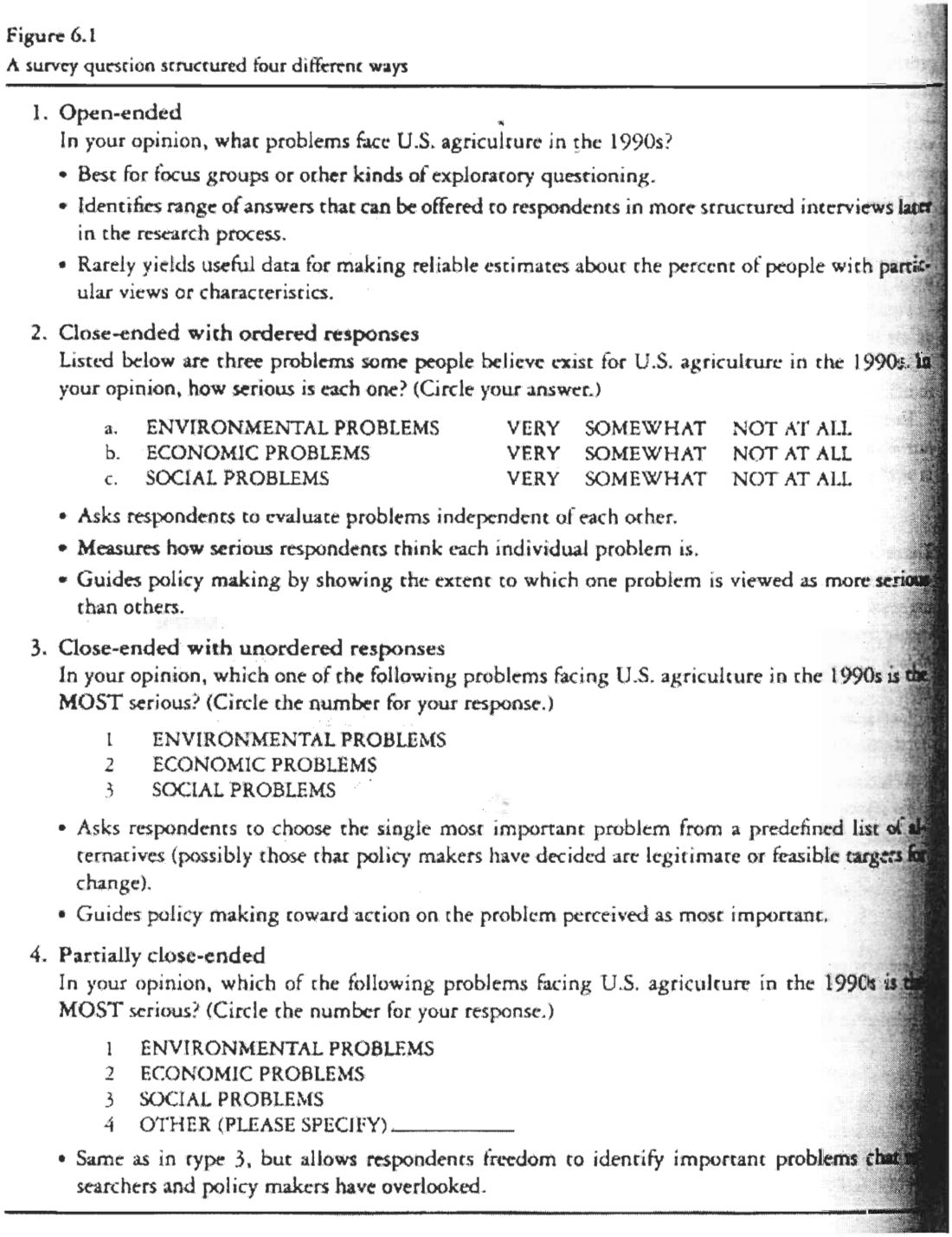

Figure 6.1
A survey question structured four different ways

1. Open-ended
   In your opinion, what problems face U.S. agriculture in the 1990s?
   - Best for focus groups or other kinds of exploratory questioning.
   - Identifies range of answers that can be offered to respondents in more structured interviews later in the research process.
   - Rarely yields useful data for making reliable estimates about the percent of people with particular views or characteristics.

2. Close-ended with ordered responses
   Listed below are three problems some people believe exist for U.S. agriculture in the 1990s. In your opinion, how serious is each one? (Circle your answer.)

a.	ENVIRONMENTAL PROBLEMS	VERY	SOMEWHAT	NOT AT ALL
b.	ECONOMIC PROBLEMS	VERY	SOMEWHAT	NOT AT ALL
c.	SOCIAL PROBLEMS	VERY	SOMEWHAT	NOT AT ALL

   - Asks respondents to evaluate problems independent of each other.
   - Measures how serious respondents think each individual problem is.
   - Guides policy making by showing the extent to which one problem is viewed as more serious than others.

3. Close-ended with unordered responses
   In your opinion, which one of the following problems facing U.S. agriculture in the 1990s is the MOST serious? (Circle the number for your response.)

   1 ENVIRONMENTAL PROBLEMS
   2 ECONOMIC PROBLEMS
   3 SOCIAL PROBLEMS

   - Asks respondents to choose the single most important problem from a predefined list of alternatives (possibly those that policy makers have decided are legitimate or feasible targets for change).
   - Guides policy making toward action on the problem perceived as most important.

4. Partially close-ended
   In your opinion, which of the following problems facing U.S. agriculture in the 1990s is the MOST serious? (Circle the number for your response.)

   1 ENVIRONMENTAL PROBLEMS
   2 ECONOMIC PROBLEMS
   3 SOCIAL PROBLEMS
   4 OTHER (PLEASE SPECIFY) _____

   - Same as in type 3, but allows respondents freedom to identify important problems that researchers and policy makers have overlooked.

(Dillman and Salant, 1994, p. 86)

Appendix D1: Process for Implementing Change

The three-stage process necessary during change (focused toward manager) and the 13 principles a manager should apply during the change process.

I. Unfreezing stage
   1. Provide your rationale- share your reasoning with the employees.
   2. Be empathetic- show the employees that you understand their difficulties.
   3. Communicate clearly- tell them all the particulars and details as clearly and extensively as possible.

II. Making the transition
   4. Explain the benefits.
   5. Identify a champion- a manager who will voluntarily support the change effort.
   6. Obtain input- show them how you have incorporated their ideas.
   7. Be aware of the timing.
   8. Maintain job security.
   9. Provide training.
   10. Proceed at a manageable pace.

III. Re-freezing
   11. Indicate top management support.
   12. Publicize successes and make mid-course corrections where needed.
   13. Provide employee services.

(Iskat and Liebowitz, 1996)

Appendix D2: Organizational Learning Curve

An illustration of a typical organizational learning curve for change. Visually explains section 3.5.8 of the Literature Review.

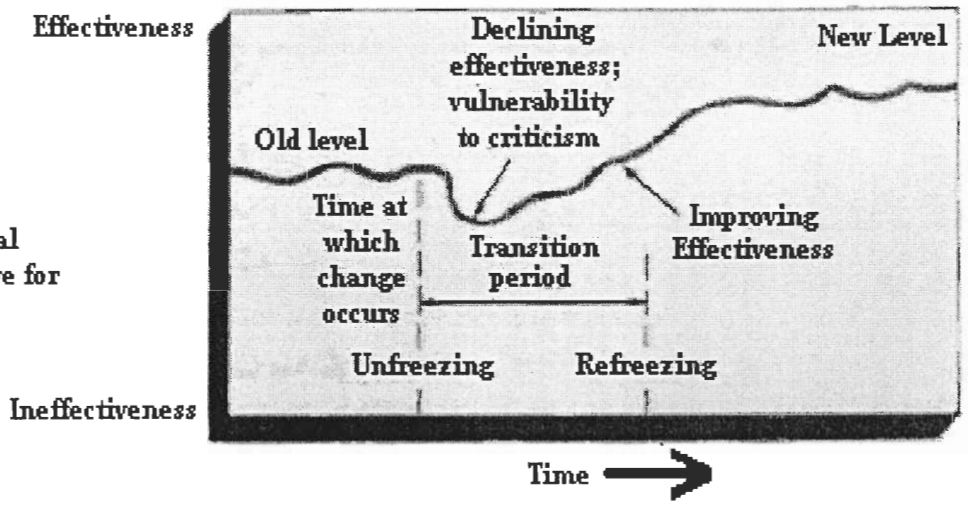

FIGURE 12-7

A typical organizational learning curve for change

(Davis and Newstrom, 1989, p. 296)

Appendix D3: Building Support for Change

A detailed outline of section 3.5.9 of the Literature Review.

Characteristics that aid in a better change process.

1. Leadership

Capable leadership reinforces a climate of psychological support for change. Change is more likely to be successful if the leaders who introduce it have expectations of success.

2. Participation

The more the employees are involved in the change the more interested they become in it. As long as they feel their needs are being considered, they feel secure in a changing situation.

3. Shared Rewards

Rewards give employees a sense of progress with a change. Both economic and psychological rewards are useful. Employees appreciate a pay increase or promotion, but also appreciate emotional support, training in new skills, and recognition from management.

4. Employee Security

Security during change is essential. Employee benefits need to be protected or the employees will look elsewhere for security.

5. Communication

Communication is vital for cooperation to occur. Cooperation is necessary for a smooth transition.

6. Employee Readiness

Change is more likely to be accepted if the people affected by it recognize the need for it before it occurs. Help employees see the need for change. Employee readiness of change is most powerful when employees discover the need for change themselves.

(Davis and Newstrom, 1989, p. 297)

Appendix E: Steps in Decision Making

A detailed outline of Section 3.6 of the Literature Review

(Four steps to utilize in order to make good decisions)

Step 1: Recognize the Existence of Problems and Opportunities
Step 2: Define the Exact Nature of Problems and Opportunities
Step 3: Identify Alternative Courses of Action
Step 4: Select an Alternative Course of Action

(Stevens et al, 1997, p. 3)

Appendix F1: GDBA Guide Dog Mobility Instructors Interview Questions

The following questions were asked during interviews with GDBA trainers to obtain information about how the guide dog trainers utilize the OAD in training. They were also used to discover what the trainers like and dislike about it, and to find out how it can better serve the trainers.

1. Describe the session before the OAD.

2. Describe the session with the OAD.

3. In your opinion, does the OAD aid in training? Explain why or why not. (Probe)

4. In your opinion, what are the benefits of using the OAD?

5. In your opinion, what are the disadvantages/problems of the OAD?

6. During the training sessions, do the visually impaired users find the OAD useful in training?

7. a) On a scale of one through ten (one being the worst, ten being the best), how would you rate the overall usefulness of the OAD?

   b) More specifically, how would you rate (again, from one to ten) the usefulness of the OAD in training the visually impaired?

8. How do you use the OAD in a training session?

9. Have you ever been trained using the OAD? Is there a special training session devoted to learning how to use the OAD?

10. Do you offer the OAD and its services to all clients during their training? If so/not, why?

Appendix F2: Visually Impaired Users at Hotels Interview Questions

The following questions were asked during interviews with visually impaired users of the OAD at GDBA hotels to obtain opinions about its use. This information was used to determine if this is a useful purpose for the device.

1. How was your stay the GDBA Hotel? Which one did you stay at?

2. Do you primarily use a guide dog or a cane?

3. a) How many times have you used the OAD in the GDBA hotels?
   b) Did you use it with a cane or guide dog?
   c) Would you consider using it again?

4. a) What did you like about the OAD in general?
   b) What did you dislike about the OAD?

5. Do you feel the OAD increased or decreased a) your mobility capabilities,
   b) your independence
   c) your stress and anxiety?

6. a) Were you trained in using the OAD before using it in the hotel?
   b) Was it easy to learn?
   c) How do you rate the overall usefulness of the OAD on a scale from one to ten (one being worst, ten the best)?
   d) How do you rate the ease of use of the OAD on the same one through ten scale?

7. a) Is there anything you feel might improve the use of the OAD to make it easier or more effective?
   b) Do you think there are any features that could be added to, or subtracted from, the OAD to make it more useful?

8. In which public places do you think the OAD would be useful?

9. Have you used other Electronic Travel Aids in the past? Which ones?

Appendix F3: Visually Impaired Users at Training Facilities Interview Questions

The following questions were asked during interviews with visually impaired users at the GDBA training facilities. This was done to obtain information on how the users feel the OAD helps or hinders them during training. This information was used to help decide whether or not the OAD is being used in such a way that is useful to the visually impaired.

10. How did you discover the OAD? How was the OAD offered to you?

11. Describe one of your orientation and mobility training sessions when the OAD was used.

12. a) What did you like about the OAD in general?
    b) What did you dislike about the OAD?

13. What did you like about the way the OAD was implemented in the training?

14. What did you dislike about the OAD and its use in training?

15. Do you feel the OAD is effective or ineffective in the training session? i.e. is training session easier or better with or without it?

16. a) Is there anything you feel might improve the use of the OAD to make it easier or more effective?
    b) Do you think there are any features that could be added to, or subtracted from, the OAD to make it more useful?

17. a) On a scale of one through ten (one being the worst, ten being the best), how would you rate the overall usefulness of the OAD?

    b) More specifically, how would you rate (again, from one to ten) the usefulness of the OAD in guide dog training?

18. Can you offer any suggestions for improving the integration procedure of the OAD in training?

19. In which public places do you think the OAD would be useful?

20. Have you used other Electronic Travel Aids in the past? Which ones?

Appendix F4: GDBA OAD Creators and Initiators Interview Questions

The following questions were asked during interviews with the GDBA OAD initiators (developers, inventors, upper management) to obtain information about how the OAD was intended to be used. This showed whether or not the trainers and designers have a clear understanding of each other and the intended goals of the OAD.

1. What was the purpose of developing the OAD?

2. In the development stages, was the OAD intended to be used in both training and hotels?(Probe this answer)

3. How is the OAD meant to aid in training?

4. How is the OAD meant to aid in hotels?

5. Do you feel that the OAD is being used effectively in guide dog training? How so? What could be some possible problems?

6. What was your 'installation plan' of the OAD to begin with?

7. What would you like to see the trainers do with the OAD in their training sessions or how would you like it to be implemented?

8. Do you feel that the OAD is being used in an effective manner at the hotels? How so? Where might some problems lie?

9. Have any trainers come to you citing problems with the OAD, saying it doesn't help them, or it hinders them? If so, what were their complaints?

10. What is your vision for future applications of the OAD, in both the near and distant futures?

11. a) On a scale of one through ten (one being the worst, ten being the best), how would you rate the overall usefulness of the OAD?

    b) More specifically, how would you rate (again, from one to ten) the usefulness of the OAD in guide dog training?

Appendix G1: Interview with Fred McGinn, Professor of Social and Rehabilitation Services at Assumption College

17 February 1999

The entire project group interviewed Mr. McGinn at Assumption College 17 February 1999. Mr. McGinn has been working in rehabilitation for 18 years and he has been at Assumption for 3 years. He used to be an Orientation and Mobility instructor for the blind and has used the OAD and similar Electronic Travel Aids. The project team asked Fred to describe a training session with a visually impaired person. He explained that most blind people have some type of vision, where they can see lines or light, and some are completely blind. The first step in O&M training is to find out what the person can see. In order to accomplish this, the trainer acts as the blind person's sighted guide, takes them around a building or even outside and asks them what they can see. After what they see is determined, the training depends on whether a cane, guide dog, or sighted guide is used. He mentioned that the dog and cane are very similar. The cane detects objects in front of the user (from the waist down). The guide dog is told by the visually impaired owner where to go; this is contrary to a common misconception that the dog is leading the person. In order to use a guide dog the blind must *really love* dogs, must be sociable because many people, especially children, will come up to the dog and user in public places, and they must also have a mobile lifestyle (if they do not, the dog loses its training).

The group also asked Fred about the common problems that impede the progress of a blind person's rehabilitation. He explained that the biggest factor impeding progress is denial. Visually impaired must accept the fact that they are blind and that they need help. If they do not have a positive attitude about training and receiving help, then the O&M training will not be effective. As far as the physical aspects that may impede progress, they are dependent on the environment that the user must travel in. Training is effective if the visually impaired is motivated and dedicated to the training. Support from family and friends help as well.

Finally, the group asked about his knowledge and opinions of secondary mobility devices. He explained that he has used many of the devices. These devices were popular in the 1970's but have faded out. They are still available to buy, but most visually impaired do not use them because they draw attention to the fact that they are visually impaired. The devices also required a greater amount of dependence, as compared to using just the cane or guide dog. He offered some possibilities to discover the reasons for trainers' resistance. He suggested that project group look at the training manual of the OAD for the trainers. He also suggested to find the similarities of people who liked the device, and find out what they like about it. Maybe they like it because it is lightweight or discrete. Maybe the device interferes with the trainers' ability to train the visually impaired. In conclusion, this interview provided the team with insight into their project because Fred explained the training process, the difficulties that the blind go through in training, and his experience as an O&M trainer.

Appendix G2: Interview with "Richard," a Blind Adult

19 February 1999

During an interview with a blind man, who shall be called Richard, at WPI, the entire project team asked Richard various questions about secondary mobility devices (SMD), his experience with them, and also his thoughts on the Orientation Assisting Device. The team asked him what he believed could be reasons for low OAD usage by trainers and he responded and explored different reasons with the team. In addition, the he offered suggestions that he thought would help make the OAD popular in public.

Richard, being blind his entire life, has gone through countless hours of orientation and mobility training. Since he is so skilled and an experienced traveler, he has had the opportunity to try secondary mobility devices over the years. He said that none of the devices he has used have helped him to the point where he would purchase a device as expensive as most SMDs. He also said that he does not like devices that utilize an earpiece because it takes away from one of his biggest senses, his hearing. By losing one of his ears to the device he loses the sound of automobiles and other moving objects coming from the direction of his blocked ear. Another problem he had was with a device that vibrated when an object appeared in front of him. The device did not clearly warn him of the stairway in front of him, so he fell down the stairs. He said that the reason for his falling was the amount of information was too much for him to comprehend at once.

Richard had not heard of or seen the OAD but was intrigued by the team's description of it. He liked the fact that he could program a trip into the OAD and receive instructions to guide him along his route. He, again, was concerned about losing reception in one ear because of the earpiece but thought the positives outweighed that negative. He thought that integrating the OAD with the public transit system would be incredibly beneficial to the visually impaired. Announcing train arrivals and departures, directing blind people to their trains or buses, and warning them of platform ledges near railroad tracks were some of the aspects Richard would like to see the OAD used for. He also thought that using them to guide a person through a museum and setting up beacons in malls, government buildings, and parks would be useful implementations of the OAD.

Richard has never used guide dogs but he does know several people who have and expressed knowledge of the use of guide dogs. He said that one major concern that the trainers may have in using the OAD in training is that it may cause the dog to become untrained. He said that if guide dogs are not continually used, the dogs will become untrained and forget how to do their job. Another reason he suggested was that the trainers may feel the OAD phases out the guide dog.

In conclusion, Richard felt the OAD would be a useful device for the visually impaired if it were used widely and in public places. He also thought that the device would be helpful if implemented in the public transit system. He did think that a negative aspect to its design is the earpiece and that maybe the trainers do not want to use it for that reason. Lastly, he thought that the device may phase out dog use or cause the dogs to lose their ability to guide a human.

Appendix H: Liaison Contact

At 11AM Tuesday, February 9, 1999 we talked to Clare Evans, our contact at the Guide Dogs for the Blind association. We explained to her the areas of literature we researched, including communication and mobility problems, secondary mobility devices, survey methods, resistance to change, and marketing strategies. She felt that these areas sufficiently cover what is needed for the project.

We also speculated as to how many people (trainers and the visually impaired who have stayed at the hotels and used the OAD) are in the survey population. Clare explained to us that there are about 16 trainers in total that must be surveyed at the different centers. There are around 50-60 visually impaired users that stayed at the hotels in the past two years and filled out a questionnaire saying that the GDBA could contact them further with questions about the OAD. Claire will get back to us with the exact number. This information will help us determine our survey method.

We asked what data Claire needs for the final report, i.e. statistics and opinions. She explained that she would like a mixture of both statistics and opinions about the device. She further explained that our unbiased research will get to the root of the problems; she speculated that the trainers are not communicating with the center managers, controllers, and the Research and Grants Department because they do not want to cause friction between organization members.

We also discussed the future commuting plans for the time we are in the UK. We will be staying at the GDBA Hotel in Hillfields Monday, Tuesday, and Wednesday nights for the first three weeks. Then we may travel to other sites, which require overnight stays. We told her that we begin work on March 22 and end May 8. Our next phone conference is March 2nd at 9 AM Eastern Standard Time in order to discuss our proposal.

In conclusion, this conversation was clarifying for both Clare and our group. The camaraderie over the phone was also reassuring that the group and Clare will work well together.

Appendix I: Visitations

Appendix I1: Visit to Folly Court, Workingham

30 March 1999

The entire IQP group visited the Folly Court Regional Training Center in order to understand the guide dog training process better and experience mobility training first hand. First, the group met with Ray Smith, the Regional Controller at the center. Ray explained that the GDBA is one of the largest guide dog organizations in the world. Currently, the GDBA has 4,700 working dogs, 268 breeding stock, 900 in training, 700 retired, and 960 at walk. The GDBA does not train anyone under 16 and does not have an upper age limit. Fifteen years ago, if a visually impaired applicant for a guide dog had health problems or was athletically unfit they would not be accepted. However, now the breeders of the organization can breed a greater variety of dogs that are compatible with different people. The GDBA still only accepts half of the applicants for a guide dog.

The process of training a guide dog begins in the breeding center, where the dogs are born and then stay with their mother for 6 months. Then they spend 6 months puppy walking, where they stay with a host family and get used to being around people. At 1 year old, the dog goes to a GDBA training center and spends 4 months with a guide dog trainer. Then, the dog spends 12 weeks in advanced training with a different instructor. In the meantime, the students' (i.e. the visually impaired) demographics and personalities are considered by the Area Team Supervisor and matched appropriately with a dog. The dog is brought to the student to determine compatibility. Then class is held at the training center for 3 weeks, where the dog and student train together. At the end of the 3 weeks, the student pays 50 pence for the dog and signs a contract with the GDBA, where the GDBA still has partial ownership of the dog. Once the dog is at the student's home, the instructor spends 3 weeks with the student and the dog at the student's home. The GDBA helps pay for food and veterinary bills. The dog has a working career of 7 to 9 years and then it retires. Upon retirement, the GDBA finds a home for the dog if the owner cannot keep it.

After meeting with Ray and touring the training facilities, the IQP group met Joe Sinkins, a Rehabilitation Worker at Folly Court. She taught the group how to use a White Cane and then blindfolded each one of them and had them go through an obstacle course, which was very challenging. Then the group ate lunch blindfolded, which was quite a feat, and took about an hour. Then the group was introduced to PJ Hogan, an Area Team Supervisor, who showed them how a guide dog guides a person (the group could not go through a guide dog training session because it is an extensive process where the student needs background training before using the dog).

Appendix I2: Visit to Cliffden Park Hotel
7 April 1999

On April 7, 1999, the entire project group took a trip to the Cliffden Park Hotel in Teighnmouth, Devon. The purpose of this visit was to interview Trevor Genn and use the OAD on a route into the town center. The group was also able to interview two visually impaired persons staying at the hotel who had used the OAD. After talking to Trevor about the OAD and how it worked in the hotels and how the hotels are set up in general, the group was given a device and a set of blindfolds and given a free run of the OAD. Sarah allowed herself to be guided by Mike Yagodzinski and used the device with a blindfold. Immediately upon exiting the hotel, the device beeped and the first message came on with the first set of directions. The directions were crisp and to the point. At the moment when Sarah wanted to know where to go next, the receiver gave instructions. There were no problems encountered with any of the equipment. However one drawback the group noticed was that it was hard to hear the device with the noise of the traffic. It must be mentioned that clip was broken on the speaker that attached to the lapel, so the group used the device with the receiver's speaker. Also the fact that the receiver did not mention the name of any of the shops that were passed was seen as a drawback to the group. The OAD guided the group back to the hotel.

After using the OAD for the first time, the group felt it had a solid understanding of the device and its capabilities. The group also felt it had an understanding of the OAD's limitations. Overall, the group was very impressed with the OAD, and immediately understood why such a device could have many applications in many places if implemented. As sighted users, just being able to have the OAD talk them around the center of town was better than having to remember the directions or reading the directions on paper.

Appendix I3: Visit to Bolton RTC
13 April 1999

On April 13, 1999, the entire project group visited Bolton Regional Training Center in Bolton. The reason for this visit was to see an actual training center in session with students and see how the OAD system there was set up. The group arrived in the middle of a training session, so there was many visually impaired people with their new guide dogs present. Since the blind people are put through such a rigorous three-week training period, no interviews could be scheduled with them. However, the group was able to interview four trainers on-site. Much information about the politics involved with the OAD came out in the interviews. Bolton had a lot of problems trying to set up the beacons around the area of Bolton where the center is located because of the restrictions by local authorities. The training center was not allowed to attach the beacons to any public property which made the setup of routes difficult. It was also learned that routes outside of the training center into town could not be used during the actual training process, because, due to insurance reasons, the guide dog is not allowed to leave the site until the student/guide dog combination has graduated. This theory was proven wrong after an interview with Jill Farrar (see Appendix J3). The group walked around the OAD route, which was a basic square route that went around the property of the GDBA. The OAD was unavailable due to changes being made to the route.

The OAD was recently installed in Bolton and was not been used on any students. Two guide dog owners were planned to use the route in front of the local authority a week after the visit to try to convince the local authority to allow the center to put beacons up around city property. This would allow for expanded routes and better routes for the visually impaired to practice on.

Appendix J: Interviews with GDBA Staff

Appendix J1: Interview with Janet Marshall, Management Accountant
29 March 1999

The purpose of this interview was to gain a greater understanding of how the GDBA would have to finance external use of the OAD. Janet explained that the OAD is zero-rated for Value Added Tax (VAT) and therefore the GDBA Trade Company does not need to be used. The UK Charity Commission would not need to get involved either, because the device benefits the visually impaired. The Trade Company would get involved if the GDBA were taking in a profit with the sales of the system to outside organizations. Janet recommended that the IQP target a few places, such as shopping malls and transit stations and assess how much it would cost to install a system and see what funds they have available. Then calculate how much the GDBA would need to finance and create a proposal.

Appendix J2: Interview with David Holding, PR and Marketing Manager
29 March 1999

On March 29, 1999 at 11 am Michael Yagodzinski conducted an interview with David Holding, the PR and Marketing Manager at the GDBA Headquarters in Reading. The reason for this interview was to develop an idea of what aspects of marketing exist within a charity organization, and also to develop an understanding of strategies utilized in marketing products for a charity organization.

The group learned that there are two mailings currently within the organization, *The Leader* and *Forward*, that update employees of events and major news within the organization. *Forward* is also sent out externally to all the visually impaired people as well as supporters of the GDBA. The marketing within the GDBA basically is confined to promotional means in order to generate funding to keep the organization running. David said that without good promotional events, the GDBA would not bring in enough money to keep the organization healthy financially. With so much money being spent on dog training and aftercare, only about £92,000 goes to the promotional and marketing aspects out of the approximately £600,000 that the GDBA spends annually. So good promotions are necessary. The GDBA runs fundraising events, but most of the income is generated from legacies.

David and the group discussed a potential marketing campaign for the OAD internally as well as externally. Certain internal marketing strategies discussed included memos, posters, and adverts inside of the GDBA's magazines. The biggest point that David said needed to be made was to sell the benefits of the OAD to the trainers. By showing them the advantages of the OAD to the users and themselves, the trainers should be less put off by the device and more receptive towards using it.

For an external marketing plan, David suggested a press campaign being set up. He said that there was a coalition of disabled and blind organizations that allowed the GDBA to sell the OAD to anyone related to them at cost. This would cause no problems with the laws governing charitable organizations since no profit would be made. David said that by utilizing the pre-existing trade company, the GDBA can make a profit. The trade company would have to be used on such organizations as railway stations and shopping centers. He said that many companies want to be seen doing good things, so they would be more apt to take on the device for that reason, and that would be a good angle to take while trying to market the device.

David Holding, follow-up
19 April 1999

In a follow-up interview conducted by Michael Yagodzinski with David Holding, the ability of the marketing department to handle taking on the OAD. David said that because of the strategic review, the marketing department was undermanned and in the process of being revamped. He also stated that the department was very busy with their other work and could not possibly expand to cover the OAD. He suggested that expanding the department to be able to handle the OAD would not be a bad idea. Because of the strategic review, he could not tell me what direction the marketing

department was heading in, so he had no ideas as to what was going to happen to his department.

Appendix J3: Interview with Jill Farrar, Association Secretary
20 April 1999

During a recent interview with Jill Farrar by Michael Yagodzinski, the Association Secretary of the GDBA, insurance aspects of the OAD and guide dog training were discussed. The main issue at hand was the issue of a student and guide dog leaving the training site before the training was complete. This issue was brought up by one recommendation that the group suggested, which was to establish OAD routes outside of training centers into the area surrounding it as a leisure route to practice on. Jill said that there was nothing written down about something like that, so therefore if routes like those were established, guidelines would have to be written up prior to creating the routes. These guidelines should encompass all aspects of a student leaving the training center and should also cover requirements the student needs to meet before they are allowed to leave the training center. With this in mind, it is up to the trainers to determine if the student is fit to go out. Jill said that since the GDBA was considered an expert in the area of mobility, the insurance company would have no problems with any guidelines presented to them. It is just a matter of getting the guidelines written down, she said.

Appendix K: Initiator and Creator Interview Summaries

Clare Evans, Research and Grants Manager
GDBA Head Office
6 April 1999

On Tuesday the sixth of April, the project team interviewed Clare Evans, the Research and Grants Manager of the Guide Dogs for the Blind Association. The questions asked during the interview can be seen in Appendix F4. The topics discussed were the OAD, its intended purpose, and her feelings on how well the OAD was being used and possible reasons for any problems. The purpose of the interview was to learn what an initiator of the OAD felt about its use.

The project team first inquired what Mrs. Evans felt the purpose of the OAD was. She said she was not with the GDBA when it first began work on the OAD but her understanding was that it was intended for newly qualified students to use at home. The use for these students was to relieve them of the need to remember complex route information and allow them to concentrate on learning how to use their guide dog. She also said that it was not originally intended to be used in hotels as there weren't any GDBA hotels at the time the OAD was developed.

Next, Mrs. Evans was asked how she thought the OAD was used in training and how well it was being utilized. She said it removes the need for the students to remember route information, thus allowing more time to learn mobility training. She does not believe that the OAD is effective in the training centers. One reason for this are that the instructors may have a "technophobia" of the computers involved with the OAD. This means they may not understand technical devices and therefore do not want to learn anything about them. They do not ordinarily rely on computers and therefore may not feel comfortable using them. Another reason is the instructors may not want to put effort into programming the OAD as that time consumption could be used for more training. Another possibility is that the instructors fear for client safety. With the OAD, the instructors have less need to watch a person as they walk through a training course and it is possible that a person could encounter danger when traveling alone. Another possibility is that they may fear that the OAD is doing their job for them and hence they may be in jeopardy of losing their jobs. However, Mrs. Evans does not believe this is a serious problem but it was just merely a suggested possibility.

Another problem with the training centers is that two GDMIs would be trained by David Thompson over three days. David would then help them set up one route and they would have two weeks to make up two new routes on their own. After two weeks David would come back and check up on them and help them with any problems. However, many times there would be no work done by the instructors after David left.

Another concern she had is that the trainers don't seem to be complaining about any of the problems that they have. She thinks maybe that they only talk to David and nobody else in the organization knows about it. She said that there is no real structured arrangement of management and that makes it difficult to communicate about projects and other inter-departmental concerns. Because of the lack of structure, many things happen that may affect other departments outside of the department.

Mrs. Evans would like to see students be allowed to come to the training centers after regular operating hours and go through the training courses to do extra work on their own. She would also like to see the routes set up more like the hotels. This would involve routes going into town and going to other such places.

Mrs. Evans believes that the OAD is used effectively in the hotels due to the positive responses. She believes that the OAD is being used better in the hotels than it is in the training centers. One concern she has is that there have been no requests for new routes at the hotels. She thinks that if there was a lot of interest in the OAD by hotel clients there would be requests for different routes. One problem she thinks that there is with the hotels is that there is only one person, Trevor Genn, to handle all of the OAD affairs at both hotels. The two hotels are several hours apart and it can be very hard to accommodate both hotels with just one person.

In the near future, Mrs. Evans's plans for the OAD are to have it installed at all training centers and used efficiently. In the long-term future she believes there are no boundaries for its use. She would like to see the problems when skipping a beacon gets fixed as well. Overall she gave the usefulness of the OAD a rating of 8 out of 10. She rated the usefulness of the OAD in training a 10 out of 10.

Alan Brooks, Interim Director of Operations
Exeter RTC
7 April 1999

In an interview on Wednesday the seventh of April, Mr. Brooks told the project team his opinions on the use of the OAD and the way the GDBA has gone about implementing it. The questions asked to Mr. Brooks can be found in Appendix F4.

Mr. Brooks said several times throughout the interview that he thought the major reason the OAD was not being implemented and used to its potential is the fact that the GDBA has not marketed the product publicly. He thought that because the visually impaired students could not use the OAD until the next time they need retraining they wouldn't want to spend time learning how to use it. Mr. Brooks believed that to both the instructors and students, the OAD was just another exercise to go through. The students did not use the device again until they went back for retraining in eight to ten years, unless they visited one of the hotels. He also believed that the instructors felt that the students should spend time learning to train with the dog rather than learning to use the OAD. There wasn't any motivation for instructors to use the OAD, according to Mr. Brooks, because they didn't feel there was a reason to use it, as it was not available in public. Mr. Brooks also said that the OAD was not effective in the hotels for the same reason as in training because people see it as another exercise.

According to Mr. Brooks, the reason the GDBA has not marketed the OAD is because "they don't do marketing, they do have a small marketing department but it is not capable of handling a large task such as the OAD." There was also conservatism within the organization which kept them from pushing the OAD into use.

Mr. Brooks did not believe that fear of technology was a reason for the instructors not to use the OAD. He believed that the instructors didn't need to be technically inclined to use the PC recorder to set up route information. He didn't think that a computer programmer should be doing programming because they were not familiar with the

terminology used in guide dog training and, therefore, the verbal messages they created may not contain enough detailed information.

Mr. Brooks said that the best way to implement the OAD is to get it marketed in public. If visually impaired people had the opportunity to use the OAD in everyday life, it would be a useful exercise in training. This would, in turn, lead to the students desire to use it and the instructors wanting to implement it. He felt it had the potential to be used in any public place. He said that the best place to first implement it would be in public transportation where people could use it to guide themselves around the town with buses or go further with trains. Beacons could be placed in the vehicles along with memory cards for each individual bus route. The information given at each stop could tell the users where they are, where the next stop is, and how to go to a particular place. Implementing the OAD into a train could be done the same way.

Mr. Brooks said that the purpose for making the OAD was to develop a piece of equipment that would help people safely and comfortably navigate a training route and allow them to work on the mobility skills rather than worrying about route information. Basically, it was made to help them avoid getting lost. It was not originally intended for use in hotels, as there were no GDBA operated hotels at that time. However, they quickly realized that the OAD could be used in many other instances outside of mobility training. This was how they decided to put it into the hotels once they became available.

Finally, Mr. Brooks rated the usefulness of the OAD as an eight or nine out of ten as a product. In training he rated the usefulness of the OAD as seven out of ten.

Chris Burrell, Managing Director of Premier Force
Outside Contractor
7 April 1999

On April 7, 1999 at 10am, the group conducted a telephone interview with Chris Burrell, the Managing Director of Premier Force. The purpose of this interview was to discuss Chris' relationship with the OAD. He was not related to the GDBA, his company, Premier Force, was hired as an independent contractor by the GDBA to work on the technical aspects of the OAD, and produce the receiver and the beacons. The group placed Chris into the category of Creators and Initiators because Chris had an integral part in the development and integration of the OAD throughout the GDBA. Chris stated that the original purpose of the OAD was to be used in training a visually impaired person with a new guide dog without an instructor. The reasoning behind this, he stated, was to alleviate the brainwork that the blind person had to do, allowing them to enjoy their walk, and also free up time for the instructors, allowing them to have more time to train people. Chris said initially the OAD was only meant for training centers, but as the device was being used, many other applications for it were discovered, and that is how it was integrated into the GDBA hotels. Since Chris was an outside contractor, he could not state firsthand whether or not he knew if the OAD was being fully utilized. But from feedback from people such as David Thompson, he had heard about the problem with the utilization of the device and couldn't understand it at all. Although Chris was an outside contractor, he had been involved in the installation plan of the OAD in training centers. Originally the plan for installation was holistic, meaning all aspects of the routes, device, beacons, etc. were laid out for the trainers. This didn't work, because after laying the plan

out and leaving, routes were never set up. Next, Chris said that David Thompson ended up going to each site and setting up a route by himself. Not surprisingly, none of the trainers had contacted Chris about problems with the device, but according to him, they went directly to David Thompson with all of their queries. Chris wanted to have the OAD expanded into the public sector, in such places as museums and safari parks. He was also very adamant about having some kind of system set up with the OAD in large buildings in case of a fire. Maybe having each building provide a card at each building that tells the visually impaired person how to get out if the building does catch fire. For usefulness of the OAD, Chris gave it a 9.5. He could not comment on the usefulness of the OAD in guide dog training because he is unfamiliar to that field. The group also talked to Chris about certain limitations that exist with the OAD. He commented on the fact that the messages don't change over time as things around it change. Another limitation he thought of was the price. No one in the GDBA has stepped up and set a price on the whole OAD system. Chris said that a receiver would probably sell externally for about £5-600, while a beacon would go for around £300. That was without factoring in the money spent on research and design. At such a high price, according to Chris, the OAD did not seem affordable to the general public yet.

Paul Masters, Director of Operations
GDBA Head Office
14 March 1999

Paul Masters was one of the initial creators of the OAD. Originally, in 1987, Paul worked with Robin Travis, who worked for Microscope (an electronics company). Their first idea was to have a dog collar that received the whistle of their owner and repeated the whistle so that the dog could hear it. They did design a prototype, however, it did not serve the purpose that they hoped. The dogs did not know where their owners actually were, in relation to themselves because the sound was emitted around their neck. So the group came up with the idea for the present device. The Orientation Assisting Device (Paul was responsible for naming the device) was developed for use as a training aid so the visually impaired do not get lost. This training aid was to be placed at various locations around a client's neighborhood, so that they would be able to learn the routes they need to get around with their dog. Initially there were three phases of implementation of the OAD. The first was the placement of the OAD in a client's neighborhood. The second was the placement of the OAD in the training centers. However, to begin with, the OAD was placed at the training centers as a demonstration route for the trainers. Then the idea that the clients should try it as well at the centers led to the implementation of the OAD in the various centers. The third phase was to implement the OAD in public areas (this stage has not been reached). He explained that the OAD was not originally used both in the training centers as well as the hotels. He has not been involved directly with the OAD in years so he could not comment on the recent use of the OAD in the training centers and hotels. But he feels that the implementation of the OAD has been too slow. The organization should have stopped development a while ago, put a price on the device, and marketed it. Instead they kept on developing it and supposedly making it better. He believes thousands of pounds have been put into the development of this device and if the organization does not market it soon, another

organization will come along with a device just like theirs and their time and money will be wasted. His short-term vision for the future of this device is that it be at all the training centers because he feels it is important the trainers know how to use it before it goes to public market. He also explained that there is a potential international market within the 63 International Guide Dog Associations around the world. These associations have heard about the device or seen a demonstration in the UK and have expressed interest in the device. He ended the interview saying, "Let's [GDBA] get on with it [OAD]."

David Thompson, Technology Officer and Creator of OAD
Tollgate Breeding Center
19 April 1999

During a recent telephone interview conducted with David Thompson, the creator of the OAD, by the entire group and his views of the OAD were presented. David has been working with the OAD for a very long time and is the primary person involved in the design and advancement of the device. David is also the primary person involved in traveling from center to center and setting up the OAD. He is also the technical support team for the OAD and runs an OAD hotline off of his phone.

Mr. Thompson said the original purpose for developing the OAD was to enhance the independence of mobility for visually impaired people with technology. Also, the GDBA wanted to increase the services it provided to the blind. Originally the OAD was meant to be installed in users hometowns. From feedback from the visually impaired, it was moved to the training centers, then hotels came later. The OAD aids a client in training by removing the need for clients to memorize routes and relieving stress, anxiety and fear from the user. In hotels, the OAD is meant to help a user find their destination while on holiday in unfamiliar areas.

David said the original installation plan for the OAD was to have the device installed at all the RTCs by the end of last year, and have the OAD in all the centers by the year 2000. Due to some technical problems at Liverpool, David's timeline is off by a month or two.

When asked about the OAD's usage in training, David said he didn't feel the OAD was getting enough use. He wants to see every client given the opportunity to use the device sometime along the training. He did feel that the OAD was being sufficiently utilized at the hotels, though. His answers for the overall usefulness of the OAD, and the usefulness of the OAD in guide dog training were 8 and 9.5 respectively. He would rate them a 10, but he felt that the OAD was only supposed to be a supplement, and didn't fulfill *every* need for a visually impaired individual. David would like to see the OAD used more readily in the training centers, and he would also like to improve the level of technical support that he provides. David said that many of the trainers had come to him with problems or questions regarding the OAD, especially about little things like battery charging, and bigger problems such as software programming.

As for the outside used of the OAD, David said that he would get together with the project team to help set up a mock system at a shopping center and railway station. This coupled with production price information that David provided (£100/software; £149/beacon (quantity 50); £242.12/receiver (quantity 50)) should give a general idea of what it would cost to set up an OAD system at a basic location. To deal with the issue of

batteries, the OAD is already equipped with a plug adapter to utilize power from wall sockets.

The group asked David his opinion on the issue of technical support, and his stance was to have a champion at each site that was well enough versed in the technical aspects of the OAD to be able to check the batteries, do minor repairs, set up routes and teach those around them how to use the system. Eventually this champion would be able to go around to the surrounding areas and set up the OAD if it came to that.

A suggestion that was presented to the group from a past interview for implementing the OAD in a museum was addressed to David. The question dealt with making the OAD able to go in any random, haphazard way and pick up whatever beacon was closest to it. This was possible, David said, because that was what the original OAD was meant to do. All he would need to do would be to downgrade the OAD to its old settings.

David Thompson, follow up
27 March 1999

The IQP group spoke Mr. Thompson throughout the day about the OAD and the problems associated with it within the organization. He explained why the students need domiciliary training at their home after they are finished with the three weeks of training with the guide dog at the training center. Before the student went through the guide dog training, a sighted guide may have led them around and therefore they would not need to know what street corner to turn or how many curbs to count because they had no need to remember that information. In the same idea, students who previously used a Long Cane may have had a better understanding of the area around their home however they would not have traveled to as many places independently, just with the cane, and therefore, they need to learn new routes.

David also mentioned the original purpose of the OAD. It was to offer additional help and support to those who were struggling with directions and orientation skills. The purpose of then installing the OAD at the RTCs around a local route was to let trainers become comfortable with it and allow them practice to be able to install it around the students' home areas. He then hoped that each RTC would use the OAD to its full potential and local stores and companies would get interested in the OAD system through word of mouth or through the individual training center. This did not happened. David also hoped that he would train some people on the OAD and in turn they would train more people and the spiral effect would occur but that did not happen. He mentioned that the trainers do have a full schedule so that time is an issue. David also told the group that he presented the OAD to each center however there is no one at top management preaching that this device should be used regularly, therefore the 4 regions decide how to implement it.

David explained that there was an unwritten rule, in the interest of safety, amongst the training staff that students did not travel alone with the dog in a harness until the student completed the coursework.

David also spoke about the system itself. The beacons leaked water and their batteries shorted out last year, however they were fixed with 12 months ago. About powering the beacons, David already tried solar panels, however, the solar panel needed to power the 12 volt batteries was too large (almost 1 meter square) and was not efficient. He would like to eventually plug stationary beacons into the power line supply.

Appendix L: Hotel User Interview Summaries

These interviews were conducted by telephone with visually impaired people who used the OAD in GDBA hotels. These were people who completed the survey issued by David Thompson and granted permission to be contacted about the device.

Visually Impaired Hotel User #30
29 March 1999
Cliffden Hotel

This person used the OAD during her stay at the Cliffden Hotel in October of 1997. She primarily uses a guide dog. She would like to use the OAD again. She said it increased her mobility capabilities as well as her independence; and decreased her stress and anxiety. She was not trained to use the OAD before using it and found it was very easy. She would like to see it used in different places such as train stations and shopping malls. She has never used other Electronic Travel Aids. She closed by saying that she wished she had the device when she was training with the dog.

Visually Impaired Hotel User #31
29 March 1999
Windermere Hotel

This person used the OAD at the Windermere Hotel 3 times during his stay there in September of 1998. He would only use the system if it were modified. He liked the OAD because it was useful, telling the user what they were approaching. He disliked the OAD because it did not use guide dog terminology. He did not feel it increased or decreased his mobility capabilities, independence, or stress and anxiety. He talked about how a street map would have been useful. He was not trained before using the OAD, but it was easy to learn. He believed it would be useful in banks. He did use a radio communicator in the 1970s.

Visually Impaired Hotel User #34
29 March 1999
Cliffden Hotel

This person used the OAD with his guide dog at the Cliffden Hotel during November of 1997. He would definitely consider using it again. He liked the OAD because it made him independent. He did not like the OAD because it was too large (the older model). He felt the OAD increased both mobility capabilities and independence as well as decreased his stress and anxiety. He did not receive training for the OAD and felt it was very easy to use. He recommended that the OAD receiver should be smaller (this was already done in the newest model). He thought that shopping malls, airports, and train stations would be good places to install the OAD. He has never used other Electronic Travel Aids.

Visually Impaired Hotel User #28
29 March 1999
Cliffden Hotel

This person used the OAD 3 times with his guide dog during his stay at the Cliffden Hotel in September of 1998. He would consider using the device again if it was available. He liked the OAD because it gave plenty of warning concerning the upcoming route. He said that it was very simple. It increased his mobility and his independence, as well as decreased his stress and anxiety- "I didn't have to stop and think," He said. He also said it was easier than a white cane. He did not have training before he used the device and it was easy to use. He said the buttons were simple and useful. He thought that the OAD could be used wherever there is a regular route; for example, in a town have a route to guide the user to the pub, restaurant, chemist, and the bank. He has never used other Electronic Travel Aids.

Visually Impaired Hotel User #35
29 March 1999
Windermere Manor

In a recent telephone interview with a former guest at the Windermere Manor, his usage of the OAD was discussed. He had used the device twice in the hotel, and was very pleased with its preciseness. He felt that the OAD increased his mobility and independence and decreased his stress and anxiety. He said it was easy to learn and that he would love to use it again. Allen could not think of anything he wanted changed with the OAD, but he suggested implementing the device inside shopping centers. He had never used any other ETAs previously, so no comparison could be made with those devices and the OAD.

Visually Impaired Hotel User #42
31 March 1999
Windermere Manor

In a recent telephone interview with a former guest at the Windermere Manor, her usage of the OAD was discussed. She had used the OAD on three different occasions, and she liked the device. Her reason for this was that she felt the device helped her navigate through strange places with ease. The only thing she disliked about the OAD was the fact that some of the beacons were not working. She also suggested adding a feature to the OAD to allow for the ability to access the previous message without having to go back to the original beacon. She suggested implementing the OAD in town centers as well as parks. She had no previous experience with ETAs, so there could be no comparison made between them and the OAD.

Visually Impaired Hotel User #41
31 March 1999
Windermere Manor

In a recent telephone interview with a former guest at the Windermere Manor, his usage of the OAD was discussed. He had been a guest at the hotel eight times and had used the OAD on a number of occasions. He liked the OAD, stating that the information it gave out about what was around him was very good. He had some problems with the device, citing that some of the beacons were possibly not suitably placed. He didn't like the fact the device was worn on the chest, and also was concerned that the staff at the hotel was not trained as well as they could have been in the usage of the device. His suggestions for implementation of the OAD include railway and bus stations. He had used another ETA, the RNIB REACT, and seemed to like it better than the OAD, although he stated if changes were made to the OAD to make it work better and fit better, he would use the OAD.

Visually Impaired Hotel User #43
31 March 1999
Cliffden Hotel

In a recent telephone interview with a former guest at the Cliffden Hotel, her usage of the OAD was discussed. She had used the OAD during one stay at the hotel and "rather liked it", saying she would enjoy using it again. She stated that the OAD helped her to relax and she liked the fact that she always knew what was around her. She had no concerns with the OAD, and wanted to see it catch on all over. Some suggestions she had for implementing the OAD were places such as railway and bus stations, as well as shopping centers. She had never used any other ETAs before, so no comparisons could be made with the OAD.

Visually Impaired Hotel User #27
31 March 1999
Cliffden Hotel

In a recent telephone interview with a former guest at the Cliffden Hotel, his usage of the OAD was discussed. He had only used the OAD during one stay at the hotel, back when the OAD was in its early stages. He said he had a pleasant time using the device, citing its ease of use and his increased feeling of independence. Some concerns of his included one beacon not working properly, as well as making sure the instructions are carefully made so as to avoid confusion. He stated that he would like to see the OAD everywhere, saying it was a "great assistance." He had used an ETA in the past, the Sonic Torch which beeped as you got near obstructions. He didn't like it and said the OAD was the best device he had heard about. He also suggested that the OAD could be used for sighted travelers as well as the blind, for directional purposes.

Visually Impaired Hotel User #26
31 March 1999
Cliffden Hotel

In a recent telephone interview with a former guest, his experience with the OAD during his stay at the Cliffden Hotel was discussed. He thought the OAD was a great device because it gave information as to what was around him. He disliked the bulk of the OAD, but he was using the earlier version of the OAD, which has since been shrunken. He thought that the OAD was fine the way it was, no improvements needed to be made. Some suggestions he had for application of the OAD included shopping centers, railway stations, and the London Underground. He had also used an ETA called the Sonic Torch, which beeped as he got near an obstruction. He didn't like that device at all, and emphasized liking the OAD compared to the Sonic Torch.

Visually Impaired Hotel User #25
31 March 1999
Cliffden Hotel

In a recent telephone interview with a former guest, his experience with the OAD during his stay at the Cliffden Hotel was discussed. He had only completed one route with the OAD, and liked the fact that the OAD was very direct with its announcements, and that he was able to become more independently mobile. He used the older version of the OAD, which was larger than the current version, and complained it was a "bit clumsy." He also jokingly stated that his guide dog ended up following the commands from the OAD, going in with the directions before he could command his dog. He suggested shopping centers and parks as possible places to implement the OAD in the future. He has had no other experience with ETAs, so no comparison could be made with the OAD.

Visually Impaired Hotel User #24
31 March 1999
Cliffden Hotel

In a recent telephone interview with a former guest, her experience with the OAD during her stay at the Cliffden Hotel was discussed. She had used the OAD a few times, and she liked the device because of its clearness and directness. She couldn't think of anything she disliked about the OAD, except possibly making it smaller. She used the original device, which has since been made smaller. She felt that the OAD would work well if it was implemented at shopping centers, parks, and town centers. She had never used an ETA previously, so no comparison could be made with the OAD.

Visually Impaired Hotel User #23
31 March 1999
Windermere Manor

In a recent telephone interview with a former guest, his experience with the OAD during his stay at Windermere Manor was discussed. He had only used the OAD once, and stated that he liked the advance notice the OAD provided. One complaint he had was that he didn't pick up a beacon on his return trip and got lost, but what actually happened was that he had wandered off the path he was supposed to be following and got out of range of the beacon. He suggested adding GPS to the OAD, making it a very sophisticated device. Some suggestions he had for implementation of the device included hospitals and railway stations. He had used an ETA previously, the Sonic Torch, a handheld device that beeps as you near an obstacle. He stated his like of the OAD as compared to the Sonic Torch.

Visually Impaired Hotel User #4
25 March 1999
Windermere Manor

She had a wonderful stay at the Windermere Manor. She used the OAD for the first time there and, although she encountered a problem, had an enjoyable experience with it. She said that she wandered off the path because her friend wanted to go into a shop and she skipped one of the beacons when she left the shop. Because of this, none of the other beacons would trigger the OAD receiver. She gave the OAD an overall rating of seven out of ten because the device isn't foolproof. Otherwise she would have rated it higher. She gave it a rating of eight out of ten for its ease of use. It was easy to use for but she did have complications after missing a beacon. She said she would be interested in using the device if it were made available in the public and said some useful places for public installation would be in shopping malls and along the seafront.

Visually Impaired Hotel User #50
6 April 1999
Cliffden Hotel

He stayed at the Cliffden Hotel and used the OAD several times on three different routes. He used the device multiple times because he felt it reduced stress, increased his independence and also increased his mobility. He liked it because the OAD allowed him to customize the trip whereas other devices only worked by triggering transmitters. He has also used other devices. These were the Sonic Pathfinder and the Laser Cane. He said the device has much potential for use in public, such as hospitals, shopping centers, and town centers. He gave the device usefulness rating of 7 and an ease of use rating of 7 as well. The reason for the moderate ratings was because the device will not work properly if a beacon is skipped.

Visually Impaired Hotel User #49
6 April 1999
Cliffden Hotel

She has used the OAD twice at the Cliffden Hotel. She said she would definitely use it again and rated both the usefulness and the ease of use of the OAD a ten out of ten. She said she received detailed instructions before using the device and found it very easy to learn. She said the OAD gave her more independence, more confidence, relieved stress, and increased her mobility. She thought the OAD would be useful in town centers and traffic areas, such as junctions and traffic lights.

Visually Impaired Hotel User #87
(interview April 7 1999 face to face)
Cliffden Hotel

He primarily uses a cane, he is 16 and has just been accepted to get a guide dog. He used the OAD once at the Cliffden Hotel and would consider using it again. He liked the OAD because the directions were so clear and he could navigate around the unfamiliar town. He did not like the fact that the OAD was not programmed to tell him what stores he was approaching during his trip. He is a very independent and confident young man but he did say that the OAD increased his mobility capabilities. He did not feel it increased his independence, nor did it decrease his stress because he said it takes a lot from him to get stressed or anxious. He spent a ½ hour training with Trevor before using the OAD. He feels the OAD would be useful in city centers. He has never used other Electronic Travel Aids.

Visually Impaired Hotel User #7
25 March 1999
Windermere Manor

She completed her first route with the OAD at the hotel and did so with her guide dog. It was the first time she had ever used an electronic travel aid. She said the OAD seemed good overall but she had a problem when her dog veered off the path and she lost contact with a beacon. She felt the OAD could increase a person's mobility capabilities and could increase the independence of less capable people. She didn't feel it would reduce stress or anxiety. She found the OAD easy to learn and use but did not want to rate it's ease of or its overall usefulness. Shopping malls were places she thought the OAD would be useful.

Visually Impaired Hotel User #8
25 March 1999
Cliffden Hotel

He used the OAD for the first time at the hotel and said he would use it again. He thought the OAD was an excellent idea and liked being told by it where he was. He felt the OAD increased his mobility, his independence, and definitely reduced his stress and

anxiety. He found it easy to learn and rated it an 8 out of 10 overall and gave the ease of use a 9-10 out of 10. He said he would definitely like to use the OAD in a public setting and some uses he suggested were at shopping centers, banks, post offices, and precincts.

Visually Impaired Hotel User #9
25 March 1999
Cliffden Hotels

He used the OAD for the first time at the hotel and said he would use the device again. He rated it an 8 out of ten overall and gave the same rating for its ease of use. He said he liked the way it gave clear information and felt it relieved his stress and anxiety in a strange place. He also felt it increased his independence and could increase mobility capabilities. He said he would like to use it in a public setting and some suggested places were at malls as well as public buildings.

Visually Impaired Hotel User #10
25 March 1999
Cliffden Hotel

He had previous experience with the OAD and said he would certainly use it again. He liked the fact that it told him where he was and where he could cross the roads. He said it increased his independence and mobility capabilities. He said the OAD was not that easy to learn and rated it a 7 out of 10. He also rated its overall usefulness a 7 out of 10. He said he would like to use it in a public setting and suggested it be used in pubs and supermarkets. He had experience with other devices such as the REACT and Pathfinder. He said he would use the REACT again, as well as the OAD, but not the Pathfinder.

Visually Impaired Hotel User #11
25 March 1999
Cliffden Hotel

He had used the OAD twice and said he would use it again. He liked how it was very precise and said it was good help, especially on steps. He said he felt it increased his mobility capabilities, increased his independence, and very much decreased his stress and anxiety levels. He rated the device a 9 out of 10 overall and the same for ease of use. He said he would like to use it in a public setting and suggested using it in city centers.

Visually Impaired Hotel User #12
25 March 1999
Cliffden Hotel

She used the OAD for the first time at the hotel and said she would use it again. She said it was good because it gave precise information but one drawback was that it was large in size. She felt it increased her independence and her mobility capabilities as well as decreasing her stress and anxiety in strange areas. She rated both the overall

usefulness and the ease of use a 7 out of 10. She said she would like to use the OAD in a public setting and suggested shopping malls, railway stations, and hospitals.

Visually Impaired Hotel User #13
25 March 1999
Windermere Manor

He used the OAD twice and said he would use it again. He said he liked the device and found it very useful although it was not good for crossing busy streets. He said he felt it increased his mobility capabilities and his independence. He said it gave him confidence and reduced stress and anxiety in unfamiliar areas. He found the device easy to use and rated the ease of use an 8 out of 10. He rated it the same for its overall usefulness. He thought that one improvement to the device would be an indication of whether or not a person is still on course, such as a bleeping noise. He thought the OAD would be useful in shops, banks, and on travel routes.

Appendix M: Training Center User Interview Summaries

These interviews were conducted by telephone with visually impaired people who used the OAD in GDBA training centers. These were people who completed the survey issued by David Thompson and granted permission to be contacted about the device.

Visually Impaired Training Center User #5
25 March 1999
Southampton RTC

She likes the OAD very much and said she would use it if it were made available in public places. She rated it an eight out of ten for overall usefulness and nine out of ten for usefulness specific to mobility training. The only thing she didn't like about the OAD was the size of the receiver. She would have liked it more if it were smaller. She has also had experience with other electronic mobility aids. She used a hand-held device that bleeped at different paces when an object was approached, which she found very confusing. The OAD was not confusing to her.

Visually Impaired Training Center User #2
30 March 1999
Redbridge RTC

In an interview with a formal student he said that he was not "too keen" on the OAD, meaning he did not find it very good. He said that he did not find it useful to mobility training and also said it would help the trainers more than it would the visually impaired user. An example of this was that it would relieve the trainer from explaining the route information to the user. He gave an overall rating of six out of ten for the device and also a rating of six out of ten for it's overall usefulness specific to guide dog training. He said he would not use the device if it was made available in public settings but it could be useful in the end. His main reason for not wanting to use the device was that blind people must know their area if they want to be a successful independent traveler. They cannot be helped all the time by the OAD. He also was told about the OAD by his training instructor and he only used it that one time.

Visually Impaired Training Center User #3
25 March 1999
Middlesbrough RTC

In a recent interview with a former student he said that the OAD was very useful and he liked it very much. He rated the overall usefulness a 9 out of 10 and gave the same rating to the usefulness specific to guide dog mobility training. He thought it was very useful because it gave accurate information, it was well instructed, and it was used in a practical manner. He had nothing bad to say about the device nor could he offer suggestions for improving it. He did say, however, that more information on how it works, such as leaflets or pamphlets. He was very optimistic about use for the device in the public and enthusiastically said he would use the device if it were made available in public.

Visually Impaired Training Center User #39
25 March 1999
Redbridge RTC

In a recent telephone interview with a former student at the Redbridge RTC, her usage of the OAD was discussed. She had only used the device on one route, but still was positive. She stated that the OAD made her feel more comfortable in an unknown area, although she felt that the OAD needed a little more detail and quicker warning. She also made some suggestions to improve the device, such as making the buttons more identifiable and possibly changing how the device is to be worn, citing the discomfort of wearing the device over the chest and being a female. She felt that the device had many advantages, and if it were everywhere, it would make travelling a lot easier. She had never used any other secondary mobility devices before, citing her lack of interest in travelling.

Visually Impaired Training Center User #40
25 March 1999
Redbridge RTC

In a recent telephone interview with a former student at the Redbridge RTC, his usage of the OAD was discussed. He had only used the device on one route, and ran into some problems with it. He felt worried while it was on that the device was not going to work, and was startled by the sudden speakers picking up the beacons. He attributed this to his age (over 70) and lack of technology in his life. Bill felt that the OAD would be very helpful for anyone younger than him, especially those training with a guide dog for the first time. He did say that he would utilize the OAD if it were universally available.

Visually Impaired Training Center User #37
25 March 1999
Southampton RTC

In a recent telephone interview with a former student at the Southampton RTC, her usage of the OAD was discussed. She had only used the device on one route a few times. She liked the OAD's ability to tell in advance what was coming, but she stated that since it is only on certain routes, it is not that efficient yet. She also said that if it were universal, it would be "brilliant." She also was impressed with the ease of use of the OAD. Also the issue of cost would have to be addressed, and she hopes that the OAD will catch on in the future.

Visually Impaired Training Center User #38
29 March 1999
Southampton RTC

In a recent telephone interview with a former student at the Southampton RTC, his usage of the OAD was discussed. He had only used the device on one route a few times. He stated that the OAD was good while it worked, but pointed out battery

problems on one route. He liked the fact that the OAD gave information as needed, not too early. He was concerned about the size of the equipment and he also wanted some sort of signal for low batteries. He suggested periodic checks on the batteries of the beacons. He also suggested utilizing the OAD in shopping centers, as well as a suggestion to start OAD training earlier in the program so as to get more comfortable with it.

Visually Impaired Training Center User #36
29 March 1999
Middlesbrough RTC

In a recent telephone interview with a former student at the Middlesbrough RTC, his usage of the OAD was discussed. He had only used the device on one route, but had been one of the technicians involved in developing the beacons used with the OAD. He liked the device a lot as long as it was set up properly. He had a few suggestions for improving the OAD. He wanted to include a low to high pitched sound scale to count down distance to obstruction or point of interest. He also wanted more volume for heavy traffic.

Visually Impaired Training Center User #32
29 March 1999
Middlesbrough RTC

He used the OAD during his training period at the Middlesbrough Training Center in March of 1998. He was asked to try it during his training. He liked the OAD because it seemed like someone was with him and there was back up if he went wrong. He felt it was very effective in his training session. He could not think of anything about the device that could be changed, subtracted, or added to the OAD. He thought it would be useful in shopping centers. He used something called a Dictaphone 20 years ago; he said it was similar to the OAD.

Visually Impaired Training Center User #33
29 March 1999
Middlesbrough RTC

He used the OAD during his training session in Middlesbrough during February of 1998. He liked the OAD because it was easy to operate and listen to. He did not like the OAD because the chest equipment was a bit bulky. He thought it was very effective in the training session. He could not suggest anything to improve the OAD. He never used other Electronic Travel Aids.

Visually Impaired Training Center User #1
25 March 1999
Leamington Spa RTC

He used the OAD at the in June of 1998 at the Leamington Training Center after being offered to use it by the training staff. He stated he used it to maneuver a set path with his dog. Although he was overall satisfied with the OAD, he had trouble with the device at one point during his walk where the device failed. The OAD apparently did not communicate with a beacon. Overall he was optimistic about the future use of the OAD, as he said it was "quite good," and had no suggestions to offer on improving it or its use. He rated the overall usefulness of the OAD as a 7, solely because it failed at one point. He also gave the same rating to its usefulness in mobility training, 7, for the same reason. He said he would like to use the device in a public setting and would consider purchasing one if it was not too expensive and there was widespread availability of beacons. Some of the public places he thought would make good use of the OAD are "in town" and in public transportation. He has never used any other Electronic Travel Aids.

Visually Impaired Training Center User #29
29 March 1999
Redbridge RTC

He used the OAD in May of 1998 at the Redbridge Training Center. The OAD was offered to his class as experimental and optional. He described the OAD as a guide to tell the visually impaired user what to do. He liked the OAD because he knew where he was and did not need to remember a lot while working with the dog. There wasn't anything he didn't like about the OAD, except that he wished it was a little louder when there was traffic. In other words, he was suggesting that the device should incorporate a technology that some car stereos use today, which automatically increases its volume when outside noise increases. He has never used any other Electronic Travel Aids before.

Appendix N: GDBA Instructor Interview Summaries

Trainer #1
8 April 1999

He said in an interview on Thursday, the seventh of April 1999, that his training center does not use the OAD very often because of technical difficulties. He said they have not had the PC Recorder installed because, until recently, they did not have a computer running Windows 95. They have that now but do not have the memory card drive needed to make new routes. They should be getting that within two weeks of this interview. He said that the instructors and rehabilitation workers are excited about the arrival of the fully functional OAD.

The reason they needed the PC Recorder was because they only have one route and not every route is suitable for every student. Also, the one route that they have no longer works because of a problem with one of the beacons. Once they can create new routes for more people they will use the OAD and offer it to every student. They won't use it with every student, however, as he says it is not suitable for every person. Currently, the trainers only offer the OAD to students with learning disabilities or those having trouble learning the routes.

Because of the problems with the OAD, they have only used a few times during the course of the year that it has been installed. The few students who have used it only used it in a trial setting but said they liked it and generally gave a good response. Also due to the lack of use, he was not willing to give a numerical rating for neither the usefulness of the OAD nor its usefulness in training.

Trainer #11
7 April 1999

He is the only Rehabilitation Worker at both the Cliffden Hotel and Windermere Hotel and he is the supervisor of the OAD at both the hotels. He is based at the Cliffden Hotel in Teighnmouth and regularly visits the Windermere Hotel. He offers the OAD to people who inquire about it. There is no formal brochure or anything that "advertises" the device. The Duty Manager at the Hotel mentions the availability of the OAD at the Saturday information sessions, but most people who want to use the OAD have talked to someone else who has used it or have talked to the bartender about going into town and then ask him to use it. A lot of people shun from technology and are not interested in the device. About 40 people a year use the OAD at Cliffden and 30 people at Windermere. Windermere is not located in a town (there is one about 1 mile away) but it is not as convenient as the location of Cliffden in Teighnmouth. He believes that the OAD aids in training because students want the dogs to like them and they only have a few weeks to succeed in this training- therefore they are extremely stressed out and afraid to fail training. The OAD helps relieve this stress because they do not have to use memory and can concentrate on working with their dog. Also the students can practice by themselves and not worry about someone watching them and they don't have to do it right. These benefits also apply in rehabilitation where the student can concentrate on cane skills instead of worrying about remembering directions. The student in rehabilitation or guide

dog training can achieve something on their own in the beginning of their training, rather than just at the end- this boosts their confidence. The biggest disadvantage of the OAD is that it is sequential. It will only work in sequence, so if the user gets off track the receiver will be looking for beacon 29 and will not find it- the only feature that may help the user get back on track is the repeat button which will hopefully get the user back on the right path. Another large disadvantage is the reliability of the system. It works on batteries, which run out and then stop working until they are changed. He spent 2 days training with David Thompson in order to master the OAD. He spends about ½ hour with each person before they go out to use the OAD the first time and usually goes with the person the first time they use the route into town. Afterwards, he and the user sit down for a cup of tea or coffee and they fill out the survey together.

Trainer #10
8 April 1999

During a recent telephone interview with this trainer the OAD was discussed. He stated to the group that the OAD was presented to his training center by David Thompson recently, and was supposed to be installed there already. Due to technical difficulties, the OAD will not be installed until May 11. Although the device is not available there yet, he said he had a good feeling about the device. He also said that they would not offer the device to all people, only certain people. The criteria for determining which people that were offered the OAD were those with limited mobility or problems learning routes. They would not offer it to the rest of their clients because they felt that the OAD could cause dependency on familiar routes, and detract from the training. He could, however, see how the device would be good in the hotels, and also can see it expanding out into the public realm. His idea of the OAD was that it was only good on unfamiliar routes, and only as a guide to help people learn those routes, and then not be used again. He expressed that he wished that the OAD had come to his training center sooner, because he had been hearing about this device for a while.

Trainer #9
8 April 1999

He is a Guide Dog Mobility Instructor (GDMI). He uses the OAD either with one student or a group of students on the path set up at his training center. He has actually been using the OAD for a few years now and used to use it when he worked in other training centers. He believes that the OAD does aid in training because if a student messes up while on a route, the OAD can get them back on track and they do not have to remember anything. He feels that the benefit of the OAD is that it lets the student concentrate on handling the guide dog and they do not have to concentrate on the route. The biggest problem that he mentioned about the OAD is that it is not reliable. He said that the older versions were more reliable than the newer versions, however the newer versions have more accurate trigger-time. Many times they have encountered that a beacon will go down without signaling that the battery is low and there is nothing to indicate anything has happened with the device. Another disadvantage of the OAD is that it takes a lot of extra work to get a route established, get permission to mount the

beacons, and record the route on the computer. He said that most blind students find the OAD useful, those that do not are usually the ones who are on the course when the beacons turn faulty. He was trained to use the OAD by David Thompson. The training session lasted 1 day and he learned how to use the computer program, how to put up a beacon, etc. But he feels he does need an updated training session since some of the equipment has been modified. He explained that every student at his training center is offered to try the OAD one day during their training. The center has 4 OAD receivers so only half the class can try it out at one time - some just don't want to. The surveys are filled out by the instructor- he talks to the student after class and fills it out according to their responses. He believes it can be very useful in many different applications such as train stations and shopping centers.

Trainer #3
13 April 1999

He explained to the WPI group that the OAD was installed at his training center two months ago. The route currently fitted with the OAD is a trial route that was used to show the staff how the device works and allows them to try it. This center currently has five receivers. He has not used the OAD with any of his students, but he does feel that the OAD could be beneficial. He and three others went through training for 1 and ½ days with David Thompson. He thought the training was overly sufficient. He said he is computer literate which allowed him to learn the device easily. He imagines the main advantage of the OAD would be the client could use the information as a backup while traveling on a new route. He said that the computer program is user friendly however it is limited. He said this is because access to the database is difficult because the advanced user cannot edit a program easily, which can be frustrating. If the trainer wants to change the message in the program, they must edit all fields, not just the specific field they'd like to change. He believes that the OAD may be most beneficial if the system was installed around the home of a recently trained student instead of having a route around the training center because the students do not have a lot of time during the 3 weeks that they are in training. Also, students cannot take the dog off the grounds during the three weeks that they are in training because of they are not covered by insurance until after they pass the training course. Hence, if a route was placed around the city outside the training center, the students could not utilize it.

Trainer #4
13 April 1999

He explained to the WPI group that the OAD is still in the trial stage at his center. He saw David Thompson's OAD device a year ago at a "road show." The road show is a disabilities traveling show that exhibits new devices and tools for the disabled. His training center had problems getting a route set up in the neighborhood around the center because the city council does not want the beacons on the telephone poles. The plan there is to have a few blind guide dog users test out the trial route. If they find it useful, the center will bring the council to the center and have them talk to the blind users and see the benefits of the OAD. Then, hopefully, the council will approve the using the device in the city because of the benefits encountered by the blind users. There is a college in the

center of the town where the training center is, where 20 visually impaired would benefit from the implementation of this device. He also believes it would be useful around the home of newly trained students or clients who move to a new neighborhood. A few beacons could be placed in needed areas around their home and then in a few weeks (or the time that the user needs to learn the route) the beacons could be taken from that area and put in another user's home area. He would only offer the OAD to students who have a hard time remembering routes- not to everyone. He feels a technical support staff, who visits the center regularly, would be very beneficial to help the trainers change the location of the beacons and make new routes on the computer program. He likes the idea of a trainer's conference, where there was a specific agenda to discuss the use of the OAD and future applications of it.

Trainer #5
13 April 1999

This trainer, a GDMI, was interviewed and told the WPI project group about his thoughts about the OAD and how he believes it can be utilized. Although he has not used the OAD with any of his students, he has been trained on the OAD and knows how to use it. The reason he hasn't used it with students is because he has not had the opportunity to use it yet due to its recent installation. He believes it can be useful to certain people, depending on their abilities.

One of the ways he felt the OAD would be best used would be in the clients' home environment to learn local routes. This would be especially helpful to clients who move to a new residence. He doesn't think that beacons could be placed in a home environment permanently due to costs, but that wouldn't be necessary anyway. He believes that placing beacons in a client's home environment for a month will allow the person to learn the routes and then the beacons can be moved to a different person's home. One particular use in home areas would be to identify someone's front gate in areas with dense housing. It would help the person to learn how to find their gate with respect to specific landmarks nearby.

He gave the OAD an overall rating of 7.5 as well as giving a 7.5 rating to the usefulness with respect to training. One reason he did not rate higher is because of some disadvantages. He thought that problems could arise with the installation of beacons. There may be problems with getting permission to put up beacons in public, as is the case at his training center. Another problem could be the vandalism and theft of beacons. Another problem stated was problems using the PC Recorder. He said that , personally, he is not very computer literate and that GDMIs such as himself may find setting up routes an arduous task and may not be worth the hassles. He suggested that having a specific person at each site be dedicated to setting up all routes on the PC recorder in order to help GDMIs who find it a hassle or don't have time.

One advantage he stated is that the OAD can give people confidence. Uses for the OAD on the training center grounds, to him, could be used more for showcasing the OAD to clients who might like to use the OAD in their home environments. It could also be used to encourage students to travel into town.

Trainer #8
13 April 1999

She was interviewed on April 13, 1999. The OAD was discussed in the interview with her, and her views on the device were also discussed. She has not yet used the OAD with a class, and she is training the first class to go through her training center since the OAD was installed there. She doesn't think she will have the opportunity to try the OAD with the new students, due to the town authorities' problems with setting up the device on town property. She mentioned that a trial run for the city was scheduled to try to convince the local authorities to allow for placing beacons on lampposts.

She seemed to like the device outside of training, but could only see certain times when the device could be used in training. She felt that the OAD would only really help a student with poor orientation skills. But due to the above-mentioned problems with the city's local authority, setting up proper routes is not possible yet.

She also mentioned that the equipment itself was difficult to obtain, citing only five receivers at the site and one extra beacon. Until more equipment is shipped there, no more new routes can be made. She also talked about the actual problems involved in setting up a route, citing the need for two people to set up a beacon on a post for safety reasons, and the need for computer skills to create the routes.

She gave the OAD an 8 for overall usefulness, citing the more uses that exist outside of training, especially the fact that a route can be set up and left for a long period of time. As for the OAD's usefulness in the actual training process, she gave it a 5, stating that the disadvantages outweigh the advantages.

When asked if she would offer the OAD to all of her students, she stated that she would not. Reasons for this include that the OAD would not be necessary for some students, and they may find it patronizing. She did comment that if there were a route into the town of Bolton, she would definitely offer it to all the students and encourage them to go.

Trainer #7
14 April 1999

He used the OAD with several students in a training session approximately 18 months ago. He said that most of his students liked the OAD and thought it was helpful, although a few didn't like the fact that they had to wear it around their neck. He explained that when the OAD is not used they number the routes in a manner that explains where the student should turn. For example, route "1553" means the student will cross the first street and turn right, cross the fifth street and turn right, cross the fifth street and turn right, and cross the third street and turn right. The OAD removed the need for a student to remember the route number and also the need to count streets. He said that this allows the student to concentrate on using the guide dog and working on their guide dog skills rather than learning a route.

He said that some benefits of the OAD are that the student can concentrate on guide dog training rather than learning route information and the trainers can step back and observe the student from a distance. He said that the OAD would be most beneficial

in the home environment of the student. He believes that it could be installed around their home to help them learn routes there.

He also thinks it would be more beneficial in home areas than in mobility training. He explained how the instructors use walkie-talkies to communicate with students out on routes which also them to give the students assistance and advice while out on a route. The walkie-talkies can be used on any route because no beacons are necessary. Because of the extensive use of walkie-talkies at his training center, he rated the usefulness of the OAD a five out of ten in training. He also said that some students didn't see a need for the OAD because the walkie-talkies were sufficient and he said he couldn't find a reason to disagree with them. Overall, he rated the usefulness of the OAD an eight out of ten because he believes it can be very useful in the home environment.

He said the training he received from David Thompson was sufficient but he would like more practice time to learn how to use the PC Recorder.

Trainer #2
14 April 1999

In a recent telephone conversation with this trainer on April 14, the OAD usage at his center was discussed. The training center there is without a Windows 95 PC, so the only route that is set up and active is the original route created by David Thompson on his initial visit there. He stated that he could see use in the OAD during mobility training the majority of the time, but he was concerned that a student could become reliant on it. Some benefits of the OAD that he suggested included the time factor, meaning that the OAD could save trainer's time due to less repetition. He also liked the fact that the device was discreet. Some disadvantages he thought of for the OAD included the previously stated reliance factor, that the device was hard to hear around traffic, an earpiece could harm hearing, and the fact that the center does not have a Windows 95 computer yet.

He stated that during training sessions with the OAD, the students were very receptive towards using the device, and were actually quite inquisitive about the device itself. When asked if he offered the device to all the clients, he stated that the OAD was only offered to students with learning disabilities. He did state, however, that he could see great use for the OAD in home areas for everyone.

When asked to rate the OAD, he gave the device a rating of 6 overall, basing his answer on the idea that the design of the beacons can be restrictive. On the usefulness of the OAD in training, he rated it a 7, claiming the OAD had great benefits in learning to use guide dogs.

Trainer #6
9 April 1999

The group conducted a telephone interview with a rehabilitation worker at a training center. His experiences with the OAD were discussed in depth. He stated that in his opinion the OAD does aid in training, because it removes all worry from the user and allows them to concentrate on their dog skills. One benefit he thought of was that the OAD allowed a visually impaired user to not have to learn an unfamiliar route, allowing for a more relaxed journey. His biggest qualm was the maintenance of the OAD, citing the fact that the device has broken down on many occasions. He also complained about the beacon placement, and wants to see it made more user-friendly. From classes that used the OAD, he stated that the visually impaired users found the OAD useful.

When asked to rate the device, he gave the OAD an 8.5 for overall usefulness, and an 8 for usefulness in training, citing he was very happy with the device as long as it worked.

He said the trainers only offer the device to people in training with guide dogs. When pressed further, he admitted that the OAD was actually only offered to those students experiencing route problems.

Trainer #12
15 April 1999

During a recent telephone interview with a trainer the group inquired about the usage of the OAD at his training center. He stated that the OAD was implemented into the training sessions after the students become comfortable with their dog on a familiar route. He stated that he felt the OAD was most useful for people with poor mobility skills, except for those with hearing difficulties. He also agreed that the OAD does aid in training, because it allowed him to stand back and observe the dog and student without them knowing he was there. He said one of the benefits of using the OAD included raising the student's confidence level, and also kept him from having to shout to correct the students. A disadvantage of the OAD was the fixed beacons; he would like to set up a tougher route. He also said extraneous noise caused problems hearing the device. One comment he made was that the students were not too keen on it due to the ease of the route, saying they didn't really need it. Hence, he wants to make a tougher route. When asked to rank the overall usefulness of the OAD, he gave it a 6. As for the usefulness in training, he gave it an 8. He said they don't offer the OAD to all of the students because they may not need it due to the ease of the route at hand. He said they only offer the device to those students with poor mobility skills.

Trainer #14
19 April 1999

On April 19, 1999, the group conducted a telephone interview with a rehabilitation worker at a training center. His usage of the OAD in training was discussed at length. He thought that the OAD was very helpful in training, especially for certain students that had problems learning routes, because it reminded the person what to

do and when to do it. With this come the benefits of being able to teach a person to learn a route using the OAD and gradually phase it out so they do not become dependent on it. He also said the OAD was a confidence builder for those students, because it allowed them to complete routes that they might otherwise not be able to complete. The only disadvantage that he could think of with the OAD was that it could cause dependence with the user. He said that the student opinion of the OAD as he saw it was that they generally liked the device. On ranking the overall usefulness of the OAD, he gave it a 9, citing specifically for those that need the OAD. For the usefulness in training, hi gave the OAD a 9 again. He said that he only offers the device to those that really need it, or those without good mobility.

Trainer #13
20 April 1999

During a recent telephone interview with a trainer at a training center, his usage of the OAD during training was discussed. He said that there is a route set up that people can use in classes, but they don't have enough equipment for everyone to use. He said that the OAD is useful for certain people, and in general is saves the users from having to remember complicated route information. He also felt that the OAD would be useful in home routes in complicated areas where there was a low number of landmarks available. Some things he did not like about the OAD were the time aspect involved in setting up routes and maintaining them, as well as the fact you need two people to set up beacons and you have to get permission from the town. He said that some students find it very helpful in training, and some didn't. It all depends on their competence level. He would not rate the overall usefulness of the OAD claiming that it could be anything depending on the person using the device. But he did rate the usefulness in training as a 4, also stating that it could be a 0 or a 10 depending on the user. He said that they only offer the OAD to those students that are less capable than most. Since they are a small center, they do not have all the facilities of a large center. He said if they did, they could use the OAD more. The main issue on his mind was that of time, saying that they use the OAD as a "last resort" due to time constraints.

Trainer #15
20 April 1999

During a recent telephone interview with a trainer at a training center, the usage of the OAD there was discussed. He stated that he liked the OAD, when it worked. Due to many technical problems at the site, the OAD has not really been utilized because the trainers have no confidence in the device's ability to function properly. Because of this factor, not many students have had the ability to utilize the OAD. He said that ideally he would like to offer the OAD to all the students, but because of the technical problems, they only offer it to the more capable students. The reasons for offering the OAD to the more capable students was so that if the device failed to function correctly, they could find their way back.

A benefit of the device to him was that it allowed him to step back and observe the student from a distance, which he thought helped the student to relax. His biggest

concern with the OAD was the technical support. For overall usefulness of the OAD, he gave the device an 8, but only if it was working properly. For usefulness in training, he gave the OAD a 5.5.

Trainer #16
21 April 1999

He said that overall the OAD was useful and it had the potential to be more so if technical issues didn't arise so frequently. Due to their low number of beacons and the vandalism of three beacons, they are limited to how they can use the OAD at their center. They currently do not offer the OAD to all of their clients because there are not enough receivers for everyone. Therefore, they only offer it to those who they feel need it. Overall he felt it was useful and rated it an 8 out of 10. He also rated the usefulness to training an 8 out of 10. Some benefits he felt were presented by the OAD were that it increased client confidence, helped to build the knowledge of an unknown area, and could give the person special reminders or warnings in addition to the route information. Some disadvantages he felt existed were the time consumption involved in setup, the limited number of beacons available for new routes, vandalism, and technical malfunctions with the beacons. He thought that the OAD would be useful in the home areas of clients who have poor orientation, mobility skills, or memory.

Trainer #17
28 April 1999

He discussed his experiences with domiciliary training in a brief telephone conversation. He explained that they have used this training with four students in recent months and found it was successful three times. The one time that it wasn't successful, they had problems making useful messages for the particular client. In the successful cases, he found that it helped the person to learn difficult parts to routes in the client's home area. In one case, two beacons were used for a short time to help the clients learn one particular spot on a route. Once the client had gotten used to that part, the OAD was removed. He said that they have used anywhere from two to six beacons on these routes and that setup was fairly easy. In previous attempts to set up domiciliary training routes setup was difficult because they would make changes to the beacons and have to return to the training center to program them. With these routes they used a laptop computer to program the changes on site which made setup much easier. Finally, he said he would use this domiciliary training again with students he felt would benefit from it.

Appendix O: Original Survey Issued by David Thompson

Orientation Assisting Device

Client Questionnaire

Please complete the following questionnaire with all visually impaired users.

GDBA Location .....

Q.1 Female ☐ Male ☐

Q.2 Age 16-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐ 60-69 ☐ 70+ ☐

Q.3 What mobility device do you currently use?

Guide Dog ☐ Long Cane ☐ Other ☐

If other, please specify .....

Q.4 How many times have you used the OAD?

First Time ☐ Less than 5 ☐ Between 5&10 ☐ More than 10 ☐

Q.5 How many different routes have you completed with the OAD?

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ More than 5 ☐

Q.6 Have you ever been concerned about getting lost or disorientated on new routes?

Always ☐ Often ☐ Rarely ☐ Never ☐

Q.7 When using the OAD system do you feel more or less concerned about getting lost or disorientated on unfamiliar routes?

More ☐ Less ☐ No different ☐

Q.8 How did do you find the OAD to use?
(Tick one box only)

Very easy ☐
Quite easy ☐
Neither easy or difficult ☐
Quite difficult ☐
Very difficult ☐

Q.9 Would you like to see the use of the OAD extended e.g. Shopping Centres, Home environments etc.?

Yes ☐ No ☐

If Yes, give additional details?

Q.10 Did you encounter any problems in the use of the OAD?

Yes ☐ No ☐

If Yes, Please describe?

Q.11 Overall how do you rate the OAD as a new mobility device?

Very good ☐ Good ☐ Fair ☐ Average ☐ Poor ☐ Very Poor ☐

Any other comments?

Q.12 Could the GDBA Research & Grants Department who developed the OAD contact you later for more information?

Yes ☐ No ☐

If yes, please complete the section below.

Name _____

Address _____

_____

_____

_____

Tel: _____

Date .....

Please return all questionnaires to David Thompson GDBA, Tollgate House, Banbury Rd, Bishops Tachbrook, Nr Leamington Spa, Warwickshire CV33 9QJ. Tel : 01926 651972

Ref.: djt/oad/q3/May 97

Appendix P: OAD Informational Web Page

Guide Dogs For The Blind Association

OAD Information

What Is The OAD?

Where Is The OAD Installed?

Contact Information

Technical Support

Return to the GDBA Homepage

Guide Dogs For The Blind Association

OAD Information

What Is The OAD?

The Orientation Assisting Device, or OAD, was developed by the Guide Dogs for the Blind Association as a secondary mobility device for aiding in mobility training. The OAD is used along with a long cane, guide dog, or by a person with limited residual vision. The OAD was originally created to be an assistant in establishing routes for people upon returning to the home environment although it is also being used in guide dog mobility training. The OAD, through trials conducted by the GDBA, has resulted in increased confidence and reduced stress among students using the system.

The Orientation Assisting Device is a device that plays back an audible message at important points during a journey, providing all necessary directions, and thus allowing the person to relax and concentrate on learning to work with the guide dog. The OAD consists of three components: the receiver, the beacons, and the PC Recorder. The receiver is a small radio unit that the person carries. The pocket-sized device has two antennas, a loud speaker in the device itself, a remote speaker which can be attached to a shirt collar or lapel, two buttons, and a memory card slot. The person's rehabilitation worker or mobility instructor uses a software package on a standard PC equipped with a standard memory card drive to set up the travel route of the visually impaired person. The information is transferred to a memory card which is placed into the receiver and gives the user instructions during his or her journey.

The beacons are another part of the OAD that provide the receiver with information. They are small radio transmitters (waterproof and vandal proof) that are placed along the travel route, generally high up on light posts. Furthermore, they are battery powered and the batteries have a life of approximately nine months to one year. The beacons do not contain information themselves, but simply trigger the receiver to give a message specified in the memory card. In order for the OAD system to be fully functional, all three components are required to be available and working. Currently, the GDBA has installed OAD beacons at the GDBA centers in Exeter, Leamington, Middelsbrough, Forfar, Bolton, and Redbridge, the small centers in Southampton and Liverpool, and at the Cliffden and Windermere Manor Hotels. It is expected that all GDBA-run facilities, including hotels and training centers, will have the OAD system installed by the year 2000.

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Guide Dogs For The Blind Association

OAD Information

Where Is The OAD Installed?

The OAD is currently installed at the following GDBA training centers and hotels:

Cliffden Hotel, Teignmouth, Devon
Windermere Manor Hotel, Windermere, Cumbria
Exeter RTC, Exeter, Devon
Leamington Spa RTC, Leamington Spa, Warwickshire
Middlesbrough RTC, Middlesbrough, Cleveland
Redbridge RTC, Woodford Green, Essex
Bolton RTC, Bolton, Lancashire
Forfar RTC, Forfar, Angus, Scotland
Liverpool SC, Liverpool, Merseyside
Southampton SC, Southampton, Hampshire

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OAD Information

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OAD Information

OAD Technical Support

Online Operator's Manual (requires Adobe Acrobat Reader)
Size: 2.1MB, approximately 10 minutes at 28.8kbps
Click here to get Acrobat Reader

Questions and Answers - For Visually Impaired Users
Answers common questions about the OAD and how to solve simple problems. For use by visually impaired users of the OAD.

Questions and Answers - For Training Staff Members
Answers common questions about the OAD and how to solve problems. For use by GDBA training staff members.

Contact Information
Contact the GDBA with general comments, complaints, or questions regarding the OAD. Also contact specialists for further assistance.

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Appendix Q: Online Catalogue of OAD Route Information

Guide Dogs For The Blind Association

OAD Route Information Catalogue

Search for a place, location type, or specific location:

Search Box Would Be Here

Browse By Region

Browse By Location Type

Guide Dogs For The Blind Association

OAD Route Information Catalogue

Regional Listings

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Guide Dogs For The Blind Association

OAD Route Information Catalogue

Regional Listings

Southern Region

The Mall, Reading

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Location Type Listings

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Guide Dogs For The Blind Association

OAD Route Information Catalogue

Location Type Listings

The Mall, Reading

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Guide Dogs For The Blind Association

OAD Route Information Catalogue

Location Type Listings

The Mall, Reading

This route starts at the bus stop on the corner of A Street and B Street. It goes into the Mall through the nearest entrance, which is next to store X. It turns right and then continues down the mall and comes back to the entrance on the other side of the Mall.
Download 1.34MB (approximately 7 minutes at 28.8kbps)

Return to Shopping Malls and Stores Listings
Return to Location Type Listings
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