Assistive Technologies for People with Dementia: Personal Review

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The Chapter 3 Low Tech Intervention by Non Electronic Tools (Memory Aids)

Contents

3.1 Review of Non-Electronic tool-Assistance (Memory Aids)

Necessity for Assistive Technology (AT; Bourgeois et al., 2010): One cannot assume that a person can use the

information stated in a therapy task for a real -life situation. The hospitalized patient could be instructed to read the orientation facts written on a message board and the family could be instructed to display a similar message board at home with the relevant information. The objective of memory devices is to assist independent living of people with dementia and to promote their well-being through using these devices. Development of simple memory devices are required to enable the person to keep him/herself informed with plans and activities which, they have finished, such as eating meals, taking medicine.

Memory Aid for the Normal Elderly (Bourgeois, 2007): More naturalistic memory aids, such as daily planners and appointment books, are often more acceptable, particularly if the person had used one during his or her years of employment. In addition to the calendar pages for tracking appointments, there can be a telephone directory, and notes pages for lists of names, categories of words, and other useful things to remember. The calendar can be used to keep track of appointments. The person who agreed to consult the family calendar every morning after breakfast is more likely to continue to depend on the calendar for information about the date and the day's activities.

In the early stages of memory impairment, it is the more complex familiar routines and information that begin to be problematic, such as learning to use a cell phone or to navigate home media with several different remote controls. The constant changing and upgrading of computers and computer software require learning and re-learning multiple steps and procedures for accessing familiar programs. Written lists of procedures are helpful at all stages of electronic use, from when first learning a new system, to later when a written list is a comforting support in the event that part of the procedure is forgotten.

Memory Aids for Mild Dementia: In the early stages of memory loss, individuals are usually very aware of the memory problems and usefulness of the memory aid (Bourgeois, 2007). Some people dropped out of the study due to the progression of the disease. If the assistive device had been implemented earlier, the person might have had better ability to learn to use the device and to get used to it. Assistive devices for people with dementia should be implemented as early as possible (Enable, 2004). Whether the elderly has a pathological memory deficit or not, the elderly person cannot avoid the memory decline with their aging. At the early stage of memory decline, they must be taught how to prepare the memory decline in future, including early usage of memo pads, electronic devices. If someone develops the MCI, or, dementia, the early application is strongly recommended (Yasuda, 2007).

In order to help these usages, we need to develop special system, tools. There are needs of developing a number of different memory aids, such as special diary systems, wearing memo pads etc. that can effectively help people access daily information. It is helpful to describe all the actions for operating the equipment. Additionally, they are strongly recommended to use them every day. Sporadic use of them would often make them forget how to use them (Yasuda, 2007). The person may need training to use the cuing system to a level of criterion that will maximize the potential for maintaining the behavior after treatment. In some cases, caregivers need instruction on providing appropriate prompts to maintain an effective cuing system (Bourgeois, 2007).

Memory Aids for Moderate Dementia: Moderately memory impaired persons have little trouble using the memory aid when it is on the table in front of them, in their pocket or purse, or handed to them by the caregiver. But they may not remember to look for it or to ask someone to help them find it. It may be helpful to have a designated place to keep the wallet/book so that the memory-impaired individual can learn to expect to find it in that same place and can put it back (Bourgeois, 2007). When using these memory aids, it is important to make sure that they are not completely hidden from view, so that people do not forget that they have taken notes (Yasuda, 2007).

Bourgeois (2007) provides caregivers with ways of making memory aids wearable. This can be accomplished by making the memory aid small, lightweight, and portable and using adaptable devices to carry the memory aid. Persons have been observed to keep their memory aids in a shirt pocket, or attached to a keychain on a belt loop. As people who have reached the moderate

stage of the disorder are no longer able to remember the day's events, Yasuda (2007) advise them to carry a notebook with them. This is not necessarily as easy as it sounds, however, as they may either forget to take it or forget that they have it with them. Sometimes, they may not be brave to take it out of their bag or pocket. Yasuda (2007) have designed wearable memory aids. This allows them to take notes, and these can later be transferred to their diary. If people find this task boring, they can simply stick the paper memo straight into the diary. It is important to use the memory aids and the diary in conjunction with the electronic devices described below. If they cannot remember what they have done during the day, they take notes and carry these around with them.

A programmable voice alarm should be used to prompt people in a moderate or severe stage to keep to their schedule. A few years hence, mobile phones may well have most of the functions described above. I therefore recommend that these people familiarize themselves with mobile phones as early as possible. They will be able to use them to buy tickets and pay at the checkout (Yasuda, 2007).

Memory Book (Bourgeois et al., 2010): Memory books are portable or wearable books to be used in a variety of locations. The memory wallet is a collection of sentence and picture stimuli which aredesigned to prompt recall of the statedfacts and other related factual information. Alternatively, one can purchase a pocket-size photo album with clear plastic sleeves into which the illustrated pages can be inserted. The memory wallet can be organized chronologically beginning with the birth date or organized into topics using tab inserts to denote each topic. The sentences in the memory wallet can either be typed in large print or hand printed in a bold, simple print style. The best pictures to include are those that clearly represent the stated fact that show one or two people. Persons with dementia reported having difficulty remembering words, the names of familiar persons and places, and the topic of a conversation. The apparent solution was to provide a collection of pictures and sentences that the person could read and that would remind him or her of specific people, places, and events to discuss. The memory book is an enlarged version of the memory wallet.

Memory Book for mild Dementia (Bourgeois, 2007): In the early stages of memory loss, individuals are aware of their memory lapses. Therefore, they can participate in the development of the categories and content of their memory book. One individual listed the various different jobs he had held over his career.

Memory Book for moderate Dementia (Bourgeois et al., 1997): Individuals in the middle stages of dementia may be unaware that they are dominating the conversation or that their conversational partner may have alreadyheard that information. In fact, some people have been observed to read aloud and elaborate about each page in theirmemory book, and then start over from the beginning again. The positive view of this stage is that the person in the middle stage of dementia can be very happily occupied in the task of telling someone else all about his or her memory book. The complexity and length of the sentences causes reading errors, or the book becomes too cumbersome to carry. Similarly, memory books that are portable or wearable can be used in a variety of location.

Memory Book for Severe Dementia (Bourgeois, 2007): In the late stages of dementia, individuals'cognitive decline may be expressed as reduced verbal output, apparent lack of interest in visual stimuli, and self-stimulatory behavior such as repetitive vocalization, tactile exploration, and repetitive movements (e.g., rocking, pacing). A memory wallet or memory book may not use it independently to readaloud the printed statements or elaborate on the topic. The physical characteristics of the aid may need to be altered for it tobe a useful prompting system; there may need to be larger pages and font size. The subject of the memory book may need to be somethinghighly interesting to the person, such as ahobby, or sport. It will be the caregiver's job to assist with turning the pages, and to provide a narration of the memory aid if it does not elicit any coherent output.

Applying Memory Aids: Moreover, as far as the psycho-behavioral symptoms, caregivers are usually told the syndromes which disorders their lovers will show and they are advised to accept their lover's behaviors since there are no other way to cope with. But is this coping enough to relieve caregiver's stress? (Yasuda, 2007). The most common behavior challenges that have

been addressed successfully with written memory supports include repetitive questions, expressions of anxiety and fear, and physical agitation. Many of the most difficult situations for caregiversto handle on a daily basis are the repetitive questions or statements made by their loved one. Caregivers reported the usefulness of a memory book page to resolve difficult behaviors such as repetitive questioning (Bourgeois, 2007). Another issue regarding accessibility of memory aids in nursing homes is staff compliance with supplying the aids. Wearable memory aids should be included in individualized care plans, just as adaptive devices such as walkers, splints, eyeglasses, and hearing aids (Bourgeois, 2007).

Role of Speech-Language Pathologists and Carers: Individuals who have memory impairment were frequently supplied with a memory aid by a speech-language pathologist or other health care professional (Bourgeois, 2007). So speech-language pathologists should participate more actively. Speech-language pathologists have been using various forms of AAC to support communication participation of persons with dementia. Many non-electronic or low-tech communication approaches have been used successfully to support social interaction of persons with dementia. AAC, in the form of external aids that incorporate stimuli highly relevant to a person's daily life, may include memory wallets, notebooks, calendars, signs, color strings, timers, communication boards, labels, and other tangible visible symbols that provide cues for interaction (Bourgeois et al., 2007).

The contents of memo should be dependent to caregivers' comments. However, more, easy, convenient, and efficient memory aids should be developed also by the professionals, since the caregivers usually does not have any afford to develop such aids. A methodology for assessment of effects of memory aids are also required, as well as develop a cost/benefit approach (Yasuda, 2007).

As individuals lose awareness of their cognitive and communication difficulties, caregivers may need to learn how to facilitate communication interactions that maintain social closeness without expecting equitable participation. For example, caregivers can name and describe a photo of a recent family event (e.g., graduation or birthday party) as a focus of interaction. Finally, in the end stages, professional caregivers may benefit from direct instruction in the use of tone of voice, familiar objects, the environment, and touch to provide comfort and to maintain quality interactions (Bourgeois et al., 2010).

3.2 Presentation Tools for Memo

Sticky notes (Azheimer's society, 2015): You can use sticky notes anywhere in your home to remind you to do a one-off task: Stick one on the freezer to remind you to take something out to defrost. Stick one on your bookshelf to remind you when you have to return a library book. Once you have completed the task, throw the sticky note away. This way you can keep things tidy and won't accidentally remind yourself to do something you've already done (Alzheimer's society, 2015).

Stationary reminders (Azheimer's society, 2015): You can make more permanent signs, for example a laminated A4 sheet, to remind you to do recurring tasks: Stick a sign to the inside of the front door to remind you to take your keys, purse, wallet or a shopping list with you. Have a sign above the sink reminding you to wash your hands before cooking (Azheimer's society, 2015).

Message within the Field of Vision: Patients with dementia of the Alzheimer type are described to have disturbances in basic visual, complex visual and oculomotor functions. Moser, Kömpf, & Olschinka (1995) could demonstrate both an attentional deficit to externally triggered, unpredictable targets and an impaired systematic, voluntary, internally organized scanning of the environment due to motivational and perceptional deficits.

So, we need a device which the eye gaze is naturally guided to the memo. Yasuda (2007) designed a device which could deliver the required message at all times, displaying it within the user's field of vision in the simple way. The reminder was called "hanging memo from the cap ". A wire was threaded through lengths of tubing running around the peak of a cap and on either side. A card was suspended from the middle of this wire and was normally flattened against the underside of the peak. When the user needed the information, he or she could pull the wire forward and read the card right in front of them, bearing messages such as, "You are in hospital."

Yasuda (2007) used this system with a woman with severe prospective memory impairment. During rehabilitation activities, she was obviously anxious and wondering where she was. He had written a card to hang in front of her eyes which said, "You are in

hospital. Don't worry." On reading these sentences, she would nod her head and resume her work. Yasuda (2007) also used this device for a man with Alzheimer's disease. Sometimes, while he was reading a book, he would look around with a worried expression on his face. He, too, would raise his head to read the card and then return to his book.

Yasuda (2007) used a simple sun visor without a cap. As the application, the caregivers are recommended to use this system. For example, when the patient can recognize the caregiver’ face, the caregiver may hang their younger-age face that the patient can recognize.

Recently, Yasuda also invented another device to show the information all time in front of users, by using the cosmetic compact mirror. The four cards are folded. When user or caregiver wants to present the information, the cover of the mirror is turned into back, inserted into pocket as the supporting base. Then, the connected four cards are unfolded, spread out to show the information on the four cards.

3.3 Wearing Memory Aids

As people who have reached the moderate stage of the disorder are no longer able to remember the day's events when they come to enter them in their diary. Yasuda (2007) have designed a lot of wearable memo pads. This allows them to take notes before they forget, and these should later be transferred to their diary. To be important to develop these wearable memory aids, these aids should be fashionable.

Wrist Type (Yasuda, 2007): For quick and easy access to a reminder when people with dementia move their arms, memo can be written on armband, a stiff plasticized card can be attached to a piece of Velcro wrapped around the person’s arm. This card can carry a list all the tasks to be performed through the day, or the tasks that they have been completed.

Bracelet Type (Yasuda, 2007): This bracelet memo pad works as the band for the wristwatch. The top of the surface of the bracelet can be turned up to reveal several transparent pockets into which several sheets of paper with information are inserted. The bottom of the bracelet’s surface can also be turned up to reveal a notepad for writing memo. Furthermore, there is the storage space for the small and stretchable pencil. The user can set the scheduling alarm of the wristwatch alarm.

Neck-tie Type (Yasuda, 2007): Memo pad in the form of a bolo tie was designed. This fashionable tie consists of a hinged clasp, where the upper section lifts up to reveal a small notepad and a short pen. Yasuda (2007) have given these to more than ten people, most of whom use it to write their shopping lists. If people with Alzheimer's disease wear their lists around their necks, they can consult them more easily, and instantly.

Brooch Type (Yasuda, 2007): This is a flower-shaped leather brooch, with a sheet of paper and a pencil fixed to the back. The users simply need to turn it over to see the reminder. If a string is threaded through the upper part, it can be attached to a bag. Women generally carry a bag when they go shopping, so with this system they can look at the reminder without having to open their bag and thus avoid unnecessary purchases. There is another version which a timer is built in.

Belt Type (Yasuda, 2007): A small notebook is placed that is pinned to the cloth. It could also serve as a kind of badge, or emblem. Inside, there is memo pad and pen. If the note on the memo has to be consulted all the time, the attached chain can be fastened to keep the pad open at 90 degree’s angles in order note are always looked. This system is developed to be useful for people with moderate-severe dementia with frequent, repeated questions. This system may occasionally become a nuisance for touching with arms. But, it reminds the wearer of the existence of the notebook and its contents.

One Hand-Writing Type (Yasuda, 2007): All the memory aids described above need the use of both hands for making notes in them. Therefore, it is impossible to make notes if you are already holding something in your hand, especially while you are moving. In order to make one-handed writing possible, Yasuda (2007) have developed a writing aid consisting of a front (iron metal) plate and a back plate. The back plate is attached to the chest with a clip, and a magnet is suspended from the back of it. On the inside of these plates, a notepad and pencil are included. For writing, the front plate folds back underneath and sticks to the magnet of the back plate. These operations make the aids stale to write. The user can still make notes immediately on this writing aid, even if one hand is occupied.

Additionally, these memos written in these wearable memo pads must be reorganize into categories into the diary. Without these procedures, the memo would so often scattered, or impossible to be searched later. Therefore, these memos can then be transferred to the diary, such as "the memory assist book" (Yasuda, 2007, 2013), described below. Users can simply stick the memos straight into this diary. It is important to use the memory aids and the diary in combination.

3.4 Diary and Calendar

Simple Memory Aids (lzheimer's society, 2015): People with memory problems have suggested some of the following aids to help remember things. C***alendar or diary:*** Put a calendar, wall chart or notice board in a place where you will see it frequently-on the fridge or by the telephone. Or keep a 'page-a-day' diary or notebook with you. Get into a routine of checking a diary, calendar or noticeboard-perhaps when you wake up in the morning, every mealtime, or every time you make a drink. ***Newspaper delivery:*** Get a daily newspaper delivered so that you always know what the day and date are when you get up in the morning. ***Calendar clock:*** You could use an automatic calendar clock. As well as showing the time, it will remind you of the date and day of the week. ***Keep a journal:*** Write a few sentences or stick photos in a daily journal. You can look back in it to remind you what you have done or how you felt. A journal may also give you something to show others or to talk about.

Special Diary for the Memory Impaired and Dementia (Yasuda, 2007): People in an early stage of dementia can keep a diary and write reminders. However, many people do not categorize the various information on their diary. As a result, it is difficult to search necessary information when needed. Yasuda (2007) published the Memory-support book "Kioku sapo-to cho" to make searching easier later on. Therefore, the page of this book are categorized into following sections. ***"To do"*** section: They can write what they intend to do in the day. ***"Done"*** section, and ***"Menu"*** section, where they can write down what they have done, and what they have eaten.

"Accounts" section: This section is for jotting down income and expenditure. ***"Reminder" section***: As people often ask the same questions, the answers to frequently recurring questions should be written under this section. They can then copy out this information every day until it has been memorized. ***"Plans"*** section: They can jot down notes such as, "On such-and-such a day, go to such-and-such a place", copying this information out each day until they reach the date of the planned trip. This considerably reduces the likelihood of their forgetting schedule.

If they find it tiresome writing the same information out every day, they can note it on a "Post-it" which can then be moved from one page to the next. On the left-hand page, there is wide space to stick receipts, patient information leaflets for medication, photos, calculation drills, parts of newspaper etc. They can also write down important words and names, which can then be copied out each day so that they do not forget them (Yasuda, 2007).

Yasuda (2013) published the new memory-support book. In this book, two new sections are added; ***"Check"*** section for goods which people with dementia frequently lost, such as wallets, eyeglasses, mobile phone etc., and ***"health check"*** section for logging the daily health condition, such as blood pressure levels, sugar level etc.

3.5 Location Management for Items

Memory Tapestry: Photographs used as pictorial prompts, the wife had taken Polaroid photographs of what was inside each drawer and cupboard so there were photographs on each door (Cash, 2004). Extra finding efforts are required if following item are stored distributary; Memos for repetitive questions, tools that people lost frequently, medicine et a. Yasuda and Shimane made a prototype of the wall-mounted "Memory tapestry" (Yasuda, 2018).

The top parts is for the storage of medicine, note paper, pencil holder, one day calendar. The digital clock is also positioned, which can show the correct day. If tablet or computer are set here, video phone conversation, or remote monitoring are possible, such as medication intake can be confirmed through video camera. The white message board should be iron so that caregivers put up magnetic sheets, on which answers of repetitive question are shown.

The storage bags for each item would be transparent. The name tags are slicked to each pocket. In this system, people and caregivers are obviously to know whether all of items are returned or not.

His /her old photo or grandchild's photos may help people with dementia focus to this tapestry. It is more effective if you put

alarm clock or IC recorder, and emit alarm, favorite songs, recorded message from grandchild.

3.6 Clothing for Memory

Memory Vest: Bourgeois (2007) provides ideas for devices, along with step-by-step instructions and pictures for making wearable memory aid devices. Included are vest pockets, wheelchair, and walker bags, a necklace, and abelt. Yasuda and Shimane are developing a memory vest which is designed for help the dementia patients to recall the events happened in their daily life, such as key, glasses, wallet, mobile phone, etc. In order to do these possible, the first version of the memory vest has a lot of pockets on it, which are specially designated for the items to be input. It is also equipped portable devices including an Android smart phone, two IC recorders, and digital video recorder to log the daily life of the patient. This video recorder can record all of scenes where wearer visit, conversations whom wearer talk with, behaviors that wearer did. The history of user activity is stored in a database. People with dementia often forget to take the needed one. However, except the most severe cases, they do not forget wearing clothes. So, if the needed items are included in this vest, they do not forget to bring (Matsushita et al., 2012).

3.7 Non-Electronic Home Environment

Univ. of stirling (2013) published the booklet *10 helpful hints for dementia design at home*. If housing is designed well, it can extend the amount of time a person with dementia can remain at home. It can also reduce the sort of adverse incidents that lead to hospital admissions. This book provides a brief introduction to key design features that will enhance the internal and external living environment of people with dementia.

People with dementia need higher than normal levels of light in order to make sense of their environment. Choose well-designed signs and mount them low: weak neck and shoulder muscles as well as poor eyesight mean that the optimal height for signage is 1.2 meters from the ground. Contrast is more important than color. Contrast makes things visible, while a lack of contrast makes them invisible. Always avoid contrast changes where different flooring surfaces meet. People with dementia can struggle with 3D perception and may misinterpret changes in contrast as steps or holes.

Way finding difficulty and disorientation within a facility can also add to agitation. Elders were more successful with processing architectural information (e.g., doorways are meant for going through, stairs are meant to go up) rather than graphic information. Items in display cases with higher personal meaning or significance often assisted residents in finding their way to their room within the facility. Nolan et al. (2000) found the same result when they used photographs as cues, but the photographs were of the residents from 50 years ago. Thus, the residential environment that houses people with dementia can be a therapeutic tool to enable identity, way finding and reminiscence through its spaces and objects within it (Gulwadi, 2013).

Memory Box: Gulwadi (2013) examined the use and usefulness of memory boxes (wall-mounted display cases) at the entrances to resident rooms in dementia care facilities. Each memory box is often a simple rectangular wall-mounted box with a wooden frame and aglass insert, designed to hold personal memorabilia of the resident. Memoryboxes have three purposes: to establish one's identity; to serve as a spatial orientation cue to assist residents in finding their way back to their room; and to act as a tool for reminiscence. Memory boxes and their contents help provide a good starting point for conversations that lead to healthy reminiscence.

Summary: Medical technologies will affect our understanding and management of dementia and communication. As technology use becomes part of the lives of people of all ages, the options for AAC tools and strategies will become dramatically more sophisticated, yet simpler. Cell phones, smart cars and smart homes, robots, prediction search engines (e.g., Bing), and technologies yet to be invented will need to be part of our clinical tool kit (Bourgeois et al., 2010).

Persons with dementia use AAC successfully, and SLPs may want to demonstrate to patients and caregivers the effectiveness of these tools (Bourgeois et al., 2010). Yasuda (2007) argue that people with dementia see their abilities decline as the disease progresses. Assistance must be increased or modified accordingly. Rehabilitation consists in helping both them and their caregivers by making maximum use of their preserved capacities at each stage, using memorization techniques and equipment. To do this,

considerable attention needs to be paid to the difficulties people with dementia and their caregivers encounter at each stage, a range of memory aids needs to be offered to them and the most appropriate ones chosen. There are a number of different memory aids, from multifunctional diary systems to electronic reminders, providing access to them is adapted as the disease progresses.

We need to examine whether such products can enable people with dementia and support their wellbeing by giving positive experiences, reducing worries and unrest, and reducing the burden on careers. The researchers introduce new and unfamiliar technology into the daily lives of people with dementia. The results from the assessment trials demonstrate that technical devices can facilitate independent living of people with dementia and reduce stress and anxiety for their careers, but not always. According to our hypothesis, use and usefulness of a device would be dependent on factors related to the person with dementia, the career, the product, the environment, the researcher, motivation, habits etc (Enable, 2004).

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