



IBES
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SeeCare IPTV

Broadband technology for improved
health literacy



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Executive Summary

This report examines the outcomes of a health literacy proof-of-concept trial held at the University of Melbourne. Despite the dramatic rise in accessing health information on the Internet, current research indicates that the health literacy levels of the Australian general public have not been improving.¹ This suggests that new approaches to health literacy information and education are still needed and led to the work described here. The trial looked at the potential for improving health literacy standards in the community via the integration of two existing broadband technologies; IPTV or Internet Protocol television which is more usually used to provide entertainment in the form of, for example, sports and movies via subscription TV channels and pay-per-view, and *SeeCare* which is a web-based, and consumer-led, care and support tool.^{2,3} The statistics suggest a low level of internet usage among persons with low level health literacy but significant TV usage for this cohort supporting our initial end-user needs analysis and case for developing such an integrated system.⁴

The target group for the study were those with type 2 diabetes (and their carers in some instances) who were selected for their generally low technology usage levels. They were invited to test the system in a mocked up lounge-room setting with large screen TV, remote controls, and comfortable chairs.

Based on a previous interview with a diabetes health educator, the client's requirements culminated (after the educator had used the *SeeCare* web-based tool) in the provision of a tailored selection of videos (delivered from an IPTV server). Having negotiated a log-in process via a remote control, users could then select on screen personalised videos from a trusted source of reliable information, rather than be overwhelmed with a range of information of unknown relevance as occurs with typical searches on the Internet. Thus the *SeeCare IPTV* service offered a personalised form of augmentation of conventional telephone or face-to-face consultations between consumer and health educator.

This report finds that *SeeCare IPTV*:

- Can deliver personalised, high quality and trusted health education, delivering it via a medium, TV, that is familiar and useable particularly for those with lower health literacy levels.
- Was very well received by trial participants who found the TV-and-remote model very easy to use, the personalised video content of direct relevance, of interest and useful.
- Should not completely replace face-to-face interactions: educators and clients both mentioned importance of personal contact via educators and/or community groups.
- Needs a wide range of compelling video content to draw in and hold the viewer over time.
- Has great potential in streamlining the provision and consumption of health information and could remove barriers such as distance to services, and English as a second language.
- Allows educators to personalise information allowing efficiency in user management and thereby providing potential alleviation of health educator shortages.
- Requires more work, particularly on the remote and interface ergonomics.
- Has obvious applicability to other chronic illnesses and aged care.

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1 Introduction

This report explores the usability, usefulness and effectiveness of a user-friendly prototype technology solution called *SeeCare IPTV* in delivering health-educator-vetted health information to people in need. Information is also accessible to family members and carers so that they can provide support. Health literacy can be defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions”.⁵ Better levels of health literacy can improve quality of life, optimise utilisation of healthcare services and reduce the burden of disease.⁶ Health literacy is a factor in combating and managing Type 2 diabetes, a major chronic health issue.⁷

The project involved integration of an existing ‘SeeCare’ Web 2.0 platform (which offers tools to help patients and carers with healthcare management) with Ericsson’s IPTV (Internet Protocol television) system to deliver personalised health education video content to individuals at home.^{2,3}

The study focused on exploring two questions:

1. How can SeeCare IPTV assist people with health conditions, in particular type 2 diabetes, to access and comprehend health information at their own leisure in a familiar setting such as their home.
2. How can SeeCare IPTV assist health educators to provide support for people in need?

Externally validated methodologies were used to explore the impact on health literacy levels as well as usability and user experience.^{8,9} The use of new broadband technologies to support people in need of health care at home and improve their health literacy is an emerging field with few empirical studies conducted to date.

Findings contained in this report will assist researchers in learning more about how an integrated platform such as SeeCare IPTV can potentially increase health literacy and consumer-led care in the community. More specifically, the results can prove useful to those in the e-health industry, health professionals and healthcare consumer organisations interested in consumer-centred, broadband-enabled healthcare in a technologically advanced society.

To give the reader some appreciation of the type and scale of the issues surrounding health literacy and why diabetes makes such an excellent first candidate chronic condition to study they first need to be considered.

1.1 Health literacy

Australian Bureau of Statistics (ABS) data reported:⁴

- A low level of internet usage among persons with low level health literacy: approximately 85% of persons with level 1 literacy and 66% of persons with level 2 literacy have never utilised the internet for information at all.
- Little information is available that is written at the recommended grade 5 or lower readability level, and electronic resources require access to a computer and the skills to navigate the Internet.
- Participation in the work force is relatively low for persons with literacy levels at 1-2. More than three quarters of the unemployed persons in Australia and more than 80% of persons not in the labour force fall into this category.
- More than 60% of Victorians (between 15 and 74) have health literacy levels below the minimum required for them to meet the complex demands of everyday life and work.

1.2 Diabetes

Diabetes creates both a large human burden and financial burden in Australia. Statistics published by the Australian Diabetes Council and the ABS amongst others have identified the following:^{4,10,11}

- Diabetes is Australia's fastest growing chronic disease: one person diagnosed every 5.5 minutes.
- The total number of people with diabetes and pre-diabetes at present is 3.5 million.
- Diabetes prevalence has increased approximately 10% per annum for the past decade.
- More than 80% of persons with diabetes were diagnosed with Type 2 diabetes and of those a little less than three quarters are above the age of 45.
- Type 2 diabetes costs Australia \$3 billion a year; the 4% of the population who have diagnosed diabetes account for 12% of the total health costs in Australia.
- The cost of diabetes to the community for a person with no complications is \$9,625 a year; for a person with complications, the cost to the community is \$15,850.

Diabetes Australia – Vic is a project partner in this study. Currently those people with diabetes in the target end user group of low health (and technology) literacy access information from the organisation via the following traditional methods:

- Face to face meetings with Diabetes educators
- Individual instruction with diabetes educator or dietician via telephone
- Group programs with written information provided
- Written information and connection to the Diabetes Australia website is provided as required
- Internet search (but target end users have minimal utilisation of this method).

The sheer scale of the growing chronic disease problem in an ageing population (where diabetes is just one example) combined with the large numbers that have low levels of health literacy is a major issue, not just in Australia but across the world. In fact experts recommend improving health literacy levels through more personal forms of communication and community-based educational outreach with 'significant widening of the content and methods used'.⁹ This project aimed to achieve that by producing the prototype SeeCare IPTV platform which could open up a pathway to consumer led care and support coordination at home and in the community for those with low levels of health literacy.

The end game would be increased levels of self-management of care for this target group, leading to behavioural change around nutrition, exercise, lifestyle, and medication. In turn this would help alleviate the growing human and financial burdens facing an ageing society into the future.

2 Background

2.1 IPTV

Internet Protocol Television (IPTV) is a television platform through which additional broadband services can also be delivered - and potentially interacted with - in the home using the architecture and networking methods of the Internet. A unique feature of IPTV is its capacity to deliver high quality video on demand (VoD): allowing the user to browse a catalogue of videos and view them at will. [2]

IPTV has traditionally been used successfully in the entertainment sphere to deliver sports, movies, drama and a host of other consumer channels to hundreds of thousands of customers in many instances across the globe. The usual configuration is a set-top box with an Ethernet connection linked to a large-screen TV via an HDMI cable, and each with its own remote control. Other screened devices such as PC's, smart-phones, and tablets can be used instead of a standard TV. Software on these devices provides the necessary functionality to decode the digital data and provide video on screen as seen in figure 1.



Figure 1: IPTV is a commercial reality today, available across multiple devices (source: Ericsson)

IPTV is capable of providing services in a variety of situations across the educational spectrum, from school age children, through higher education to continuing professional development as well as for the general population. IPTV for education was the topic of a recent IBES report to which the interested reader is referred for more detailed technical and other information regarding IPTV.¹²

A typical IPTV platform provides two standard services. One is so-called *linear TV* that is rather like traditional broadcast TV: users can select from a number of channels that are delivered according to a published schedule. These can be live events such as sports as well as pre-recorded material. The second service, VoD, presents the user with category lists with user-friendly thumbnail images of videos that can be selected and viewed at any time, as shown in figure 2. The user then has full control of *trick-features* such as pause, channel record, fast forward, rewind and so on, from their remote control. In function it is rather like having a DVD player or personal video recorder attached to the TV.



Figure 2: Video on Demand on IPTV

2.2 SeeCare

SeeCare is an online information system that has adapted Web 2.0 or *social web* concepts to enable consumer-led care and support management at home and within the community. [3] Personalised health information content is provided based on people's specific needs, goals and health conditions as these change over time. With permission, relevant information is also made available to carers and support agents of people in need. The implementation of SeeCare with cancer patients and their carers won the 2011 Broadband Innovation (Health) Award from the Australian Telecommunication Users Group.

The user has their own SeeCare account and through this manages their own care, or they can give permission, for example, to a family member to act in this role if unable to do so for themselves. The web-tool provides a list of carers and support agencies which the user can enlist to provide them with various forms of support at specified times. This could be to receive help at home in terms of cooking and cleaning, visiting medical appointments, or attending social engagements, for example. The carers and support agencies have visibility only of those details that the user decides is relevant to them so there are, in effect, various *circles of trust* in their personal SeeCare eco-system.

2.3 The integrated SeeCare IPTV system

As TV is a familiar and user-friendly medium for most people, particularly those with low health literacy and less computer skills, it can provide an excellent avenue for users to access health information if allied with other suitable infrastructure.⁴ This is where SeeCare and IPTV come together to create just such a system: it allows health educators to populate each user's SeeCare account with relevant video titles based on interviews or phone calls between the two parties. Note that as well as health considerations this might also mean providing videos in a language other than English for migrant groups. Figure 3 shows the various steps to achieve this. The SeeCare system interfaces with fellow project partner Ericsson's IPTV video server which will then stream only the most relevant health education videos to a TV in the user's home.

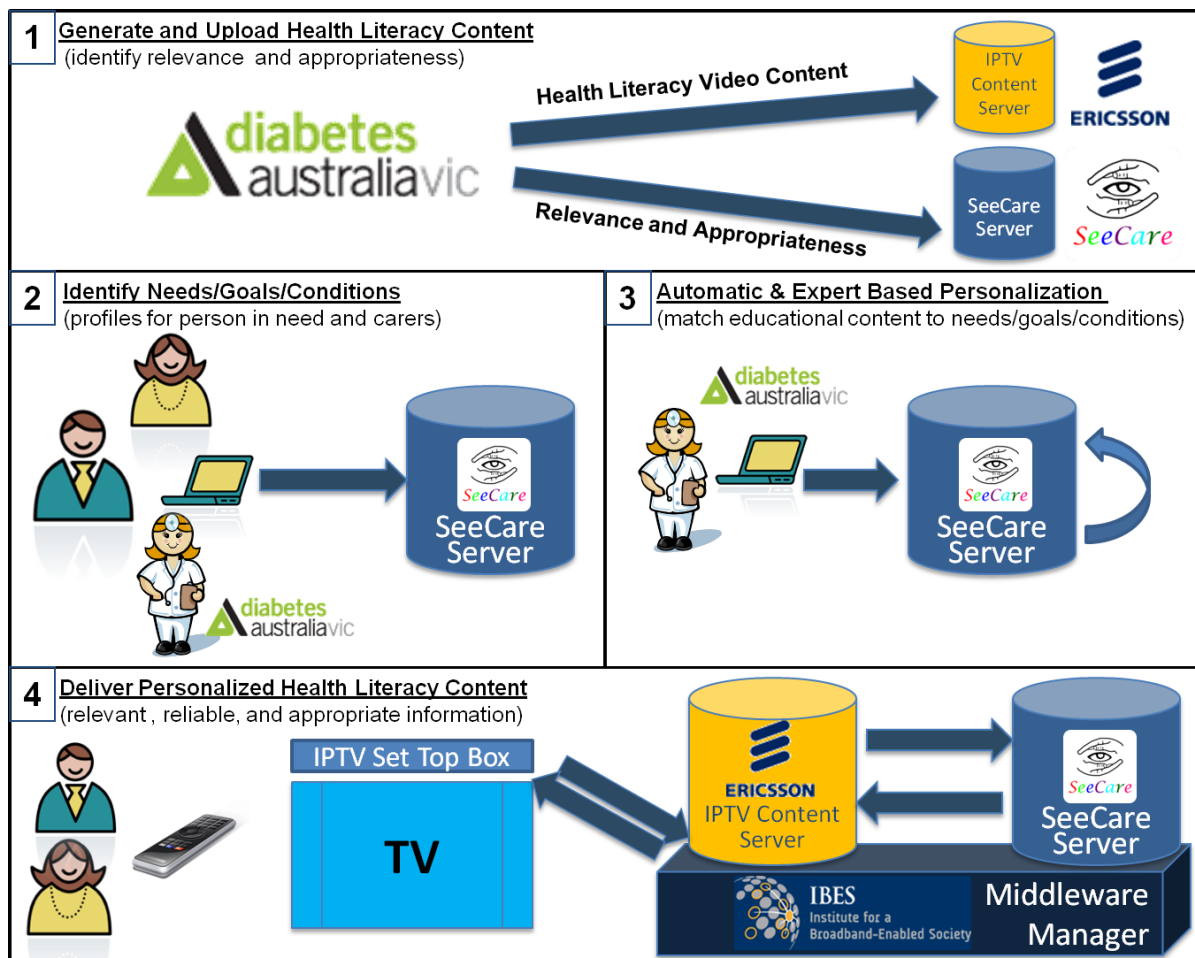


Figure 3: The workflow for the integrated SeeCare + IPTV system

All videos are pre-loaded onto the IPTV server and allocated an ID tag. The SeeCare system can automatically match users' needs with a particular ID tag and/ or the health educator can manually make selections of the most appropriate videos based on their expert opinion of the user's needs, goals, and conditions. ID tags and condition categories are then forwarded, as in figure 4, to the Ericsson server via the middleware, which acts as the intermediary in the transactions. This Application Programming Interface (API) specifies how the software components interact with each other to overcome any data format and exchange issues between the two separate systems. It should be noted here that for privacy reasons the two systems share only information about the videos and VoD categories or *conditions* that are required for display, not any other personal or medical information.

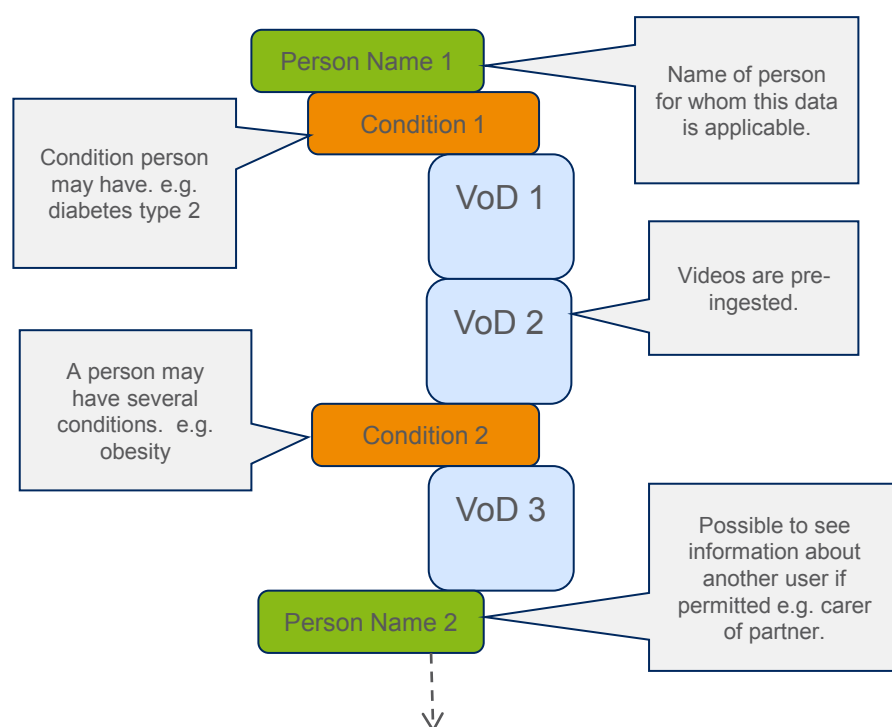


Figure 4: Dynamic text received from SeeCare server that is specific for the user logged in

Once the health educator has enabled the video selections, the user must then log on to the SeeCare IPTV system via their TV screen and a remote. This is not a technical limitation but part of the privacy requirements to ensure no one else can access the user's account without authorisation. The log in process is the closest users get to requiring computer skills, but TV remotes have alphanumeric functions built in and there are special keyboard-style remotes also available as were used in this study (see figure 5). The system can easily cope with multiple accounts and passwords so that family members and carers can also access their own video selections: for example there might be videos on diet or wound management that carers specifically need to see.

After log-in the user can then see a list of conditions as video categories down the left side of the screen with thumbnails and text descriptions of each video title to the right, as seen in figure 5 and the front cover shot of this report. The remote control can be used to scroll down and across to the desired selection and the video played, paused, and fast forwarded as if the TV were connected to a DVD player in the room even though the content is being streamed over a broadband network from a distant server.

The video content was kindly supplied for the duration of the trial by Real Time Health Pty Ltd and consisted of filmed interviews with people with diabetes and their carers, relating their experiences with many aspects of the disease from symptoms, lifestyle choices, exercise, diet, and other related issues such as depression.¹³ The different topics covered in each video interview allowed the content to be broken down into relatively short (generally five to ten minute) segments which the health educators could match via the SeeCare tool to the specific requirements of trial participants. For example a participant might have videos in three distinct headings made available to them under the categories of "Diet", "Exercise", and "Depression", often with more than one to watch in each category.

The integrated system described provides tailored access to content and offers a very different interface from conventional health information websites. Users can enjoy high quality, reliable information from a trusted source that is delivered directly to them without the need for searching. Contrast this with the current model where persons with low levels of health literacy have to overcome a high technological hurdle to gain access to an overwhelming volume of variable quality material, much of this from often unreliable sources.

3 Proof of Concept

3.1 Operation

The pilot study tested the integrated SeeCare IPTV system with a small number of users under controlled conditions. This was conducted at The Institute for a Broadband Enabled Society's (IBES) broadband test facility located at The University of Melbourne. The study looked at all users of the system, namely health educators from Diabetes Australia – Vic who populated the database with required personalised videos based on client interviews, as well as people with diabetes and their family members or carers who then subsequently viewed their personalised list of relevant health video content on the system. This user-interface of the system consisted of a large screen TV connected via a set top box (STB), which decoded the incoming broadband data from the remote IPTV video server and provided a high definition picture. The users had three different remote controls they could choose to use: a standard TV remote as well as two different types for the STB. The first of these was a standard hand-held device with alpha-numeric buttons, but the second was a special keyboard-style remote, which ostensibly would allow easier typing in of complex usernames and passwords as required. As previously mentioned this was the closest to computer skills that participants required and was seen as a key test of the system- if users either couldn't or wouldn't log in the proof of concept could have effectively been finished as an idea. The log-in step was essential to the concept and couldn't be omitted as it ensured the privacy of users. Typical usernames given to participants were around 10 characters long and contained two non-alphanumeric symbols '@' and '_' or '.', making them relatively non-trivial to enter for people with few computer skills.

People affected by Type 2 diabetes were asked to attend a one hour private session at the test-bed lab to trial out the system at a time convenient to them. Each of them had an individual SeeCare IPTV system user account set up for them by SeeCare. In order to organise personalised video selections within their accounts, these participants were asked to fill out a brief survey to collect details of their diabetes literacy. They were also telephoned by a diabetes educator who asked what they wanted to know more about in regards to diabetes and diabetes management prior to attending their scheduled session. Upon arrival at the test-bed, participants found a facsimile of a domestic setting with large TV, easy chairs, and coffee table as in figure 5. The intention was to mimic a familiar, comfortable setting as much as possible. Each participant was given a short ten minute presentation and instructions on how to use the basic functions of SeeCare IPTV. They were then asked to log-in into their SeeCare IPTV account and browse and watch their personalised diabetes education video content on the system – using a TV screen, and the three remote controls as described above as they saw (as seen in figure 5) – for thirty minutes. As they did so, participants were observed by a researcher, and videotaped. Subsequently, participants were involved in a twenty minute structured interview about their experience using SeeCare IPTV, which was also video-taped for later analysis.

3.2 Participants

3.2.1 *People affected by diabetes*

Participants for this study were recruited through Diabetes Australia – Vic (DA–Vic).¹⁴ Advertisements regarding the study were placed in DA–Vic’s Melbourne office and mailed out to those on the organisation’s mailing list who had been diagnosed with Type 2 diabetes. Interested participants were asked to phone a SeeCare IPTV researcher who then selected relevant participants based on screening questions to ensure the best fit with our low health literacy aims. Table 1 overleaf contains a summary of the trial participants details. A total of 13 people affected by Type 2 diabetes participated in this study. Ten participants had Type 2 diabetes diagnosed within the last twelve months. Of these participants who had been diagnosed with diabetes, 3 of them attended their scheduled session with their carer. Eight participants were male and five female. Nine participants were over the age of 65 at the time trials were conducted. Most participants possessed a low level of computer literacy. Eight of them stated that they used computers no more than twice a month and mainly used computers for basic functions such as online searches, email, processing software (e.g. Word, Excel) and social media. All of them used a television at home.



Figure 5: Participants in the SeeCare IPTV trial using TV, set top box, and keyboard-style remote control

Participant Demographic Data	Categories	Total (13)
Gender	Male	8
	Female	5
Age range	Age > 65*	9
	Age < 65	4
Own a computer at home	Yes	8
	No	5
Having an internet/ broadband connection	Yes	5
	No	8
Frequency of computer use	Once a week or more	5
	No more than twice a month (Includes participants who do not use a computer)	8
Computer is used for	Google / Searching and visiting websites	5
	Email	4
	Social media	4
	Processing software (MS Word / Excel)	5
	Processing software (MS Word / Excel) (while working >15 years ago)	1
Available technologies at home	TV	13
	DVD player	12
	Landline phone	13
	Mobile phone	5
	Gaming console	2

Table 1: Summary details of trial participants

3.2.2 Health educators

Four DA–Vic educators voluntarily participated in the SeeCare IPTV trials. All educators were female, technologically literate and used computers daily for work at DA–Vic. In particular, all educators used computers at work for online searches (e.g. Google), social media (e.g., Facebook, YouTube), sending and receiving emails, using a Salesforce database, and preparing articles with Microsoft Office (e.g. Word, Excel, PowerPoint).

Educators attended an hour-long group presentation by researchers at the test-bed, learning how to use the basic functions of SeeCare IPTV. The personalised videos on the system via a PC and web access through their respective system user accounts that were set up for them by SeeCare. Educators were then assigned a number of participants and tasked to call them during office hours to enquire about what they wanted to know about their condition, care and other lifestyle choices. Educators were then able to select personalised video content for study participants. After the conclusion of participant trials, educators took part in a structured one-hour group interview about their own experience using SeeCare IPTV, which was video-taped for subsequent analysis.

4 Results

4.1 Data Analysis

Thematic analysis of video-taped data and observational notes were done initially using so-called *open coding* which means the identification and categorising of the various underlying concepts from the transcripts.¹⁵ One of the researchers analysed raw data collected and identified patterns that were evident throughout the data in relation to the phenomena being explored, for example, the usability of IPTV.¹⁶ Patterns or events arising from the data that appeared to be similar were grouped into distinct core categories or core themes and concepts. Thematic analysis was then conducted using *selective coding*. That is the categories and/or core themes derived from open coding were compared and one researcher systematically explored their inter-relationships and how these categories may or may not be integrated. All coding was cross-checked by another researcher to ensure reliability between ratings. Participants were also asked a number of questions pertaining to the usability and features of the system. The results are summarised below.

4.2 Findings

4.2.1 People with diabetes and their carers

The results of this study highlight both similarities and differences in opinion in regards to the usability of SeeCare IPTV. Many participants stated that the system was easy to use and navigate after playing around with the remote controls for a short period. It was regarded as generally similar to an ordinary television set and Pay TV system. However this was not a universal sentiment. This can be attributed to the fact that some participants were more *technologically-savvy* than others, i.e., they used computers on a regular basis so were more familiar with some functional aspects than the others that had few, if any, computer skills.

In relation to the videos, many participants stated the videos played smoothly and were responsive. They also found the subtitles available in the videos to be a welcome feature they could use although the font of the subtitles was small and at times shifted from side to side on the screen. There were also some shortcomings related to the design of the categories on the left side of the screen: some participants noticed that a few of the video titles were repeated. This occurred because some videos were assigned to more than one category depending on which topics were discussed in them. Thus some participants might have the same video assigned to them multiple times. Also participants noted that some categories or video titles were cut-off at times in the menu, but this is a cosmetic design issue and easily remedied in any final product.

Participants had varying perceptions towards video content and personal anecdotes they contained. Many felt reassurance, comfort, and hope for someone newly diagnosed with diabetes. They also felt empathy with those on screen. For some it refreshed their memory. However, one participant was disturbed by some of the stories shown in the videos, perceiving the content as “shocking” and

“inappropriate”. Others felt that the content was un-engaging as it conveyed diabetes information that they were already familiar with.

Although some participants stated that the remotes and keyboards were small in size, all participants were able to figure them out and familiarise themselves with their operation, successfully browsing and watching videos on the system. As stated in table 1, all participants have a television set at home, which presumably they use, and the majority of them said the system was responsive: videos loaded very shortly after they were selected on-screen via the remotes. As such, the functionality of the IPTV system is arguably comparable to the functionality and operation of a regular television set: one screen requiring one main remote likely explains why most participants stated they had no difficulties in using the system. This lends weight to the proposition that subjects do not need a high level of computer literacy to operate and navigate the Secare IPTV system. Moreover, age is a reasonable factor in explaining why there were dissatisfactory responses in regards to the small size of the remotes and keyboard keys. Note that these were standard domestic remotes as supplied by the TV and STB manufacturers, not devices especially designed for this trial. People are, of course, more likely with age to have deteriorating eyesight. The majority of the participants were over the age of 65 and as one of them stated, she was not able to read some of the icons on the remote without her glasses.

Participants’ responses pertaining to the usefulness of the system indicated that the diabetes video content on the system was relevant and interesting to them to a certain extent. Most said the content was relevant to their diabetes condition and were encouraged by what they saw to be more self-aware of their health condition. Just under half of the subjects said that they learnt something new from the videos but at the same time a number of them mentioned that they would have liked to see a wider variety of videos (diabetes medication, the different stages of diabetes) as opposed to simply watching personalised anecdotes from people with diabetes. In fact this response was encouraging to the researchers involved in the project as IPTV platforms are inherently capable of serving massive amounts of video. The real issue is on the supply side and a common problem for any content distributor: access and copyright must be negotiated with existing owners of video content and/or the cost involved in creating new video must be borne.

Each person diagnosed with diabetes can experience different aspects of the condition and tend to be more vigilant about their diagnosed symptoms. Hence, information about the different aspects of diabetes will appeal to different people and adds to the importance of the SeeCare IPTV system being able to tailor content to each user, assuming a wide variety of content is available as per discussion above.

4.2.2 Educators

Educators found many aspects of their part of the system easy to use, i.e. accessing the web-tool via a personal computer. Some found it easy to use in terms of:

1. Logging into their SeeCare IPTV account.
2. Personalising videos within participants' accounts, in particularly locating the appropriate videos within the database and linking these videos to participants' accounts.
3. Its similarity to other databases that they have encountered.
4. Its responsiveness to their commands.

With the exception of one educator, all were able to login to the system and successfully select personalised videos for participants' accounts, despite the educators themselves expressing some initial hesitation in using the SeeCare IPTV system. New technologies naturally require some initial practice even for those with relatively high level computer skills. Feedback from the educators expressed the general desire to have more time to use the system in order to better familiarise themselves with it.

However, some educators felt that there were some shortcomings with respect to the usability of the system. Some said that:

1. There were too many, contrasting navigational steps to arrive at particular areas of the system.
2. There were too many emails to approve prior to personalising videos.
3. Video content was limited on the system.

Educators also expressed concern at the security of the system and had little knowledge of how secure participants' personal data on the system was (although this was in fact taken care of by the login feature for both educators and participants). Also, some educators were unsure if they had personalised the videos correctly on the system, leading them to feel uncertain about using the system. This confidence is something that would come with more experience of using the system.

In general, educators thought that the system was best used as a supplementary tool for people affected by diabetes in the context of self-managing their health. Educators surmised that their clients would glean a lot of information from watching videos on the system, but this may not necessarily replace the intimacy between face-to-face appointments with healthcare professionals.

Findings show that the system has the potential to enhance communication between health educators and their clients, acting as a two-way health information communication tool. Educators saw the system as an opportunity to manage their workload; by providing clients with additional information about diabetes to look at in their own time at home: they felt that this would instigate clients into thinking more about their condition. Similarly, participants expressed eagerness at learning something new about diabetes and a desire to interact more with diabetes organisations in the community.

Participants and educators suggested that the system could potentially be used by and beneficial to:

1. Those who are newly diagnosed with diabetes.
2. Family members and friends.
3. The younger generation to educate them about diabetes.

They felt that the system is not only useful for health educators and people with health conditions, but anyone in the wider community who wants to learn.

4.3 Further work

Participants provided feedback as to how they felt the usability of the system could be improved. These suggestions can be divided into three aspects:

1. Improving the controls, in particularly combining the three remotes into one remote and introducing a bigger keyboard with bigger buttons, numbers and icons.
2. Streamline the navigation screen incorporating a bigger log-in screen, more colourful video thumbnails and more informative titles. Menu headings could also be added on the left of the screen.
3. Provide an instruction manual for users to read prior to/during use of the system.

Suggestions given by participants to improve the content on the system were:

1. Incorporating personal anecdotes from wider age groups (e.g., younger people just diagnosed), wider demographic groups, detailed anecdotes from people with diabetes, and real-life action shots instead of static in-door shots, for example outdoor activities such as walking, jogging, swimming, gardening, etc.
2. Adding specific diabetes management guidelines in relation to exercise routines, suitable diets, reading food labels and measuring and recording blood glucose levels.
3. Adding up-to-date factual information about advances in diabetes research (for example treatments and medications), potential cures, impact of non-diabetes medication on diabetics, health conditions associated with diabetes, and the various stages and consequences of diabetes.
4. Engagement with diabetes and non-diabetes-related organisations (for example Beyond Blue for depressive illnesses, and community organisations, etc.) and services (for example events, programs, support groups, fitness clubs that target people with diabetes, health professionals, etc.). Participants felt that this information would broaden their knowledge about diabetes and help them to meet other people with diabetes.

Suggestion for system feature improvements can be divided into three aspects:

1. Incorporate the ability to print a summary of the content from the system.
2. Incorporate the ability for participants to explore other relevant websites from the system.
3. Add a pushing feature (e.g. email) to the system so as to inform the users about new content.

The educators also had feedback on desirable features from their point of view:

1. Fewer emails to approve.
2. Fewer navigational steps to get from point A to point B in this system.
3. Availability of simple instructions on how to use this system and communicate effectively with their clients.
4. Mock patient scenarios to practice with to familiarise themselves with the system.

Other possibilities for improvements that could be relatively easily incorporated via existing mechanisms include automated on-screen reminders and details of nutrition, exercise and medication.

5 Conclusion

The proof-of-concept trial successfully demonstrated the inherent value of the SeeCare IPTV platform as a means of improving health literacy in a personalised and engaging way. Although by no means free of issues, the trial of the prototype reinforced the concept of the TV and remote control as an excellent portal to health information for many members of the community, particularly those with low levels of computer skills who were undaunted by logging in and navigating the video content on offer.

The ability to access health information is a fundamental skill which allows people to make informed decisions and assist them in maintaining basic health. Newly developed user-friendly broadband-supported technologies such as SeeCare IPTV can enable health educators to deliver personalised information directly to the home with minimum effort, bringing efficiency to their day to day tasks. People should then be more inclined to access such information on their own and thereby improve their health literacy and health outcomes.

There were many excellent suggestions from all participants for ways in which the SeeCare IPTV system could be improved, and there is still much work to get to a final product that could be used with the necessary confidence in its performance. The roll-out of such a system based on the concepts of SeeCare IPTV could enable improved health literacy and health outcomes for people in need and their carers. It would be of even greater value for those people in outer metropolitan, regional and rural areas that are traditionally underserved in many ways, including having adequate access to health educators.

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