

VIRTUAL ENRICHMENT CENTRE (VEC)

*Concept Development  
CSC318S Assignment 3  
Tutor: Agnes*

CHANSHIN CHANG

*chanshin.chang@utoronto.ca*

BILL MATTHEWS

*g6bill@cdf.utoronto.ca*

MICHAEL ZIELENSKI

*g5bios@cdf.utoronto.ca*

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**1.**

***DOCUMENT SCOPE***

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This document outlines the initial stages of design and development of the Virtual Enrichment Centre (VEC), an interactive virtual community for seniors. It is the result of a series of "brainstorming" sessions of the design team (see Section 7). This document is an initial step in the iterative design process of interactive computational media, placing an early focus on users. It will serve both as a foundation and a road-map for the next phases of design and development. Specifically, the aims of this document are to pinpoint the target user base, outline the concept design and development, summarize the results of the brainstorming sessions, propose a use model (including a "Day In The Life..." scenario), and introduce the design team and outline functions of each member for the future phases of design and development.

VEC

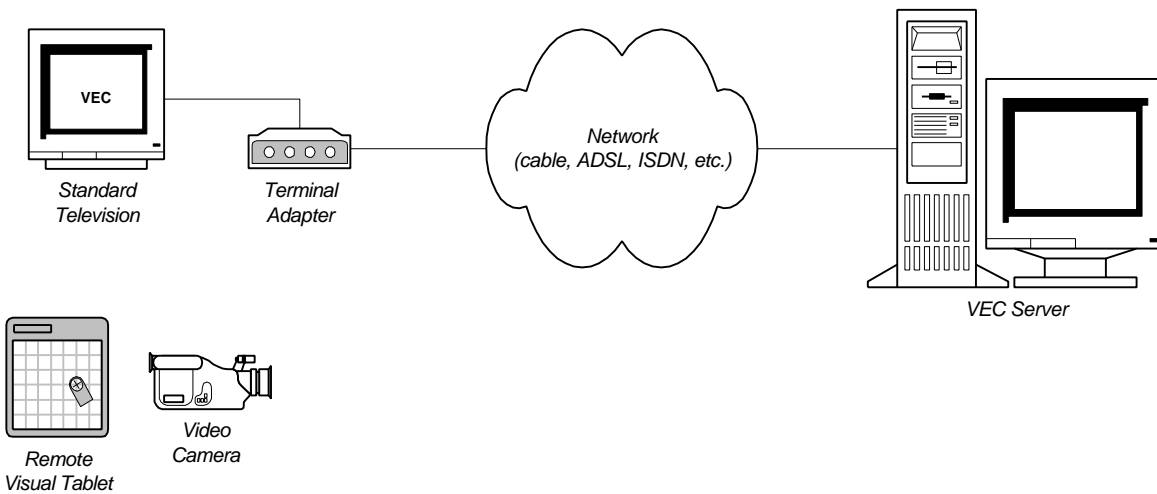
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**2.**

**OVERVIEW**

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The Virtual Enrichment Centre (VEC) extends existing technology, such as the television, to create an interactive virtual community for seniors. Referring to the diagram below, the terminal adapter (in the form of a cable or ADSL modem, or some other symmetric high-bandwidth device) is the transparent connection between the user's screen (a standard television) and the VEC server. The user interacts with the system using an input device, such as a remote visual touch-screen tablet and/or a video camera, using simple on-screen instructions in the form of menus. A similar system design is currently in use by the SEGA channel.



The system's open interface design allows it to be used with a multitude of input devices, while maintaining a common on-screen interface across all of them. Users can select the device that best suits their needs (see Section 5.3 for a discussion of these options).



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### 3.

### TARGET USER BASE

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An analysis of Canada's population reveals a conclusive trend in aging. Last year, seniors (those aged 65 and over) made up 12.3% of Canada's total population<sup>1</sup>, a figure expected to reach 15.9% by the year 2016<sup>2</sup>. One of the factors responsible for this incline is increased life expectancy due to long-term declines in death rates from heart disease and strokes. Life expectancy has increased by nearly ten years between the birth periods of 1920 to 1950 (life expectancy figures: 59.37 years in 1920, 61.00 years in 1930, 64.58 years in 1940, and 68.51 years in 1950)<sup>3</sup>. In 1991, a person aged 65 had an average life expectancy of 18 years, over a year more than in 1981 and almost five years more than in the 1921 to 1941 period<sup>4</sup>. Not only are today's seniors living longer, but the vast majority (approximately 75%)<sup>5</sup> are in good, very good, or excellent health. Consequently, most of today's seniors live at home, as opposed to in an institution such as a nursing home. In 1991, 92% of all people aged 65 and over lived in a private household. More importantly, a substantial proportion of these seniors live alone. In 1991, 28% of seniors lived alone, compared with just 8% of those aged 15-64<sup>6</sup>.

An examination of this demographic group's lifestyle patterns reveals that seniors generally have more leisure time than people in younger age groups, with television viewing accounting for a considerable proportion of this free time. Additionally, seniors are travelling for leisure far more than they did in the past<sup>7</sup>. In terms of more passive activities, the *General Social Survey*<sup>8</sup>, commissioned by

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<sup>1</sup> Source: Statistics Canada, CANSIM, Matrix 6367 (1997).

<sup>2</sup> Source: Statistics Canada, CANSIM, Matrix 6900 (1996).

<sup>3</sup> Source: Statistics Canada, Catalogue No. 82-221-XDE (1996-1997).

<sup>4</sup> Source: Statistics Canada, Catalogue No. 85-519-XPE (1996-1997).

<sup>5</sup> Source: Statistics Canada, Catalogue No. 85-519-XPE (1996-1997).

<sup>6</sup> *ibid.*

<sup>7</sup> *ibid.*

<sup>8</sup> Source: Statistics Canada, General Social Survey (1992).



Statistics Canada, concluded that 90.1% of those aged 60 years and over read newspapers (83.8% on a regular basis), 72.9% read magazines (59.0% on a regular basis), and 60.3% read books (44.2% on a regular basis).

The characteristics of today's retirees make them an ideal target user base for an interactive virtual community like the VEC. The abundance of passive time spent by today's retirees can be turned into a more active, self-improving and rewarding experience. Even though seniors are a vast demographic group, the aim of the VEC is to span the complete spectrum of users and offer an enriching experience for everyone. For example, the active users can take part in cooking and gardening instructional content, health and exercise activities as well as extensive travel information all at their own pace and leisure. The more passive user may be interested in real-time news, religious services, and product showcases when they want and however often they want. Furthermore, those that enjoy participating in social activities can join in a game of bridge or bingo with other users of the VEC, while those wanting to take a participatory role in the workforce can contribute their skills and expertise through the mentorship service. The overall goal of the VEC is to enrich the life experience of its users through four key areas (educational, mentorship, recreational and lifestyle) fostering a sense of purpose, self-improvement, and most of all, self-worth. The VEC is specifically designed to meet these goals with the outlined target user base.



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#### **4. CONCEPT DESIGN AND DEVELOPMENT**

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The inspiration for this concept is quite simple to see after a rudimentary task analysis: currently, a vast majority of retirees are, in the words of one interviewee, "sitting around doing nothing". It is the VEC's aim to enrich that often mundane and unrewarding life experience. The plan is to develop a product that could provide substantial activities in which the user could participate at his or her own leisure. What is a substantial activity? Suffice it to say, that many retired seniors would rather be doing more than coupon clipping or playing solitaire. There are two types of activities that we believe are the kinds of things that users would find enjoyable and rewarding: self-improving activities, and socially engaging activities. Self-improving activities that we have proposed to include are educational services and health and lifestyle services. Socially engaging activities that we have proposed are mentorship services that would put their life experience to use and recreational services which they can use to keep connected to society. So how do we go about developing this concept?

At this stage, our contact with potential users has been limited to feedback on the concept's specifications. We interviewed a small sample of individuals from age 65 to age 80 about what benefits they would look for in a technology designed for them. Our five subjects are all retired, still relatively active, and possess full cognitive faculties. However, after retirement, all of our subjects complained that they have been largely unproductive. Most of their daily functions are now undirected and lack purpose. In the words of one subject, they are "doing a lot of time-killing". Consequently, our subjects all agreed that they would like to return to productive activity without compromising their retirement lifestyles. This feedback complements the initial parameters established in the VEC proposal. In fact, two of our subjects expressed immediate interest in the technology when we explained



what the VEC would have to offer. Once we have a prototype to bring to the subjects, we will conduct a more in-depth interview with them concerning the features and shortcomings of the initial product.

As stated earlier, the subjects currently spend most of their time at home sitting around watching television. Thus, their environment can be reduced to a chair or bed, and a TV. Despite their dissatisfaction with the status quo, this environment is still comfortable for these subjects. By introducing the VEC via the television, it requires only small changes in how the subjects would normally interact with their environment, namely that they would be have an active relation (interaction) with the TV as opposed to a passive one (viewing). This should make the addition of VEC as unintrusive as possible.

As well, the majority of our subjects recommended that the final product should be very easy to learn how to use. They stated that it would be unlikely that they would use such a technology if it required more than a negligible amount of effort to learn. Only one of our five subjects has experience with computers, so it is clear that the features of the VEC must be tractable for those who are not computer literate. This will be one of the primary concerns for the design of this project, as it means we will not be able to employ the typical interface metaphors used in the personal computer industry. Given that the service is being provided through the subject's television, we believe a good candidate for an interface metaphor would involve the domain of the television. For example, we could offer options in terms of channels and programmes, something with which anyone who has used a TV guide should be familiar. Another possible metaphor would be to use a community centre approach, with option offered in terms of centre facilities (eg. Library, Auditorium, Rec. Room, etc.). Again, this format would be more intuitive than an existing PC metaphor for an individual who is not computer literate. Furthermore, either of

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these metaphors would provide a much simpler learning curve, ensuring that the subjects will not be discouraged from using the product from the outset.

VEC

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## **5. PROPOSED FUNCTIONALITY (BRAINSTORMING)**

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The brainstorming sessions were focused on three key areas: VEC content inclusion, software interface issues, and hardware interface issues. They are outlined as such below.

### **5.1 - VEC CONTENT INCLUSION**

The content of the VEC falls into four distinct categories organized into "channels" (each of which consist of "programs"): educational, mentorship, recreational and lifestyle. These four categories represent the goal of the VEC to enrich the experience of seniors through self-improvement, participation and social engagement, ultimately improving the level of self-worth and productivity, which is all too often lost after leaving the workplace. All content is presented as a combination of audio, video and text elements, as traditional television programs are, except that the programs are not presented in a linear fashion. In other words, the user can choose what to watch, when, and at what pace. In this regard, the VEC takes the television concept further by melding it with VCR concept, inheriting functions such as pause, rewind, and forward (which the vast majority of seniors is already familiar with). For example, when watching a cooking program, the user can pause at any time to follow along, or jot the recipe down.

The educational channel includes programs focusing on intellectual self-improvement, providing an opportunity to develop new skills or brush up on old ones. These include lessons on a wide range of topics ranging from history to creative writing courses (see Section 6 for a proposed use model). This channel also includes the option of completing a college or university degree through distance learning. This is made possible through unique partnerships with accredited distance

VEC

learning institutions such as The California Virtual University (URL: <http://www.california.edu>), which ties together the online and distance education offerings of every accredited college and university in California. For the active user, this channels boasts many programs requiring participation, such as cooking and gardening lessons. This channel also includes up-to-date news and the latest scam alerts to protect the users from fraudulent activities often targeted specifically at seniors. Additionally, another major component of this channel is an extensive travel information base, which consists of travel destination profiles, places of interest, interactive maps, flight and accommodation information.

The mentorship services offer the opportunity to be a virtual volunteer and maintain a high level of productivity and self-worth. This is organized on a user-by-user basis and can be carried out in a personal (ie. adopt-a-grandparent) or professional capacity (see Section 6 for a proposed use model).

The recreational channel is the social component of the VEC. This vital component includes virtual gatherings with other members of the community who are online. The choices here range from one-on-one A/V full-duplex chats, to bridge and bingo games (see Section 6 for a proposed use model), to religious services.

The final component is of vital importance to the user's physical well-being, namely, the lifestyle channel. The content included here consists of numerous health resources (diet and medical information) as well as exercises geared specifically to the user's age and condition (see Section 6 for a proposed use model). Additionally, the user can get one-on-one medical assistance in emergency situations.

## 5.2 - SOFTWARE (ON-SCREEN) INTERFACE

The functionality of the on-screen interface is very simple. Options will be presented on large button-like icons. Depending on the hardware input device the user employs, they can "press" the button in order to make their selection. The



screen will then change and present subsequent options or will provide the corresponding content. The on-screen buttons will be made large and obvious so that the seniors, who may not be used to a point-and-click interface, do not have to hunt around the screen for "hot links" or "clickable areas". The amount of information and options presented at one time will be kept to a minimum so as not to overwhelm any potentially computer illiterate users. The software side of the interface required a small amount of brainstorming.

Clearly, the most important features of the on-screen interface are going to be intuitive operation and simplicity of appearance. The most important part of the brainstorming was to come up with issues that address the special needs of seniors. Unlike a new media project for the general public, a product for a largely elderly demographic group has certain constraints. For example, seniors may have limited eyesight, limited hearing, and shorter attention spans when it comes to computational media. We look for possible solutions to these issues when we were brainstorming ideas.

One potential problem is the tricky balance between making a stylistically aesthetic interface and making an easily legible interface. Lately, the graphic arts have been quick to use fancy drop shadows on text, and contrasting fonts for effect. Such attributes seriously compromise the legibility of menu items particularly for seniors whose visual acuity is not what it used to be. Our idea to avoid this is to keep text on a plain background so that if we do choose to add style, we can do so without interfering with what needs to be read. Thus, we should be able to make a visually pleasing screen with keeping it easy to read for seniors.

Another issue we thought of was that of print size. This is a twofold problem, in that the print on the screen could be too small, and the screen itself maybe small making everything that appears on it difficult to read. Our initial plan to correct this problem was to devise a method to adjust print size depending on the screen size.



However, this adds further complications because under certain circumstances, it may be impossible to fit all of the menu items on the screen at the same time. We later came to the realization, though, that screen size probably will not be a serious concern. If the screen is somewhat small, then the senior watching it will have situated himself close enough to see it clearly when watching it normally, so in these cases they should be close enough to read text regardless of the screen size. All that needs to be done is to ensure that the text size used is big enough in relation to the proportions of a television viewing area. That way, if the senior is close enough to see the screen on a smaller TV, they will also be close enough to read the text. Thus, this should not affect the proposed functionality of the on-screen interface.

One idea that we have come up with is still under consideration. We thought of the possibility of designing different shaped on-screen buttons so that they will be easier to recognize than a text label. The potential advantages of this would be increased ease of use and recognition of operations. As well, it would eliminate the need for small text on the button that may otherwise be too small to read. The potential disadvantages are that it may inadvertently confuse the operation of the VEC if the shapes we choose are too ambiguous or obscure. This is something we will need to investigate when we begin the prototyping phase.

### 5.3 - HARDWARE INTERFACES

This brainstorming session concentrated on a touch-screen tablet, a glove, and other input methods.

The basic idea of the touch-screen tablet is to provide a simpler interface than the traditional mouse, which requires good control of hand movement. The touch-screen tablet will display the available options that the user can choose from based on the content displayed on the main screen (WYSIWYG: What You See Is What You Get). There is a wide spectrum of users that can benefit from this interface. For



senior users, low demand on agility and strength and an interface closely coupled to other long existing products makes the touch-screen table intuitive and very easy to use.

The touch-screen tablet is designed for in-door usage. The wide screen and touch-sensitive area allows a large margin of error as there is no need for the user to push the exact center of a button (the buttons can be large and adequate space can be left between them to minimize the probability of a wrong input due to a hand tremor or other condition). The table itself can be secured on the arms of a chair or put on a table. Also, it is designed to be a cordless device. The user will have the comfort to input the commands from a distant sofa or chair. Also the cordless design will prevent accidental tripping over the cord connecting the panel and the main system which can result in serious injury.

Different detail levels can be chosen in order to fit the preference of different users depending on their eyesight and familiarity with computers. Also, the font size of the display can be adjusted to display more or less. The response time of each input and changing of options can also be adjusted for people with a low reflection response.

The selectable options displayed on the touch-screen panel will change with the content on the main screen, so these buttons are not fixed. Also, there will be space between each selectable area to prevent the accidental or wrong selection. Further, the selectable buttons will not be just squares with text inside them, they will include graphics, little or large pictures, different colors to simplify usage and pattern or color matching to the current content of main display screen.

The force required to push the button so that the panel recognizes it is a legitimate input from the user (and not an accidental push) can be adjusted to fit different users with the particular strength they are comfortable with.



There will be a help button on every menu page, and the help information will be displayed on the main screen if the user has questions about what the choices are and what the functions of the buttons are. The tablet itself has a fixed, physical button which, upon pressing, will always take the user back to the main menu to start over.

The glove is an input device that is currently around but not yet in general use. This device can be used by the elderly with ailments such as tremors who cannot control their hand movement to point at a specific area (which makes a device like the mouse impossible for them to use). The user wears the glove like an ordinary glove, and they input the commands by bending one or a combination of their fingers, like the gloves for 3-D environment on the market. This way, the commands can be input without being affected by the shaking of arms and/or hands. The movement of the user's hand will be "traced" on the screen making it a highly intuitive and easy to use input device. The main drawbacks of this include the user's hand fatigue, and having to take the glove off to stop input when carrying on another activity.

The two ideas mentioned above, the touch tablet and the glove, can be combined into one interface. Sensor chips, which sense the pressure or electronic signal, can be placed on the tip of each finger of the glove. By pressing the finger against the tablet, commands can be issued depending on the digit which made contact with the tablet. This way, different fingers can be assigned different functions and this assignment can be expressed on the screen.

Other input methods that will seamlessly integrate with the system include a tablet with a fixed number of coloured buttons, which are represented by corresponding functions of the screen, and speech recognition. This allowance of a multitude of input devices affords flexibility and a wide user base (including those with acute ailments).



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## **6. PROPOSED USE MODEL ("DAY IN THE LIFE SCENARIO")**

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As mentioned previously, a day in the life of a potential user is currently innocuous in many cases. Essentially, the individual gets up in the morning, does any of the daily chores if necessary, watches television when not doing anything (which is the case more often than not), and then goes back to bed. It is this inactivity that we wish to address. This is how we envision that we can put our users' free time to better use.

Consider a hypothetical subject, "Chuck", who is 67 years old and is a retired board member of a prestigious manufacturing corporation. He is still healthy and could easily be active, however, before finding the VEC he just sat around without anything to do. Now that he is a VEC user, his daily regiment is more productive. He gets up turns on the TV, and flips the switch on the VEC terminal adapter and he is presented with the main menu. Using the touch tablet, he selects LifeStyle services. At this menu, he selects dietary recommendations to determine what he should have for breakfast. Based on the information he submitted when he subscribed to the service, the VEC suggests that he should have a bowl of bran flakes, a glass of orange juice and some toast with peanut butter. After finishing breakfast, he returns to the LifeStyle service and selects the exercise option. He chooses a morning workout presentation that has been provided by a registered physiotherapist. A digital video presentation appears on the TV that he can follow. The benefit of these functions is to provide Chuck with the tools necessary to maintain his good health. Without this service, he would likely just sit in his chair and watch television, which clearly is not a healthy lifestyle for someone his age.

Next, he selects the Educational service and calls up the next lesson in his creative writing workshop. One of the things that Chuck has always wanted to do is write a book, but before his retirement he never had the time to develop his writing





skills, let alone find the time to write. Now that he has more leisure time, he has been able to develop these skills. Today, there is a live presentation with Professor Ludovico from the University of Somewhere who will provide some lessons on developing an idea into an overall story line. The benefit of this service is to ensure that Chuck does not let his mental faculties deteriorate just because he has retired from the active work force. Furthermore, he can develop new skills and still be proud of his accomplishments which gets back to our philosophy of self-improvement. Again, without the VEC, Chuck would be unproductive and would not have any projects to keep him active. Furthermore, with the VEC, he can study any of this material at his own pace and at any time of his choosing.

Later in the day, Chuck prepares for his seminar with the board of directors at a company similar to the one he worked for. He selects the Mentorship service, and chooses the connection to the remote board room. Chuck can now be seen and heard by the members in the board room via the camera and microphone connected to Chuck's terminal adapter. The members in the board room can be seen by Chuck with a similar setup that the company borrowed from the VEC service provider for the occasion. Now that Chuck has a two-way audio-video connection, he is able to field questions from the board and makes suggestions based on his life experience. Again, all of this can be done from the comfort of his living room. The benefit of this service is that Chuck remains in touch with the working society, and is able to stay abreast of social developments. As well, he gets a sense of purpose by applying his life experience to a worthwhile cause. Without the VEC, Chuck would feel that all the work he has done in the past was all for nothing since otherwise he would just sit at home alone.

After a full day, Chuck has some dinner and decides he would like to have a little fun. He returns to the VEC and selects the Recreational service. Chuck then chooses the on-line poker option and sees that there are already several groups



gathered. He joins one of the games and up come the other player's pictures across the top of the screen. Across the bottom of the screen is his hand and the betting information. Using the touch tablet, he can select his bet, pick which cards to discard, etc. Throughout the game, he has a full duplex audio connection with the other players (via the microphone) so they can chat while they play, just like a real poker game. After cleaning out his friends, Chuck leaves the game and checks out the chat room option. He spots the name of a woman he spoke to last night in one room so he joins her in a private chat. Similar to the connection used in the board room connection, Chuck can now conduct a two-way audio-video connection. The benefits of the services are a bit more obvious. Without some sort of social stimulus, seniors tend to become reclusive, disconnected from society. This lifestyle is unhealthy and potentially dangerous if no one knows of their condition. The VEC attempts to address this issue by offering a service that will allow users to socialize from the comfort of their own.

In general, the main benefit of the VEC is that it offers users the opportunities of self-improvement and social engagement without having to leave their home. This is what makes the project unique in that although similar services are available in real life (from community centres or seniors clubs), many seniors do not take advantage of them. This is due either to infirmities, a lack of a means for travel, or simply because they have gotten lazy. Instead, the VEC brings these services to them, making it much easier to take advantage of them.



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## 7.

## THE DESIGN TEAM

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The VEC development project is currently being undertaken by three members of CSC318S, an undergraduate course at the University of Toronto, in the Design of Interactive Computational Media.

- **Bill Matthews (g6bill@cdf.utoronto.ca)**

Bill's skills include programming (C, C++, Java, Javascript, Lingo), 4 years experience with Director/Lingo, design/layout, and writing. Bill has training in psychology, sociology, cognitive science, and organized behaviour as well. He is responsible for on-screen interface design and development, Director authoring, design, and digital audio/video post-production.

- **Chanshin Chang (chanshin.chang@utoronto.ca)**

With previous experience working in a group, Chanshin will guide the group to effective management and scheduling of the project. His skills include programming in Turing, C, and HTML. He is be responsible for designing and development of input devices that interface with the system.

- **Michael Zielenski (g5bios@cdf.utoronto.ca)**

Michael brings to the project extensive experience in software design and development, with a minor background in sociology and management. He is responsible for research, analysis and report writing aspects of the project.



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**APPENDIX**

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The appendix consists of examples showing sample content of the touch-screen tablet. Notice the big buttons and wide spacing (particularly between the buttons). Included are also some screen-shots of the preliminary VEC interace.

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