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## Usability testing of public health web-based information systems

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### Keywords

Usability, testing, public, health, web, based, information, systems

### Disciplines

Business | Social and Behavioral Sciences

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# Usability Testing of Public Health Web-Based Information Systems

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## Abstract

*While the Internet provides many opportunities for increased levels of care and access to information services in the area of public health, many web designers are not yet taking full advantage of its potential. This study looks at Intensive Care and Palliative Care, as important instances where health informatics could improve public web-based services, in meeting the particular information needs of family members of critically and chronically ill patients. This study is significant in adopting an approach to the usability testing of websites based on concepts from Activity Theory. This takes a realistic and practical approach, which identifies the purpose of the web-site from an end-user perspective and then tests it in situations which simulate typical real-life activities of the user. The results of this work indicate that, with current website designs, face-to-face communication is still the preferred means to fulfil the public's need for health information when family members are in care. The websites used in this study, as is the case with most community health web-sites, did not allow interaction or direct communication between clinicians and the public. The results indicate the rising need for multifaceted modes of communication with different languages, multimedia, and interactive features.*

**Keywords:** *Intensive Care, Health Information, Palliative Care, Usability Testing, Activity Theory, Web-Based Information Systems, Ubiquitous Use.*

## 1. INTRODUCTION

The new directions of Web-Based Information Systems (WBIS), usually referred to simply as 'websites', employ ever-changing technologies that enable greater end-user access and interaction. However this does not guarantee that these websites are usable by those for whom they are intended. In the public sector, governments have welcomed the ability of online systems to promote equal access to information and services for the majority of citizens regardless of location, facilities or computing skills. The opportunities provided by this phenomenon have been hard to realise and the situation has been made more complex by rapid of the technological capability and associated increasing demands for new functions by users. A growing and diverse user population is turning to information and communication technology (ICT) for service provision in the health care industry. The internet technology has brought forth a set of opportunities for making online communication more meaningful interactive and, most importantly, usable by everyone.

The Internet has become increasingly popular as a means to transform personal and public health as it provides a ubiquitous medium to disseminate information and provide education (Escoffery et al, 2005). The many advantages of the Internet over other media include the ability to provide access to a wealth of information to a greater population without additional cost, twenty four-seven, while maintaining privacy and anonymity (Shephard, 2002). In addition, the Internet offers access to many sources of information

and up-to-date announcements quickly and flexibly. Governments, non-profit organizations, and private/commercial actors around the world have been eager to take the advantage of the Internet's ability to communicate with large numbers of people, and have established a variety of health-related websites to accomplish this.

The research described in this paper focuses on Intensive Care and Palliative Care, as important instances of areas that rely on public health information. These areas require comprehensive and diverse types of information, designed to promote quality of life for patients and families facing problems associated with life-threatening, serious or incurable illness. Palliative and intensive care units in hospitals aim to prevent and relieve the suffering of terminally or critically ill patients by a variety of means including; early identification of problems and quality treatment of pain and associated issues that they face, whether, physical, psychosocial or spiritual. Stakeholders in intensive and palliative care include the patients, their carers, friends and family as well as the clinicians.

This paper describes the conduct and findings of this study. It is organised as follows. The next section presents a compilation of numerous studies that are related to usability tests for health informatics provision. This is followed by a section that describes the methodology used in this study, the data sources and the method of analysis. Then the findings generated from the analysed websites are presented. Lastly, we conclude with some recommendations and suggestions for future application and research.

## **2. LITERATURE REVIEW**

ISO9241-11 International Standard Organization (1998) defined usability as “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” (p.2). Generally, this definition is the basis of evaluating a WBIS. This definition highlights four elements, one is the system itself, the three other elements are external to the system, but important in describing usability: “specified users”, “specified goals” and a “specified context”. Therefore, the key elements of usability are that a system should be perceived to be usable by the specified users for whom the system has been designed and developed, and the scope of the focus is extended to a wider context or situation within which the system is expected to operate.

Further elements are the system's effectiveness, efficiency or use and the satisfaction of the users. Effectiveness is the accuracy and completeness with which users can achieve specified goals in a particular environment. In other words, can users do what you want them to do on your site? Efficiency is the resources expended in relation to the accuracy and completeness of goals achieved. In other words, how much effort did the users have to exert before that could successfully complete tasks. Satisfaction is the comfort and acceptability of the work system to its users and other people affected by its use. In other words, are the people satisfied?

However, usability is a lot more than the measurements of how efficient/effective the system is and how satisfied the people are. Usability testing is qualitative and, thus hard to quantify. Proper usability testing needs to enable the website to be improved based upon findings that the researcher has obtained in his study. Usability testing is about learning from usability tests so to increase your expertise, experience and insights to enable improved service provision.

With the increase use of computer based information systems, knowledge, skills, and experiences of computers users, has become very broad. Therefore, a universal usability is indeed an issue, because it has the potential to provide a simplified, fine understated design, which potentially will be used by all users. Universal (ubiquitous) design is a young and new discipline that focuses more on users' experiences and makes explicit the need to accommodate users with different skills, knowledge, age, gender, disabilities, etc. In the health context, this paves the way for future ubiquitous developments such as a personal

medical devices, improved health care systems, and expanded government services. It also focuses on designs that bridge the gap between what users know and what they need to know, user diversity, and technology diversity (Lazar, 2007).

The literature about information and communication technology demonstrates the needs and requirements in the use of these technologies for the collaboration and sharing of information within and across disciplines. The use of communication technologies in collaboration and sharing of information across organizational boundaries is widely recognized (Blanton & Balch 1995; Bernnan 1996b). Introduction of computerized systems has minimized workloads and resolved some of the problems related to information flows between nurses and doctors. This increase in use has occurred notwithstanding a range of difficulties that include; the need to the need to comply with the system, disruption in the flow of information, hindrance with existing efficient and effective communication etc, yet despite these problems, communication technology has become the norm in healthcare.

Thus there are an increasing number of people who communicate and interact through the Internet to gather and exchange information and experiences and to interact with online support groups. A study by the Paw Internet and American Life Project finds that, patients with chronic illness, access the Internet for medical information more than those who do not have a chronic illness (Paw Internet 2005). Internet driven information use has increased significantly in line with new technology in medicine. The Internet has made a major impact in delivery of medical information to the public (Taylor 2000). Doctors and medical practitioners increasingly review the “medical” literature, condemning inappropriate advice, while also supporting and using the online systems as well. WBIS can connect patients with healthcare providers by secure e-mail or secure Internet-based video consultations.

Communication in healthcare is an essential activity comprised of the gathering and disseminating appropriate health information. This activity is undertaken to enhance the delivery of health care. McLaughlin (1984) emphasised that effective communication is the ability to translate information accurately and in a timely manner. Various studies have identified, ineffective communication, as the major barrier to achieving quality care in the health care system (Bhasale et al. 1998, and Wilson et al. 1995). According to Buller & Buller (1987), it is also evident that patients’ satisfaction with the medical treatment received is a major factor that contributes to patients’ improvement. Patients’ satisfaction is largely dependent on the physicians’ communications in the doctor-patient interaction.

Lloyd & Bor (2004) identified that family and friends as well as doctors can be prejudiced against the patients in terms of how they contracted the illness, or their habits, such as drinking or smoking. Illness or injuries caused by patients’ habits or behaviours can result in negative attitudes towards the patient as he or she may be seen to “deserve it”, like a punishment. Thus, the nature of the patient’s perceived behaviour influences the belief about the illness and helps to determine the level of care and the time given to care that will be provided.

Recent studies in critical care settings indicate that nurses should adopt family nursing practices with a comprehensive approach to their patient care. It is suggested that a family-centred care approach will shift the health care providers’ perspective towards collaborative systems that recognize the vital role of family involvement in ensuring the health care of the patient (Forsythe 1998; Stewart et al 2003). Irlam (2002) acknowledged families as experts in the care of their children, and that the information they provided is important to clinical decision making.

In the context of health communication, general practitioners mainly ask questions, or provide information and explanations and support (Ong et al., 1995). Furthermore, Lloyd & Bor (2004) advocate that the ability to communicate with patients is essential for medical care. In addition to direct communication with patients, occasionally medical staff, will have to communicate with

the patients' families as well, which also has a direct relevance to the patients' care.

### 3. METHODOLOGY

The main purpose of the current study is to focus on improving the effectiveness of public web-based health information services in addressing the information needs of family members or relatives of critically and chronically ill patients. To accomplish this aim a partnership was set up between the researchers and a team involved in the redevelopment of public health websites. One is a palliative care website (<http://www.caresearch.com.au>) and the other is an intensive care website (<http://intensivecare.hsnet.nsw.gov.au/current/node>). Both websites were chosen for analysis in order to examine their existing benefits and then to suggest ways to improve them. The WBIS's provided a number of benefits, such as detailed information for information-seeking consumers. As intensive and rich information sources encourage repeat visits due to their effectiveness in meeting the needs of information seekers. These websites can also serve various communication and social channels and functions in addition to being an information repository (Cho & Cheon, 2005).

This study adopts an approach that is based on concepts from Activity Theory (AT), this view undertakes usability testing in the context of the activity being studied. This approach sees identifying the purpose of a business's computer system or web-site as important and allows us to conduct tests it in a situation which simulates that of typical real-life activities of the users. This approach suits the broad perspective of the study and was practical, as an Activity Theory Usability Laboratory (ATUL), is available to the researcher (Vrazalic & Hasan 2001). ATUL is set up for studying Human Computer Interaction, Activity Theory and Knowledge Management and for practical usability testing of systems using methods derived from AT research (see figure 1). The principal objective of ATUL is to conduct HCI research through formal usability testing and to produce evaluations in a realistic context, which provides for the analysis of group activities and interaction, using an Activity Theory methodological approach.

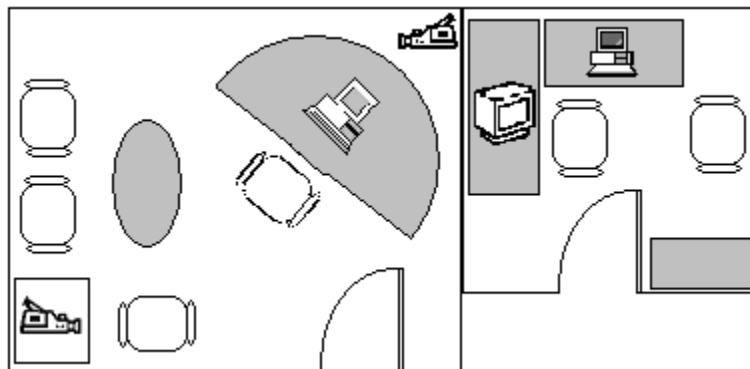


Figure 1: ATUL Layout (Vrazalic & Hasan 2001)

The usability tests of the intensive care website were conducted in September 2007. An expert evaluation of the new site was first done in October 2007 and this was followed by another one in late February 2007. The usability tests of the palliative care website were conducted in late February 2008 with medical students. All the tests that were conducted at ATUL were one hour in duration each. The Subjects were given the Pre-Test questionnaire (Appendix I, II, and III), and asked to carry out scenarios as contained in Appendix (IV&V). An ATUL facilitator encouraged them to talk loud as they used the website. The computer screen was captured and a video and audio recording was made to document the interactions and audio commentary. Once the scenarios were completed, (these took 40 minutes), the facilitator asked relevant questions and drew further comments from the test Subjects.



Previous research (Nielsen & Landauer1993) advises that 4 to 5 participants will yield 80-85% of the findings in a usability test) based on using the Poisson binomial probability distribution. Our research following this well-known principle.

The Activity Theory Usability Testing process includes the following stages:

1. **Establishing the test goals:** at this stage, Testers consult with the Client to establish the reasons for the test and the proposed outcomes (Baca & Cassidy, 1999 and Sears, 1997).
2. **Establish the system purpose:** The Clients and / Owners are interviewed to determine the business goals that the system is designed to achieve.
3. The information from stages 1 and 2 is used to create a questionnaire for interviewing the user after the test.
4. **Identify User Characteristics:** at this stage, it is important to identify who is going to use the system and the set of potential users' of the system. This could range from experts in the field to lay users.
5. **Identify User Activities:** typical user activities are identified including the presumed needs and goals in using the system. What would people want to use the system for? What information would users need to find out?
6. **Devise Test Scenario:** typical scenarios of use are produced at this stage to enable the usability testing to proceed. Tests can be more or less structured as required.
7. **Conduct the Usability Test:** in ATUL, the scenarios are explained and given to the subjects who then proceed to carry it out. Simultaneous recording is made on videotape of the audio, the computer screen is captured, the user's facial expressions and hands movements are videoed and audio interactions are prompted by the Facilitator. The latter keeps the user on the task, by asking general and encouraging questions such as 'Can you suggest any other ways to do that?' Where else could you look for it?' The Facilitator takes notes and should be neutral till the Participants finish all scenarios, and then he or she asks the post-test questions (Dumas and Redish 1994).
8. **Analyse the test records:** the taped record of the usability test is reviewed in the context of the test goals and the system's purpose.

The pre-test and post-test questionnaires are a proper tool for data collection and provide an assessment of the user's overall satisfaction. The pre-test questions set the background questions in order to identify the participants profile before the test. After the test, the participants are given a brief questionnaire regarding the usability of the web-based information service they have just evaluated (Rubin 1994; Dumas & Redish 1994).

In addition, the prepared scenarios describe a particular task that a user needs to accomplish during the usability test (Baillie, Benyon, Macaulay and Petersen, 2003). The major benefits of the scenarios method is that reviewing and evaluating the system is done in terms of realistic activities of usage. It enables the website developers to see how well the system performs the assigned tasks by involving real participants to carry out the required activities that the system is being designed to do. It also reveals the issues of usability, development, and implementation of the system and recognizes the system significance, in processing and carrying out the users' activities.

In total, there were nine different scenarios that were designed. To prepare for the usability tests of intensive care website, three scenarios were designed in a storytelling form, with assistance from two doctors who work in the two main hospitals in the state, and who have substantial experience in critical

care units. These scenarios incorporated emotional effects and added motivation to reach the goal of this usability test. Every scenario has particular tasks to be done during the test by the participants. To ensure high efficiency and accuracy of the data collected, the questions in the scenarios are varied to meet the emotional and human aspects of the situation and to identify the actual points of view of the family members, of the patients in an Intensive Care Unit (ICU) on WBIS. The first scenario represents a lady admitted to an ICU after removing a tumour from her uterus. The second scenario is about a forty-year old man suffering from a heart attack. The third scenario is about a young man who has been admitted to hospital many times because he suffers from Diabetes Mellitus (DM) (see appendix IV).

Similarly, six other scenarios were designed in the form of storytelling, for the usability tests of Caresearch website. The CareSearch website was tested using activity-based usability testing from the end-user perspective of patients and families. This approach involves surrogate users who are given scenarios, as realistic as possible, to simulate the needs for palliative care in Australia, these scenarios helped to motivate participants and ensure the success of usability test. Also we developed realistic scenarios based on the intended audience of the web site.

The usability test that was conducted with the aim to provide feedback, about the degree of satisfaction achieved, for patients who needed palliative care services and for their families and carers. Attention was given to what they found in the website, which is considered as a second important source of information in the field.

The first scenario represents a female nurse who has been working with cancer patients in palliative care and who was looking to improve her skills and knowledge in this area. The second scenario represents a female teacher who was diagnosed with breast cancer and has decided to look for a professional palliative care service that can provide the medical care she needs at her home and the encouragement that she requires to cope with this new phase of her life. The third scenario is about a seventy-year old man suffering Alzheimer's disease at the age of 65. The fourth scenario is about a 55-years old husband who was involved in a road traffic accident, which has left him suffering from a severe brain injury from which there is no chance of recovery. The fifth scenario is about chronically ill- patient who needs multiple medicines and was exploring alternative medicines. The sixth scenario represents a newly graduated medical student who recently begun his work in palliative care units and needs more specific skills in several aspects of palliative care. (See appendix V).

## **4. RESULTS AND DISCUSSION**

This research is designed to assess the efficiency of the website's WBIS, as a tool or resource for the provision of health information, taking into consideration that Internet and electronic sites are common sources of e-health informatics to the public. The aim is to establish more understanding of the nature of communication between health providers and patients' families in the clinical environment, and to come out with the best means for providing information on WBIS in a satisfactory manner, which meets the expectations and needs of its current users. This would serve to improve the efficiency of communication between health service providers and patients and their families.

### **4.1 The Intensive Care ICU Website.**

In addition to being a public site, it is also important on national and international levels in providing accurate information on ICU services in Australia. Hence, it all helps to improve the medical services provided to patients and their families, and to better recognise the needs of the specialists and workers in the ICU. The tests subjects involved young university students who have English as a first language, except one who has not (see table 1).



#### 4.1.1. *The positive side of the ICU website:*

1. The participants representing the family members of patients considered this web site/WBIS-useful for general medical information about the patient. It offers them the opportunity to know what is happening in the ICU, without direct information from the doctors and nurses.
2. WBIS saves time and effort in obtaining medical information required about ICU patients.
3. It contains a lot of information about general ICU procedures, visiting hours and restrictions, locations of hospitals, services provided, such as, religious needs, medical terms, and includes relevant medical links for those that want further information. The visitor information page provides basic facts and frequently asked questions related to an ICU. This aids in reducing the anxiety and stress of the public who requires such information.
4. Content for the public is under links such as, 'what is an ICU? Where are all the ICUs in NSW? What is wrong with me? What sort of technology is used in an ICU? Who is caring for me? Procedures in Intensive Care, Visiting in Intensive Care and Frequently Asked Questions (FAQ). Overall, the convergence of content for the general public is quite fine as there is an immense amount of information available. In addition to this, the language used is appropriate for the general public even though some medical jargon or terms are used. Some Information is also translated for non-English speaking users.

The following are some positive responses of participants about the ICU site:

- *The WBIS website is useful as a source of written information that can be referred to and read several times.*
- *The availability of translation services for some parts of the website is useful for "multicultural communications", especially for non-English speaking members.*
- *WBIS is a good means of communication because the information is presented in a simple language compared to when talking directly to doctors who are likely to speak in a more professional language.*

#### 4.1.2. *The negative side of the ICU website:*

In terms of evaluating the WBIS from the perspective of Intensive Care patients' families (ICU), there needs to be continued assessment of the level of satisfaction with regard to the accuracy, sufficiency and accountability of information available on the web site (WBIS) as new changes are made. There needs to be an evaluation of the quality of information released in terms of the ICU environment, e.g. the equipments used, employees working in the ICU and the visiting hours of patients. In addition, it is important to find out whether there is satisfactory information on different ICUs in NSW hospitals, and to inspect all relevant information that might be of importance to the families and relatives of the patients.

The following are some negative responses of participants about the ICU site:

- *There is a need for a patient's family to be assured of the current medical service provided to their patient. The website is totally lacking in this information because the patient's family is incapable of communicating directly with the ICU where their patient is.*
- *It contains a huge amount of information that confuses the searcher, who is looking for specific information.*
- *\*It needs to have a suitable multimedia interface presentation, such as video and audio clips, flash animation, diagrams and 3D graphics.*
- *\*It lacks the sufficient medical information sought by the patient's family members.*

- There is a need for all the sections of the website to be translated for all family members. (One of the participants spoke English as a second language and wanted to read the information on WBIS in his first language).

The analysis of data obtained from ICU patients' families through the "usability Tests" clarified that the website provides mainly general information with the aim to help user's to better understand ICUs. The website cannot be a replacement of face-to-face communication through which the families can find assurance and are able to get more accurate information about what is happening in regard to their family member in the ICU. Face-to-Face communication is the means to fulfil their need for more information, as the website does not currently allow interaction and direct communication with ICU workers.

#### **4.2. The Palliative Care CareSearch Website.**

As the evaluation process of CareSearch website involves young medical students who were in their twenties, the tests subjects were all computer literate and knowledgeable about medical terms and topics (see table 2). However, they had not had much to do previously with the palliative care. They found this website as resources that they may use themselves but they seemed to consider this site as one that would be useful for others including patients, carers, and community workers.

##### *4.2.1. The positive side of the CareSearch website:*

1. The subjects were almost all surprised that a government agency would provide resources to public's and invest time and effort on this valuable source.
2. The participants were unanimous in their support for the aim of the site to bring all this information in *one-stop-shop* site. They liked the page layout and colour schemes as well as the language used in the content of the pages and commented that it was sympathetic and easy to follow without being patronising or trivial. In addition, they liked the design.
3. The WBIS was generally okay for browsing. The navigation within the submenu was well done and the test subjects could find things quite quickly.
4. The links to external sites functioned properly. The lack of the prominent CareSearch menus proved a good flag to tell the user that they had left the site.

The following are some positive responses of participants about the CareSearch site:

- *It is intensive and innovative website because it contains huge amount information. Who made this brand new website?*
- *Definitely, it is probably mostly useful for patients. It has a lot to offer for medical students, but I was looking at it from this perspective.*
- *The best thing that I like about this site that it is very good classification of information. It is very easy to find information needed. The language used is simple and relevant to what I'm looking for. In fact, I would like to use it myself.*
- *I was able to get information the search was searching quite easily and quickly.*
- *The web-site (CareSearch) has a simple design and the navigation design makes it easy to access general Information*

##### *4.2.2. The negative side of CareSearch website:*

1. The subjects commented that the extensive coverage of the site made it quite a complicated site and most were not sure where to find things from the main menu. Once they were into the right submenu, navigation in general was not a problem but finding the right main menu to start with was problematic. Trial and error was used a lot.

2. All participants found the wording in the main menu confusing when looking for something specific. Most of the time they used trial and error or used the local search facility after they were not in the right place. Indeed, half of the participants naturally used the search as often as the menus when looking for something.

The following are some negative responses of participants about the CareSearch site:

- *Menu arrangements were difficult to follow. But once you get to the submenus it is easy to find your way around and flip around the pages.*
- *The wordings need to improve because it is kind of confusing once you search for something really specific.*

When participants were asked about their suggestions to improve the CareSearch site, they all suggested that there could be an opening room for discussion forums, online chat, and online support groups amongst patients and carers, but not among physicians as they would be too busy and this was not their main area at present. They also suggest having a section for the public to pose questions (FAQ) in which the site would respond to them. In addition, one student suggested that it is useful to have job section that provides users of some information about job vacancies, positions, and application.

## 5. CONCLUSION

The government health websites do help patients' family members to gain a better understanding, and thus reduce psychological stress and the fears patients' families are under because their relative is in a chronically perhaps critical condition. This provision of online information leads to better care for their patients and assists the families in sharing important decisions made by the doctors and healthcare workers about the health of their patients.

Communication between the public and professionals in times of crises is complex due to various factors that limit effective communication processes. This study identified a number of factors that affect communication. However, as the communication process is dynamic, the factors may evolve over time. Therefore, it is an important responsibility of service providers to those who use advanced technologies, which support and facilitate effective communication between the public and professionals, to evaluate these facilities using methods that accurately reflect the user's context of use. .

The usability test applied to the health care websites in this study reveal a number of recommendations that are consistent with previous studies in HCI. The crux of web-based information systems is user information needs, which when met provide guaranteed user satisfaction.

The results of this research indicate how significant the aim of this WBIS is, which is to strengthen communication between all concerned stakeholders in the government health system which were identified as; expert groups, e.g. clinicians and consumers within the State. More importantly, as online information services are already being used to inform the public, it is necessary to continue to develop online services in line with technological advancement to ensure effective exchange of communication between users and provides occurs within the desired timeframe. The results also indicate the rising need for the use of multicultural communication by employing different languages section, multimedia, and interactive features.

This study evaluates the effectiveness of healthcare websites using a sample of intensive care site and palliative care site as representative of the content and features, as well as users' interactive behaviour, and their perception of interactivity. The results of this study suggest further work is warranted to examine interactivity, behaviour, and perceptions of interactivity, occurring between and among online users by employing more study that use intensive or experimental techniques. Future research should also focus more systematically on understanding how the medium's interactive features can be optimised to enhance

communication objectives of the site. Public health websites in general offer potential for doing more than providing information to the consumers. Research is needed to inform the practice of improving the interactive capability of the Internet in such sites and thus allowing for better health outcomes overall.

This study concludes that in the future, the test may include having someone prepared to play the role of clinician or healthcare providers. Following the experiment, the participants, who all had a technical background, were motivated to offer help to the web service management to develop the service further. As this study creates knowledge about the nature of communication in crisis situations, in future research the approach and results of this study could be used to examine issues concerned with the use of the Web for information flows, knowledge transfer, understanding and learning in different types of crisis situations, all of which cannot easily be studied, by the use of conventional research methods.

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## **Appendix (I) Usability Test Pre-Questions**

### **Activity Theory Usability Laboratory**

**Name:**  
**Date:**  
**Pre-test Questionnaire-Test #**      **Scenario #**

Please answer the following questions by placing a Tick in front of the appropriate answer.

What is your age?

- ☐ under 25 years
- ☐ 25-45 year's
- ☐ Over 45

Your highest level of education is:

- ☐ higher school certificate
- ☐ University Bachelors degree
- ☐ Postgraduate degree

Your gender:

- ☐ Female
- ☐ Male

How would you describe your computer literacy?

- ☐ poor
- ☐ fair-good
- ☐ Expert

Your first language:

- ☐ English
- ☐ Other language

Do you ever research for medical information for patients in palliative medical conditions?

- ☐ Yes
- ☐ No



## **Appendix II: Usability Test Post Questions –ICU Post-test Questionnaire**

- \*What is your overall impression of the current web site?
- \*Is there anything that you feel is missing on this site?
- \*Do you agree that the web is important and useful?
- \*How does the current web site affect your understanding about what happened to your relative in the ICU?
- \*Did this web site help you to absorb the medical language when your patients' conditions became worse?
- \*What did you like best about the site?
- \*What did you like least about the site?
- \*Do you think that this site is linked to other useful and credible sites?
- \* Does this web site offer information about support groups or offer virtual or chat-support groups?
- \*Does this web site allow for interaction and communicate with the provider of the site, with professionals, or with other visitors?
- \*What do you prefer, personal (face-to-face communication) or written info, in such crisis situations?
- \* Does access to this web site help to reduce family stress and improve consistency in communication?
- \*Do you agree that the web would replace verbal communication in critical medical environments?
- \* Is there a section on this web site that is devoted to new information regarding health care services?
- \*What are your suggestions to improve the contents of the web site?
- \*Do you have any other final comments or questions about this current web site?

### **Appendix III: Usability Test Post Questions –CareSearch Post-test Questionnaire**

- \*What is your overall impression to current web site?
- \*Is there anything that you feel is missing on this site?
- \*Do you agree that web is important and useful?
- \*How the current web site affect your understanding about what is the Palliative care
- \*What did you like best about the site?
- \*What did you like least about the site?
- \*Do you think that this site is linked to by other useful and credible sites?
- \* Does this web site offer information about support groups or offer virtual or chat support groups?
- \*Does this web site allow for interaction and communicate with the provider of the site, with professional, or with other visitors?
- \* Is there a section on this web site that is devoted to new information regarding Palliative care services?
- \*What are your suggestions to improve the contents of the web?
- \*If you were the website developer, what would be the important things you would do to improve the website?
- \*Do you have any other final comments or questions about this current web site?
- \*The homepage is attractive?
- \*The site has a good balance of graphics versus text?
- \*Can you get to the information quickly?
- \*Is the language used understandable and if there a glossary (medical terms)?
- \*Is there a Frequently Asked Questions (FAQs) section?

## Appendix IV: Usability Test Scenario 1 – ICU

**Please read the following scenario from the Intensive Care Unit (ICU) of ROYAL PRINCE ALFRED hospital:**

This is your favourite Aunt Emilie, wife, mother and grandmother. She is one of those people who are always ready to lend a helping hand and look on the bright side of life. She is someone you can go to



when you need advice. A couple of years ago she was diagnosed with ovarian cancer for which she quietly had treatment and got on with her life.

Unfortunately, Emilie recently went in for an operation for a recurrence of the cancer. The operation took 4 hours after which the doctor explained that she required a resection of an ovarian tumour, which had infected part of the large bowel, omentum, and pelvic lymph nodes. A team of physicians from

gynaecology, oncology as well as the colorectal team were involved.

After the procedure, Aunt Emilie was admitted to the ICU for further care and management. You visit as often as possible with the rest of the family. The ICU staff tried to be helpful giving you the following information, although you will use the Web to find out more.

As part of Emilie's treatment, the following instruments were attached to her body:

- Two IV lines (intra venous) at both arms;
- A Foleys catheter inserted in her bladder;
- A colostomy bag at her abdomen;
- A drain attached to her abdomen;
- A nasogastric tube [Pulse] oximeter attached to her finger.

She was on broad spectrum IV Abs (intravenous antibiotics), Analgesia, anticoagulant treatment, NBM (nil by mouth) and Intra venous nutrition.

Aunt Emilie stayed in an ICU for 9 days with daily blood tests for a FBC (full blood count), LFT (liver function test), RFT (renal function test), Electrolytes and Coagulation test.

On Day 5, her condition deteriorated; she complained of chest pain, coughs and shortness of breath. Examination revealed tachypnea, tachycardia and low oxygen saturation. The following procedures were done to her: sitting position, Oxygen supply by facial mask, ABGs collected (arterial blood gases), CXR (chest X-ray), and ECG (electro cardio graph).

Emilie then showed signs of developing pulmonary embolism (PE), so a CTPA was ordered for her (computerized tomography pulmonary angiography). The result was positive, confirming the diagnosis. She was given a full dose of anticoagulant drugs to resolve the lung clot.

On Day 9, post-operative Emilie was well enough to be transmitted to the ward.

**QUESTIONS:**

**Please use the website to help you answer the following questions about this case:**

Is the ROYAL PRINCE ALFRED's ICU the best place for her?  
Why did Aunt Emilie need the post-operative admission to the ICU?  
Why she was deteriorating?  
What are the risks?  
How about visiting the ICU, Who could visit?  
How long will she remain in the ICU after the medical conditions became more complicated?  
What are the signs of a good prognosis?

#### Appendix IV: Usability Test Scenario 2 – ICU

**Please read the following scenario concerning your uncle who required time in the Intensive Care Unit (ICU) of WESTMEAD Hospital:**



This is your uncle Jeff, a single father with a young son and daughter. He is like a big brother to you, ready to help you any time you need. He just came back from overseas, and you were looking forward to catching up. However, before you meet him you heard that he had been admitted to Orange Base Hospital with severe chest pain. You go to the hospital and find out that ECG, CXR and blood tests have been conducted which lead to a preliminary diagnosis of Acute Myocardial Infarction (Heart Attack).

Jeff's condition rapidly deteriorates, necessitating intubation and ventilation, and he is transferred to the Intensive Care Unit within 30 minutes of arrival to the hospital.

Unfortunately, his condition continues to deteriorate and a diagnosis of cardiogenic shock is made. This means that he needs to be treated in a High Dependency ICU not available in Orange Base Hospital; for this reason preparations are commenced to transfer Jeff to Westmead ICU in Sydney for further management.

#### QUESTIONS:

**Please use the website to help you answer the following questions about this case:**

- Q1: Is the Westmead ICU the best place for your uncle?
- Q2: What information can you find out about Westmead ICU?
- Q3: What may happen to your uncle in the ICU?
- Q4: What more information can you find out about cardiac conditions in general and heart attacks in particular?
- Q5: Is it likely that your uncle is suffering pain now?
- Q6: Is it likely that your uncle needs a surgical treatment?
- Q7: What are the treatment options?

#### Appendix IV: Usability Test Scenario 3 – ICU

**Please read the following scenario concerning your cousin Peter who required time in the Intensive Care Unit (ICU) at ROYAL PRINCE ALFRED hospital:**



This is your favourite cousin Peter who loves to play sport. However, he has been admitted to hospital many times because he has suffered from Diabetes Mellitus (DM) since he was born, but this week he has become very ill. Yesterday Peter was admitted via the Emergency Room to ICU with an altered level of consciousness, new onset DM and Severe Diabetic keto acidosis (DKA). His condition was seen as critical. The altered level of consciousness and critical condition of the patient was attributed to a severe complication called DKA as a result of his underlying disease DM. In DM the body is unable to secrete an important hormone called Insulin, which is important in controlling blood sugar and different vital metabolic functions in the body. Because of this, the body is unable to control the sugar in blood, which will be high, affecting the body's electrolytes, fluid movement in body tissues and brain, and the use of wrong sources of energy leading to harmful waste products. So the main task, initially, is to control blood sugar and prevent loss of

fluid and dehydration. Peter had intravenous lines (IV lines) to supply the adequate amount of insulin and fluids. His blood had to be checked initially every hour and blood electrolytes and PH every 2 hours. He had a catheter put into his bladder to watch carefully for urine amount. Over 48 hours the blood sugar was brought down to normal ranges and the intravenous insulin was changed, which is to be given under the skin 3 times a day. Peter's body fluids were corrected, his IV fluids were stopped and the patient was allowed to eat, but according to a specific diet.

On the 3rd day of admission Peter's general condition improved, but he complained of pain then was unable to pass urine. He was found to have a rare complication of DKA where the muscles of the body get affected and break down. This material from the muscles is toxic to the kidney and causes renal failure. Peter required (Dialysis), which is a process where the patient's blood goes through a machine that acts like the kidney in cleaning the toxic materials from the blood. His kidneys got better over time and did not require more dialysis.

Before discharging Peter, he was taught about the nature of his disease (DM) and the need for long-term management with insulin as well as carefully watching his diet.

**Please use the website to help you answer the following questions about this case:**

Q1: What instruments are used in the ICU for your cousin's conditions?

Q2: Why do people with Diabetes Mellitus (DM) develop a kidney problem?

Q3: What are the expected outcomes of Diabetes Mellitus (DM)?

Q4: What further treatment plan may be arranged for him to live a normal life?



## Appendix V: Usability Test Scenario1- CareSearch



Maree is a nurse who has been working with cancer patients in Palliative Care in a Sydney hospital close to where she lives. She would like to extend her skills and knowledge in this area but, due to family commitments, is not able to travel interstate or overseas. Consult the care-search web-site on her behalf and answer the following:

Questions:

- Q1: Are there any courses promoted on the website that would suit her?
- Q2: Which conference promoted on the website would be suitable for her to attend?
- Q3. Is there any information on service specific for cancer patients?
- Q4: Is there any other information on the site that would interest her?

## Appendix V: Usability Test Scenario 2- CareSearch



Jane is a 64 year-old Sydney woman who has been diagnosed with 4th stage Breast cancer. Her only close relative, a son, lives and works inter-state and cannot give her much support.

While she was really shocked after the initial diagnose, she has always been a strong independent person who as a teacher always loved her work, her school and her students. But now after the surgery and the chemotherapy her long term prognosis is not good and she feels extremely sick and anxious.

Currently she requires assistance with her activities of daily living and for her medical needs. She realises that her ability to function is decreasing and she need someone to really listen to her hopes and fears.

She has decided to look for a professional palliative care service that can provide the medical care she needs at her home and encourage her to cope with this new phase of her life.

Q1: What can you find out about suitable palliative care within NSW?

Q2: What can you find out about local or online groups to provide social support?

Q3: What information is there about symptoms management?

## Appendix V: Usability Test Scenario 3- CareSearch



Jamie's father is 70 years old; he was diagnosed at the age of 65 with Alzheimer's disease.

Jamie's mother had always taken full care of him because Jamie is a full time worker and has 3 children.

But now his mother is getting too old to cope.

Both parents now seem to be filled with tension, anxiety and fear and are not able to deal with important issues.

Jamie feels circumstances have changed significantly and

would like to take more responsibility but is not really qualified to cope with two Alzheimer patients.

Doctors said they need help from family and community resources to deal with their behavioural problems as their need for the medication. A friend told him that there is state support that provides palliative care. Jamie wants to know about this, to improve his knowledge on how to deal effectively with his parents. See what information would help Jamie in the Families' section of the Care Search website.

Q1: Does the website help families to understand this disease and help them professionally?

Q2: Is there a way for Jamie to be trained to be the main caregiver for his parents?

Q3: Is there information to help such families emotionally, physically and medically?

Q4: Is there information to help such families cope with the stress and sadness times of their situation?

## Appendix V: Usability Test Scenario 4- CareSearch



Evelyn's husband Adam is 55 years and was involved in a road traffic accident which has left him suffering from severe brain injury from which there is no chance of recovery.

Evelyn is now responsible for the family which consists of five children (three of which are school age). The cost of Adam's medication alone is just slightly less than his social security income. With him to look after at their home she cannot work.

They really need financial and social support, so Evelyn has decided to look for a live-in palliative care service nearby that the Australian government provides for patients with chronic or advanced illness. See what help you can find for Evelyn on the carer's section of the Care Search Website.

Questions:

Q1: How can Evelyn get the best palliative care service for her husband within the government palliative service in NSW?

Q2: What is the financial support available to pay for the private palliative care services?

Q3: If there is any support group information on the web-site?

Q4: Can you find more information about the Australian governmental palliative care policy?

Q5: What are procedures if you want to complain about government help for palliative care services?

## Appendix V: Usability Test Scenario 5- CareSearch

Antonio has primary pulmonary hypertension, a rare condition of the blood vessels in his lungs. There are no treatments that can cure his illness, and he needs multiple medicines.

He is admitted to the hospital almost every month because he has hard time breathing. Episodes can be brought on by a mere cold or changes in the weather. During these hospitalizations he receives extra doses of medication, but it takes a few days for him to feel better.

Each time he is hospitalized, the palliative care team works with his heart and lung doctors to treat his breathlessness. The medications they prescribe allow Antonio to feel calm and comfortable.

You are the doctor for this patient. He has recently expressed concern over medications he is taking, and he would like to explore alternative medicine.

Q1: What information is there available on the Caresearch website about alternative or complementary medicine?

Q2: Name several databases you could refer to for obtaining such information.

## **Appendix V: Usability Test Scenario 6- CareSearch**

You have just graduated from the university with a degree in Medicine. Recently you have begun work in a NSW palliative care unit and find that you need more specific skills in some aspects of palliative care.

Q1: What sort of further training could you undertake?

Q2: If you wanted to specialise in a specific area of palliative care what kind of certifications are available?

*Table 1: Pre-Test Questions: Demographic Details of the six subjects used for the usability tests of ICU are as follows:*

<b>Age Group</b>	<b>Gender</b>	<b>Highest Level of education</b>	<b>Computer Literacy</b>	<b>First language</b>	<b>Current study</b>
Under 25	M	University Bachelors Degree	Expert	English	B IT 3rd Year
Under 25	M	University Bachelors Degree	Expert		B IT 2nd Year
Over 45	M	Post Graduate-PhD	Fair Good	English	PhD Commerce 3rd Year
Under 25	F	Master Degree	Fair Good	Other Language	M Commerce 2nd Year
25-45	F	University Bachelors Degree	Fair Good	English	B Commerce 2 Year
25-45	F	University Bachelors Degree	Fair Good	English	B Education 2 Year

*Table 2: Pre-Test Questions: Demographic Details of the six subjects used for the usability tests of CareSearch website are as follows:*

<b>Age Group</b>	<b>Gender</b>	<b>Highest level of education</b>	<b>Computer Literacy</b>	<b>First Language</b>	<b>Current Study</b>
25-45	F	University Bachelors Degree	Expert	English	B Medicine 2nd Year
Under 25	M	University Bachelors Degree	Expert	English	B Medicine 2nd Year
Under 25	M	University Bachelors Degree	Fair Good	Other language	B Medicine
25-45	F	University Bachelors Degree	Fair Good	English	B Medicine 1st Year
Under 25	M	University Bachelors Degree	Fair Good	English	B Medicine 2nd Year
25-45	F	University Bachelors Degree	Fair Good	English	B Medicine