

Towards Evaluating Health Information Portals: A Tasmanian E-health case study

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Abstract

This paper investigates a subset of E-health systems, that is, the provision of health information intended for rural residents, made available through a portal and accessed on the internet. While a vast number of websites provide access to health information, concerns have been expressed about many of them. A range of approaches to evaluate health portals is considered, using several frameworks from the literature. Evidence exists that the health of rural Australians is affected due to their location. A case study of an E-health system that aims to help redress this inequity is presented, where health information is made available from a non-commercially oriented portal accessed through a rural Tasmanian telecentre. The nature, success and quality of the health portal are explored, using the frameworks, before conclusions are drawn. The health portal was found to be a quality website. The results suggest that under some circumstances it may be viable for health portals to undertake self-certification of their quality. Further work is recommended to test this hypothesis.

Introduction

Telehealth evolved from telemedicine, as the focus moved to services provided by a range of health professionals from services provided only by doctors [1]. E-health is a broader term that encompasses telehealth and telemedicine, although some disparity in the definitions of the first term is noted [2]. It denotes access to health information, support and services by the public, health workers and others through the internet [3]. Consumer health informatics aims to make health information accessible to consumers as well as to incorporate their preferences into health systems [4].

The electronic provision of health information, where it is actively sought out by consumers and provided by the internet, is the second of three models of E-health systems. In the first, *the traditional medical model*, [5] (p.1132) information passes from a medical authority to a passive patient. In the *healthcare consumer model* (p. 1132), patients search for health information, while in the *information sharing model* (p.1132), information flows in both directions between a health professional and patient.

Health information is necessary for health consumers to understand their health status and make meaningful decisions about their medical care [5]. In the past the decision making function in the health arena has been performed by health providers and other groups [6]. It is only recently that patients have started to take on this role, as a consequence of the growing emphasis on

facilitating patients in making informed decisions [5]. There are advantages in assisting health service consumers to access health information and so be in a position to make informed decisions. With accurate health information, consumers will be more effective at understanding their healthcare provider and implementing their instructions [7]. Further, patients with chronic illnesses have been found to have improved health, and behave in a health-promoting manner, where they have access to health information and make effective use of it [8].

Health portals form a frequently encountered category of E-health systems that enable the provision of health information. A portal is a website that offers a set of services to assist people in navigating the internet [9]. Portals can provide a range of services, along with access to health (or other) information. Additional common services offered through portals include search facilities, community building utilities, access to commercial offerings and personal productivity applications [10]. Effective portals are likely to attract a large number of “hits”, or visitors. Portals are also the “stickiest” of all websites (that is, visitors spend more time on them) [9].

Health focused websites are some of the most heavily used internet sites, with in excess of 100 000 estimated to provide health information in 1999 [11]. As a consequence of the proliferation of health websites, concern has been expressed about the quality of some of the health information available to patients on the internet. As one approach to the problem of doubtful quality, recommendations have been made that health professionals should direct

consumers to high quality health information [12]. It can be difficult, however, to determine the quality of health information websites.

Few studies have evaluated E-health systems [13,14], while the literature that is available tends to be speculative rather than empirical or theoretical [2].

Consequently, it is appropriate that aspects of these systems be assessed, along with methods of doing so. With many competing health websites available, including portals, and the high mortality rate of portals [9], the perceived “success” and quality of portals are of considerable interest.

Success for the purpose of this paper was interpreted to mean the degree to which the outcome of the portal was favourable or otherwise, while quality was seen to be the combination of characteristics that bear on the ability to satisfy explicit and implicit needs [15]. In this scenario, the need was to access reliable, relevant health information. As the success and quality of portals are likely to correlate at least in part to their characteristics, different ways to characterise the nature of health portals are also worthy of exploration.

Consequently, this paper considers different approaches to evaluating the nature, success and quality of portals available on the internet that provide access to health information. It is argued that it is difficult to evaluate each criterion without also considering one or both of the other two.

Approaches to Evaluating Health Portals

The literature presents a range of approaches to evaluate websites. The assumption is made that many of these approaches can also be applied to the evaluation of health portals.

It has been claimed that E-health reflects a tension between two competing rationalities, the first of which is the “managerialist rationality” [16] (p.40), which incorporates scientific principles and emphasises curing disease. The second is a “discourse of social responsibility and community values” [16] (p.41). The former discourse focuses on efficiency and effectiveness, and points to the potential of cost reductions associated with E-health. The latter relates more to a holistic model of care, providing healthcare that disregards geographic location or social class [16]. A range of advantages have been claimed for E-health including better access to healthcare services for patients, increased quality of healthcare, cost reduction and reduced travel for both patients and healthcare providers, including specialist care [17]. Each claimed advantage needs to be considered in turn to determine whether it falls within the managerialist rationality, or the social responsibility discourse. Although acknowledged as difficult to do [16], one way of evaluating the nature of an E-health system is to consider the dominant discourse that drove its development. The perception of success of a particular health portal will vary according to whether the discourse that drove its implementation was set within a managerialist or social responsibility context. For example, if the driver was managerialism, and the E-health system was shown to have no

cost-benefit advantages, yet it contributed to the cohesiveness of a community, its success may be seen as minimal.

One study used the key success factors of access, audience, accuracy, timeliness, content, authority and privacy to evaluate health information websites of different types [14]. When evaluating portals, it has been proposed that portal “success” is derived from the dominance of a portal along three dimensions, horizontal, vertical and geographical [9], a concept that has been referred to later in this paper as “reach”. The horizontal dimension relates to how wide or narrow is its field of operation, for example, all health issues versus mental health. The vertical dimension relates to how wide or narrow is the community targeted, for example, parents of all children versus parents of disabled children. Finally, the geographical dimension relates to the portal’s geographic range, for example, international versus a specific region in a state or province. Although Damsgaard [9] refers to the three dimensions as a way to evaluate portal success, it appears that the classification could also be used as another approach to characterise the nature of a portal. Damsgaard gives as an example, a portal that could be seen as successful on the basis of being “the preferred site for rock’n’roll lovers under 25 years in the greater Cleveland area...(with a) narrow horizontal, vertical and geographical scope” [9] (p.410). In this example, the portal dominates other potential competitors when the three dimensions are considered in combination. It is argued that the combination of the three dimensions will help define the portal’s nature, while the degree to which the portal is pre-eminent across the dimensions will form one way to determine its success.

Many portals aim to develop their community of users, as the portal is dependent upon a community that uses the services it offers, while the users will utilise the portal as long as it offers them relevant services [9]. Empirical measurement of portal use over time provides another way of evaluating the success of portal, a measure that may be linked to its quality, that is, its ability to satisfy the collective needs of the users. Another associated measure of portal success for a commercially-oriented site will be the revenue generated by it.

Distinguishing a successful portal from a non-successful one by counting the number of visitors to a portal has limitations, as many portals fail after attracting numerous hits earlier in their life [9]. It has been proposed that a successful portal is one that both effectively manages its portal community, in conjunction with appropriate timing for seeking payment from that community to access the services on the portal [9]. Yet it can be seen that the last approach proposed for maximising the success of a portal is more appropriate for portals that seek to make a profit. A simple characteristic that can be used to distinguish the nature of one portal from another is whether it has a commercial or a non-commercial orientation.

The literature includes several sets of criteria for assessing the quality of health information on the internet. Where a portal contains health information, these criteria are relevant for evaluating the portal's quality.

A core set of *Quality Criteria for Health Related Websites* has been developed by the sixty Member States of the European Council, along with Norway, Switzerland and the United States of America (USA). The criteria relate to the reliability of health websites rather than their content, and were designed to be applied in conjunction with the law of the implementing nation [18]. The criteria were intended to act as a resource for Member States, and their public and private organisations, for the development of voluntary codes of conduct, and similar. The quality criteria were developed to address both sites that provide health information and those that facilitate transactions between users and service providers. The criteria are as follow:

- Transparency and honesty
- Authority
- Privacy and data protection
- Updating of information
- Accountability
- Accessibility

MedCERTAIN was a project funded by the European Union that sought to encourage providers of health information to follow best practice guidelines, in combination with external evaluations and monitoring of health websites [19]. Again, the impetus for the research was concern about the quality of health information available on the internet. The project acknowledged that the quality of a website cannot be measured universally, but ultimately the user will decide whether it can be trusted. MedCERTAIN developed a

trustmark and metadata scheme to assist the evaluation health information. An evaluation hierarchy used by MedCERTAIN is summarised in Table 1.

Table 1: MedCERTAIN evaluation guide (adapted from Eysenbach *et al.* 2001)

Level	Type of evaluation	Focus of evaluation
1	self	disclosure
2	third party non-domain expert	structure & process
3	third party domain expert	information
4	researcher	knowledge & validity

As Table 1 shows, Level 1 health websites involved self-certification, and were not evaluated externally. The focus of Level 1 health websites was on ensuring that any necessary disclosures had been declared, such as the body that had funded the provision of the information. Level 2 websites were evaluated by a third party expert from a domain outside that of the health information. The emphasis of the evaluation for a Level 2 trustmark was on the structure and process of the information presented. To gain a Level 3 trustmark, the health information was evaluated by a third party domain expert, who focused on the content of the information itself. For the highest trustmark category, Level 4, the health information was evaluated by a researcher, who was interested in the knowledge transfer that took place [19].

The *Quality Criteria for Health Related Websites* relate most closely to disclosure aspects of the health information in the MedCERTAIN

classification, that is, the Level 1 trustmark. In both schemes at this level, self-evaluation was required.

An alternative but older set of criteria for assessing the quality of internet-based health information was compiled by Mitretek, a US-based non-profit company that researches technological problems [20]. The Mitretek evaluation criteria are listed below:

- Credibility
- Content
- Disclosure
- Links
- Design
- Interactivity
- Caveats

The criteria used by Mitretek also relate to perceptions of quality rather than the nature or success of a website. For some websites however, including non-commercial healthcare information portals, the success of the site will be aligned to its perceived quality. To illustrate, the outcome of using the site could be more favourable where the health information is perceived to be of quality.

Now that a range of approaches for evaluating the nature, success and quality of health information portals has been presented, a health information portal developed in rural Tasmania will be evaluated using the approaches, in order

to examine their utility. The portal evaluated attempts to help redress health deficits associated with living in a rural environment in Australia.

Case Study

Background

Rural areas have found it hard to attract and retain healthcare services and personnel [21; 22]. Residing in a rural area can isolate patients from current health information [21; 23]. These reasons are believed to have had impact on the quality of rural health [21]. Not surprisingly then, many investigations have shown that Australians who live in rural areas have a greater need for healthcare as they have higher rates of several non-communicable diseases, including cardio-vascular disease (see for example, [24; 25]). Although an important aim of telemedicine technology is to improve healthcare in rural regions [21], the impact of E-health on rural healthcare has had only limited examination [13]. There is a need for both studies and methods that investigate the efficacy of E-health systems used in rural areas.

Tasmania is the only island state of Australia. In comparison with the other five Australian states, a relatively high proportion of the Tasmanian population live in rural areas. In recognition of this characteristic, a network of 64 telecentres, called “online access centres” was established in Tasmania from 1998, using federal government funding. The main goals of the telecentres were to deliver free computer training, free access to the World Wide Web and e-mail to all Tasmanians living outside of Hobart, the state capital [26]. Two other key objectives sought from the establishment of these

centres were to drive economic growth through assistance to micro businesses, and to encourage social and cultural development in rural and regional communities throughout Tasmania [27].

Lilydale is a small town with a population of approximately 980 in a rural community in the North-East of Tasmania. The major industries in the surrounding area are mixed farming and wine growing. Lilydale Online Incorporated, the body that manages the Lilydale Online Access Centre, gained a small grant from the Tasmanian Government's Community Support Levy to develop and implement a portal of health information links for rural Tasmanians [28]. The portal, Health Access for Rural Tasmanians (HART), was implemented in November 2003, and offers a simple interface to Australian and international third party sites that provides information on illnesses, medicines, family health, health news, lifestyle, self help and support groups. The sites have been categorised into three levels of difficulty, and include government and commercial sites. The international sites are largely from the USA. A small team developed the health portal, including a general practitioner and two pharmacists, all from Lilydale. One of the latter is the Chairperson of Lilydale Online Incorporated, who could, it is assumed, bring both health-oriented expertise and an understanding of the local community to the development of the portal.

Methodology

The HART portal was analysed for indicators of its nature, success and quality, using some of the frameworks from the literature presented earlier.

The purpose for doing so was both to examine these three aspects of an E-health system designed for use by rural residents, as well as to evaluate the potential of the approaches. Two researchers trained in Information Systems research methods independently analysed the data available. The degree of intercoder reliability was considered acceptable where agreement between the two researchers reached 70% or higher.

To examine the nature of the E-health system, first the thrust of the discourse was examined. Content analysis techniques were used, both on the introductory text used in the website and an article that described HART's purpose, published in a quarterly online magazine by Community Teleservices Australia 2003 (CTSA). CTSA is a national industry association that represents the interests of telecentres around Australia.

Then a second method of evaluating the nature of the portal was used, by analysing its reach on three dimensions. Data used for this analysis came from the content of text available on the website and in documentation of the project. The third method of assessing the nature of the portal was by classifying the website as commercial or non-commercial, depending on whether it aimed to raise revenue. This was done by examining whether the site requested payment for the service it offered.

Next analysis was made of the success of the health portal, by considering the application of three different approaches. The first approach used was to investigate the dominance of HART on the three dimensions, by undertaking

a search for its competitors using the Google and AltaVista search engines. The terms health “portal+rural+Tasmania” were entered, to determine whether any health portals that competed in the same dimensions could be found. Then the search was widened, replacing the search term “Tasmania” “ with “Australia”.

Although another indicator of success is to measure the use of a portal, this approach was not used. As the portal had only recently been implemented, it was too early for this measure to be useful, particularly if a sustained hit rate was sought. A third approach to measuring success is to consider the revenue raised by commercial sites. Whether this approach will be taken will hinge on the assessment of the website as commercial or non-commercial in nature, as the measure is meaningless for a non-commercial site.

The last characteristic of the HART health portal to be investigated was quality. Three different approaches had been identified that could be used to measure the quality of the website, the *Quality Criteria for Health Related Websites*, MedCERTAIN and the Mitretek evaluation criteria. The *Quality Criteria for Health Related Websites* was chosen as the method of analysis.

It has been seen that the MedCERTAIN approach uses levels of trustmarks, and relies upon external or internal certification. As the HART portal does not use trustmarks, it would not have been meaningful to use MedCERTAIN as the analysis technique. In analysis however, an attempt was made to assess

the level of quality of the site, using the hierarchy of levels from the MedCERTAIN approach.

The Mitretek approach to quality was not used for analysis, as it pre-dated the *Quality Criteria for Health Related Websites* approach. Also, because a representative from the USA worked on the development of the *Quality Criteria for Health Related Websites* approach, it seems reasonable to assume that the Mitretek approach to evaluating the quality of health websites was considered, but rejected, when the *Quality Criteria for Health Related Websites* criteria were developed. The HART website was evaluated, using the sub-criteria within the six core criteria, by seeking evidence of compliance or non-compliance with the guidelines of the *Quality Criteria for Health Related Websites*.

The results obtained after applying the approaches discussed above to evaluate the nature, success and quality of the HART portal are presented next.

Results

Evaluation of Portal Nature

Results of an analysis of the nature of the HART portal, using a framework compiled from the literature, is presented in Table 2.

Table 2 Indicators of the Nature of the Portal

Issue examined	Finding
1. Direction of Discourse	
Managerialism	No evidence
Social responsibility & community values	Yes to inform, aid understanding and empower rural residents
2. Motivation	
Commercial	No – free access to portal. However some links charge for information
Non-commercial	Yes
3. Reach	
Horizontal	Wide – all health issues
Vertical	Medium – rural communities
Geographic	Medium – primarily for Tasmanians

As summarised in Table 2, no evidence of a managerialistic discourse, such as references to cost-benefit advantages or efficiencies, were found in documentation incorporated into the portal or in an article setting out the portal's aims. However, a discourse of social responsibility and community values was evident in the same documentation. It can be seen from the following quotations that HART was conceived as a community service, designed to enhance the understanding of consumers with regard to health issues:

...goal was ...a(n)...interface...to access ...simple to understand health information [28] (p.13).

...HART ...can be of benefit to...Australian(s) ... interested in understanding...conditions, diseases, or medications they or their families may currently have [28] (p.13).

...there is something of interest here to anyone interested in becoming more informed on health matters [28] (p. 13).

The HART portal is ...a community service...[28] (p.13).

This website is ...for the ...benefit of the public [29].

The health portal was classified as a non-commercial site, as it “... provid(ed) links to health information free of charge” [29]. However, it was noted that some third-party sites included in the portal imposed a charge for some services, which did not benefit the portal developers.

HART was found to have a wide reach for the horizontal dimension as a wide range of health issues were linked to the portal, including lifestyle issues, medicines and mental health issues. The vertical dimension was classified as medium, as it was designed for rural communities rather than for all community groups. The geographical dimension was also regarded as having medium reach as the portal stated it was designed primarily for Tasmanians,

although it was acknowledged that it could benefit Australians living elsewhere.

Evaluation of Portal Success

The success of the HART portal was then considered, looking for dominance in the three dimensions as an indicator of success. Entering the terms health portal+rural+Tasmania using the Google and AltaVista search engines revealed no competing health portals. However, when the search was widened, a range of Australian health portals was found, with a different reach on the horizontal dimension, such as mental health and alternative health.

As a result of the search, an assumption was made that HART had no competitor in its niche area as at January, 2004. Further, as HART was apparently first implemented in November 2003, it is unlikely that the concept would have received funding if there had been a competing health portal operating in the same dimensions. Using dominance in the three dimensions as a criterion, it appears that HART can be considered a success.

Other indicators of the success of a portal necessitate measures of portal use, and the revenue raised for commercial sites. Neither indicator of success was investigated. A reason for not measuring use of the portal has already been given. As HART is a non-commercial health portal and does not aim to raise revenue, it is inappropriate to use this form of measure for success.

Moreover, if the discourse behind the development of the portal was managerialistic, then these two indicators of success would be more appropriate, as cost-benefit analyses are frequently used to justify efficiency.

As can be seen from Table 2, however, the discourse behind the development of HART was one of social responsibility and community values.

Evaluation of Portal Quality

The last characteristic of the HART health portal to be investigated was quality. Table 3 sets out the data on quality gathered from the HART portal, using the *Quality Criteria for Health Related Websites*.

Table 3: Analysis of Quality of HART Portal

Issue examined	Finding
Transparency & Honesty	
Site provider, eg name, physical address, electronic address	Name & electronic address provided; no physical address
Purpose & objectives	Both purpose & objectives provided
Target Audience clearly defined	Yes
All funding sources including grants, sponsors, advertisers, non-profit voluntary assistance	Grants & developers stated
Authority	
Sources of information & date of source publication	Source clearly stated; date of information depends on source
Name & credentials of human/ institutional information providers & date credentials received	Links only

Privacy & data protection

Policy & system for processing personal data clearly defined (including invisible processing)	No input of personal data required on portal except where payment is required
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Updating of information

Clear & regular site updating, up-date date displayed on each page; relevance checked regularly	Update date stated on each page; too early to determine rate of update or to check relevance
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Accountability

Accountability user feedback & officer with oversight responsibility stated on site	User feedback accommodated; webmaster reference, no named officer
Effort made to ensure linking only with trustworthy sites who comply with codes of best practice	Linked sites were reviewed; quality sites selected
Statement of editorial policy regarding content selection	Limited information eg reliable, easy to understand

Accessibility

Attention to guidelines regarding physical access, findability, searchability, readability, usability, etc.	Some attention to guidelines, simple & clear; rationale for ordering of links not clear or stated
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For the three areas of analysis, the intercoder reliability exceeded 85%, which is well above the level of 70% that was sought as being acceptable.

Discussion

It was not difficult to evaluate the nature of the discourse that directed the development of HART as being overwhelmingly influenced by the social responsibility and community values discourse. The portal was non-commercial, being funded by a development grant. It was unclear from the documentation examined how the portal could be maintained, apart from its link with the Lilydale Online Access Centre. The health portal was likely to have a loyal group of supporters in the Lilydale area, particularly those who were in contact with the general practitioner and pharmacist health providers of the township, and also the users of the online access centre. Although the health portal appeared to have no competitor in its niche area of rural residents of Tasmania, without some promotional strategies, HART'S reach is likely to be only local.

It can be seen that some of the typical means of evaluating portals cannot be applied to HART, due to its not-for-profit character. More appropriate means of evaluating the success of the system may be to gain qualitative feedback from healthcare providers and Tasmanian rural residents. The latter group may be contacted through the Tasmanian online access centres. This approach would better reflect the discourse that directed HART's development.

Using the *Quality Criteria for Health Related Websites* criteria for assessing website quality, the HART portal performed well on most criteria, which suggests that it is a quality E-health system. This may have arisen because the

site developers were aware of the *Quality Criteria for Health Related Websites* or Mitretek approach to quality. However, no reference was made in the portal to the application of these or other quality guidelines in the development process.

MedCERTAIN's Level 3 (and second highest) evaluation required third party domain experts to evaluate a health information provider. The general practitioner and pharmacists involved in the development of HART possessed the appropriate domain knowledge for its development. The fact that they were not independent third party experts suggests that self-certification of E-health information systems, under some circumstances, is viable. It may be that self-certification of non-commercial health websites, where domain experts in a professional area are closely involved in its development, is appropriate.

Conclusions

As little research has been undertaken to evaluate E-health systems, this study has explored approaches to determining the nature, success and quality of health information portals on the internet. Then HART, a health information portal for rural Tasmanians, was investigated for its nature, success and quality, using the frameworks discussed. HART was designed to help reduce the disadvantages to health of living in a rural environment.

The case study suggests that there are at least several approaches to evaluating health information portals. The literature accessed suggests that methods for

classifying the quality of health websites has been better researched than those to classify its nature and success. A body of literature exists that has considered the quality of health information websites, that is applicable to health portals. This is not surprising, as the risks associated with poor quality health websites are widely acknowledged.

The health portal analysed was found to be of high quality, even though it did not use a trustmark and the site displayed no statements to suggest that it had followed a formal framework to ensure its quality. These findings suggest that under some circumstances it may be viable for those developing health portals to be permitted to undertake self-certification, rather than be rated externally, which is resource-intensive. Only further evaluation of other health portals will confirm this hypothesis that is suggested by the case study.

Additional study will also confirm whether the collated frameworks used to evaluate the nature, success and quality of the HART health portal are useful for general application.

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