Journal of Health Informatics in Developing Countries

www.jhidc.org
Vol. 7 No. 1, 2013

Submitted: February 18, 2013 *Accepted: March 8, 2013*

Virtual Health Library Users in Trinidad and Tobago—What Do They Need?

Meerabai GOSINE-BOODOO[a], Randy SIEW[a,1] and Ayaana ALLEYNE-CUMBERBATCH[b]

[a] *Medical Sciences Library, The University of the West Indies, St. Augustine, Trinidad and Tobago*
[b] *Medical Library Port of Spain General Hospital, The National Library and Information System Authority, Port of Spain, Trinidad and Tobago*

Abstract. This paper aims to evaluate the usability of the Trinidad and Tobago Virtual Health Library (TTVHL) website based upon opinions of employees, students and 'walk-ins' in health care environments. Questionnaires were administered either in person or via e-mail to 122 persons who agreed to comment on the TTVHL website. All 122 responses were usable, resulting in a response rate of 100%. Data were generated using coded or classified responses and the findings were derived from data analysis. Respondents represented three categories of participants, viz.: health care personnel; library/information personnel; and persons operating outside of the biomedical or library/information fields. Their overall opinion of the website was favourable. Limitations of time, research personnel, and Internet access curtailed the administration of the survey at some locations where eligible respondents were present. The method employed can readily be applied to other VHL websites. Research on virtual health libraries within Latin America and the Caribbean is still in the early stages.

Keywords: health information; virtual health libraries; website evaluation; Trinidad and Tobago; Caribbean.

I. Introduction

The Virtual Health Library (VHL) is a decentralized and dynamic information-source collection, designed to provide unbiased equitable access to scientific information on health[1]. It was conceptualised by the Latin American and Caribbean Centre on Health Sciences Information (BIREME) to integrate a range of health information sources from Latin America and the Caribbean region that includes: full-text materials, hypertext and numerical data, indexes, bibliographic databases and dictionaries, as well as value added products for teaching, learning and decision-making [in healthcare][2]. The proposal to establish the VHL was presented by BIREME at its 6th biannual meeting held in March 1998 at San Jose, Costa Rica. At that meeting, the 'San Jose Declaration towards the Virtual Health Library' was approved. Since then, the VHL network has come to include more than 2,000 institutions across 30 countries from regions even beyond Latin America and the Caribbean, where the VHL model is also being adopted[3].

[1] Corresponding Author: Randy Siew, Medical Sciences Library, The University of the West Indies, St Augustine, Trinidad and Tobago; Email: randy.siew@sta.uwi.edu.

The Trinidad and Tobago Virtual Health Library (TTVHL) was conceived in the context of the Government of Trinidad and Tobago's 'National ICT plans', its 'Millennium Development Goals' relative to health and its long-term development plan, 'Vision 2020'[4]. As such the TTVHL's overall goal expresses commitment to the following: contributing to the development of health in Trinidad and Tobago by promoting the use of scientific and technical information for decision-making, thus empowering nationals [citizens] to live long, healthy, happy, and productive lives[4]. The TTVHL initiative was officially launched in Trinidad on December 12, 2005.

It is clear that the responsibility of fulfilling such a goal is a long-term contract. The TTVHL initiative appears to have set developmental objectives for the national community from its stated intent to undertake the following: encourage the collection and dissemination of local research in health; utilize the potential for distance education in health; increase information support to researchers; and to support public health information[4]. For an initiative like this, stakeholders and users would expect the TTVHL to evolve into a competent provider of unbiased, relevant, and updated database information; such that can be accessed easily via a platform that offers and promotes local and regional research in health and facilitates health education.

This study was inspired by a desire to encourage health care and information personnel as well as persons seeking health information to become clients of the TTVHL website <http://www.vhl.org.tt> which currently offers national as well as universal network resources. The authors anticipate that stakeholders of virtual libraries will deem the findings useful as the link between website assessments and increasing site relevance to clients is made clearer.

II. Review of relevant literatures

The design objective of a website is to provide the expert visitor with the features that make the experience comfortable and to minimize the time that novice users require to reach the comfort zone[5]. With this in mind, Web teams can create a successful virtual experience for users no matter what the level of user expertise.

The importance of a user-focused approach to the success of a website was highlighted by several researchers. Battleson et al.'s approach[6] to designing a "user-centred interface" was to first identify the interface's primary users, know who the users are, what they wish to accomplish using the site, and what support they need to complete their tasks successfully. In his discussion on measuring the success of a website, Jadav[5] noted "the web development process attempts to create the most effective experience for the visitor". Of all the indicators and tools for measuring site success, this author[5] focused upon the popular choice—the usability study, which is "a method of determining the effectiveness of a web site from the perspective of the user's experience ... the focus of the [comprehensive usability] study is on the experiences of a visitor to the site".

Once a website is launched, regular evaluation becomes an ongoing responsibility for the site's continued existence and success. Users' expectations in today's commercial

climate are dynamic in nature making it imperative for Web designers and developers to collaborate closely when responding to user needs. Flavian et al. reported that[7] a successful website is one that, "attracts customers, makes them feel [that] the site is trustworthy, dependable, and reliable and generates customer satisfaction". To have one's site described as such would be gratifying for any development team. The Web designer whose concern is site appearance and customer interaction and the Web developer whose focus is the workings of the website[8] are obvious choices for the team that will implement recommendations for a site.

The usability study is often used as a prediction and a diagnostic tool[5]. In current practice, usability evaluation typically involves usability experts and representative users[9]. Zhang also noted[9], "usability evaluation is an important activity in the development of interactive systems". He described how to use it effectively as a diagnostic tool as follows: "the design of a user interface should go through an iteration of design and evaluation process until usability evaluation shows satisfactory results".

Research has shown that an effective site can be created and maintained by adopting a user-centered approach to the design and development[10]. Changes may be necessary not only for the audience/clientele interface but also for the goals and objectives of the site. Continuing evaluations even if informally conducted are recommended to determine and maintain a website's effectiveness and value. The results of usability studies can provide Web designers and Web developers with invaluable guidance as they undertake redesign and other enhancement.

This study sought to create awareness on the TTVHL in Trinidad and Tobago especially among its health care providers, determine the TTVHL's value and level of usage, and identify user-based requisite features for the model. Since the structure of the Trinidad and Tobago model is consistent with the BIREME/VHL prototype, the authors believe that results of recent discussions presented by BIREME's 2nd Working Group[11] in particular, would add credibility to findings from the study.

III. Method

3.1 Survey Design

A set of pre-defined tasks and a semi-structured questionnaire were developed for the study sample. To introduce the site, each participant was provided with the list of tasks prior to filling out the questionnaire. The questionnaire was structured to source three sets of primary data from the participants: first, demographics of the user (i.e., questions 1–3); second, user pattern of interaction with the TTVHL website (i.e., questions 4–7); and finally, personal opinion of the site features (i.e., questions 8–11). In terms of the types of responses required: questions 1–9 consisted of close-ended questions requiring respondents to select or rate options provided and questions 10–11 were open-ended and geared to receiving qualitative comments from the respondents.

3.2 Survey Sample

Based on user and staff statistics from selected information access points at six health care facilities in Trinidad and Tobago, the total population eligible for the survey numbered 1176. The sample population comprised of the 122 persons who were available and met the selection criteria regarding working/studying/seeking health information. The geographic spread of participants at locations that were either public hospitals or public health facilities was as follows: Trinidad–111 (North–21, South–6, Central–19, East–34, and West–31); Tobago–11. In selecting the sample, researchers used the stratified non-random sampling method where cases were selected non-randomly from each subgroup of the population[12]. For this survey, the subgroups chosen were health care personnel, library/information personnel, and health information seekers.

3.3 Survey Administration

Administration of the survey lasted one month during 2012. Prior to this, the questionnaire was pre-tested using the following four persons: a library/information professional; a practicing Information Technology (IT) professional; an IT graduate; and a medical student enrolled in a tertiary institution. Only one of the four participants had visited the site previously. This procedure improved the clarity and focus of the questions, thereby increasing the likelihood of relevant feedback.

The survey was conducted using the 'triangulation' method. Jadav explained that[5] triangulation refers to the process of comparing and validating data collected through different means (i.e., observation, questionnaire, and interview).

Participants were asked to undertake the following pre-defined tasks: spend five minutes looking at various aspects of the website; select a search topic based on their expectations of the site; conduct a search; and use their experience(s) with the site to fill up the questionnaire. The researchers were on hand to respond to administrative questions as well as to observe participants during the search.

3.4 Data Analysis

Data was analysed using the Statistical Package for Social Sciences (SPSS) version 19 for Windows. For the analysis, all responses as well as non-responses received from the 122 respondents were considered valid. Of the 122 questionnaires: 110 were completed offline and 12 were filled out via an online version of the survey. Findings derived from the data analysis are illustrated in Figures 1–7 and Tables 1–3. The researchers determined that 50% and over would represent the majority response and that less than 50% would stand for the minority response. Both participants and researchers observed that the site became difficult to access shortly after the survey was completed. To support the discussion of the findings, a screenshot of the TTVHL homepage, as seen by participants, is included in the Appendix.

IV. Findings

All 122 responses were usable, resulting in a response rating of 100%.

Table 1 Socio-demographic details.

	No.	*%*
Gender		
Female	70	57.4%
Male	52	42.6%
Age		
40 and over	32	26.2%
30-39	46	37.7%
20-29	42	34.4%
19 and under	2	1.6%
Occupation		
Health care personnel	83	68%
Library/information personnel	22	18%
Other	17	14%
Total respondents	122	100%

4.1 Respondents' socio-demographic

Table 1 highlights the socio-demographic characteristics of the respondents. The entire survey sample of 122 participants responded to all three questions. Question 1, which had asked for respondents' gender, showed that the number of females 70 (57.4%) was greater. In terms of age, the highest number of respondents 46 (37.7%) was between 30-39 years. With regard to occupation most respondents 83 (68.0%) were health care personnel, 22 (18.0%) were library/information personnel and 'other' 17 (14.0%) comprised of health information seekers.

Data on each aspect of the profile (i.e., gender, age, and occupation) were matched with each of the data sets ranging from questions 4–11. This exercise did not result in discernible differences in participant responses based on age or gender. However, there was a link between occupation and site awareness, whereby less than 15% of the health care personnel had visited the site prior to the survey but over 30% of the library and information personnel were already aware of the TTVHL website.

4.2 First time visitor to the TTVHL

Question 4 sought to determine whether the respondent was a first time visitor to the TTVHL website. The three options available were—'yes', 'no' and 'not sure'. An analysis of the 122 responses revealed that: the majority 91 (74.6%) of the respondents had said 'yes' and were therefore first time visitors; 26 (21.3%) of the respondents had said 'no' having visited the website prior to the survey; and 5 (4.1%) of the respondents were 'not sure'. These findings indicate that only a minority percentage (21.3%) of the sample population had prior knowledge of the site. A look at the occupations of this minority revealed that only 12 (14.5%) out of the 83 health care personnel and 8 (36.4%) out of the 22 information and library personnel had used the site before the survey (see

Figure 1). These findings suggest that relatively little awareness of the TTVHL website exists in and around health care environments where target groups reside.

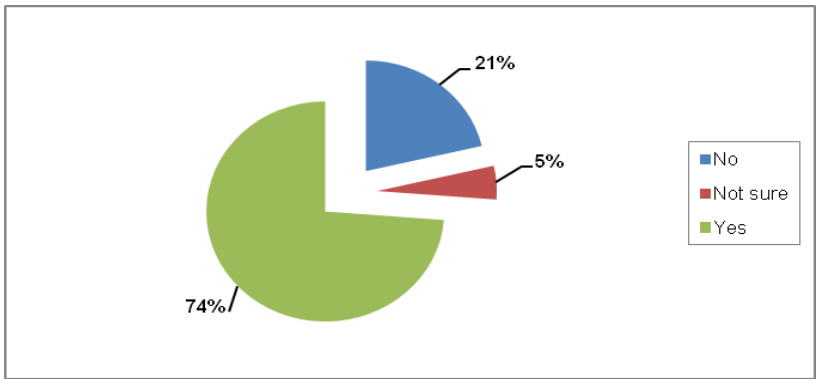


Figure 1. Pie chart depicting an analysis of first time visitors

4.3 Discovery of the TTVHL

Question 5 of the survey asked participants how they had discovered the TTVHL. Findings show the most popular answer to be the 'other' option selected by 47 (38.5%) respondents (see Figure 2). An examination of the data revealed that 10.6% or 5 of the 47 respondents did not explain 'other' but that 89.4% of these 47 respondents attributed their discovery of the TTVHL website to the survey.

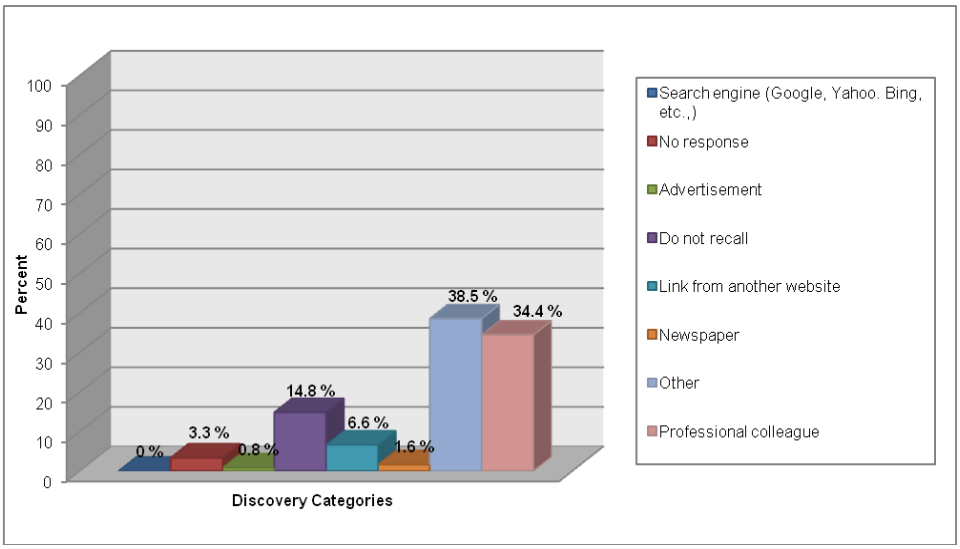


Figure 2. Website discovery categories

Figure 2 identifies 'professional colleague' as the second highest response (34.4%) selected by 42 participants. Interviews, which were integral to the data collection exercise, revealed

that by ‘professional colleague’, respondents meant the person administering the questionnaire. The latter 42 respondents together with the previous 42 who had selected ‘other’ brought the total number of persons who had discovered the site through the survey to 84 (i.e., 68.8% of the overall sample).

Of the five remaining options, the one entitled ‘do not recall’ 18 (14.8%) would offer no information but the choice does imply that these respondents were aware of the site. Responses from the other four options except for ‘search engine’ (0%) were also useful in calculating the total number and percentage of participants with prior knowledge of the site. As such, the selections ‘advertisement’ (0.8%), ‘link from another website’ (6.6%), and ‘newspaper’ (1.6%) together indicated that 11 (9.0%) persons had accessed information about or from the site before the survey. Together with the ‘do not recall’ response of 18 (14.8%) persons, it appears that 29 (23.8%) of the total sample had prior awareness or knowledge of the site.

4.4 Frequency of visits to the TTVHL website

Question 6 asked about the frequency of visits to the TTVHL website during the six months prior to the survey. Figure 3 illustrates that respondents utilized the five options that categorized the frequency of visits to the site. The percentage of visitors to the site during the six-month period totaled 18.9%, which represented a minority. This result lends credibility to the finding from question 5 that there was prior knowledge of the TTVHL website by a relatively small number of persons in the locations surveyed. The highest percentage of repeat visitors recorded for any of the frequency options was the 9.8% of the sample who claimed to have visited the site ‘once per month’.

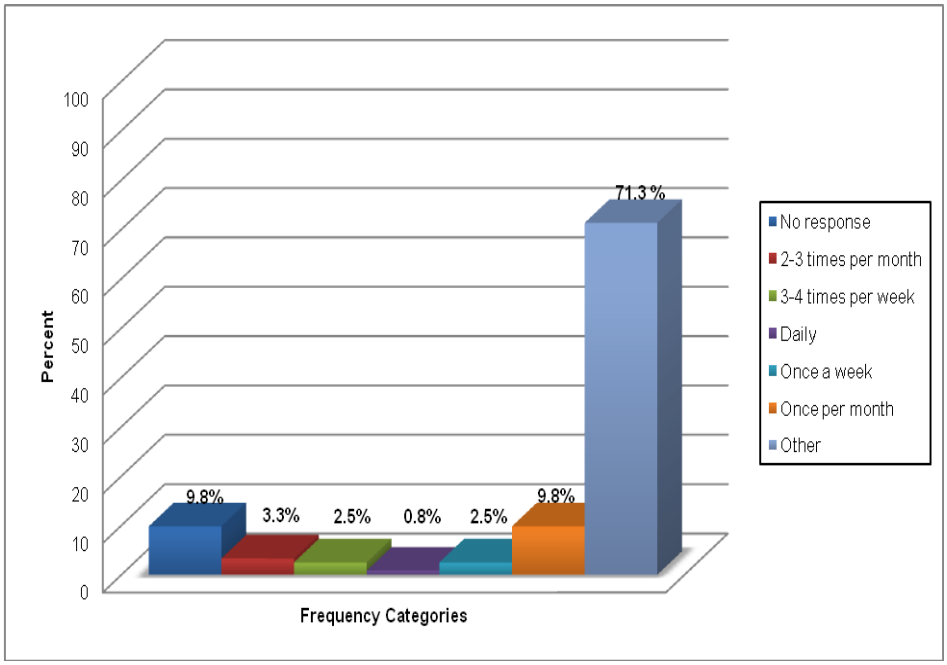


Figure 3. Visits to the TTVHL website within the last 6 months

The largest group of respondents represented by 71.3% of the bar chart (Figure 3) was made up of 87 persons who had selected 'other'. Further analysis revealed that 76 of the 87 respondents who had selected this option explained that they were first time visitors to the site or had visited it mainly to conduct the survey. The latter explanation coming from 62.3% of the entire survey sample supports the finding from question 5, whereby the majority of respondents had related their discovery of the site to the survey.

4.5 Reason for visiting the TTVHL website

Question 7 of the survey requested participants to indicate their main reason for visiting the TTVHL website. By selecting one of the four options, participants revealed that they were looking for 'general health information' (13.9%), 'specific health information' (19.7%), 'contact information' (1.6%), or 'other' information (56.6%; see Figure 4). The latter response was clearly the choice of the majority of participants. Since 42 of the 65 participants who chose 'other' had identified the survey as the reason for their visit, it was also the most popular reason (offered by 34.4% of the sample) for visiting the TTVHL website.

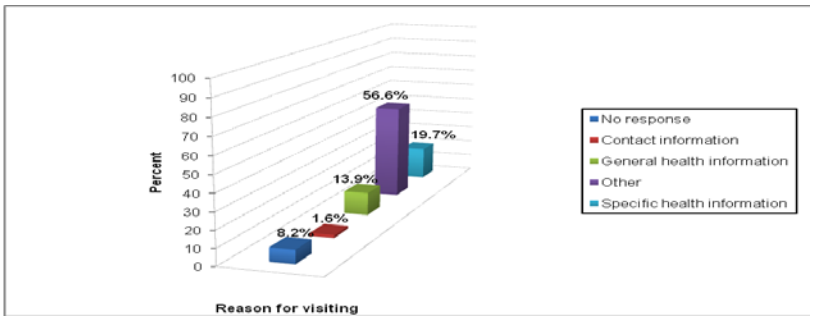


Figure 4. Main reason for visiting the TTVHL website

4.6 Recommendations to visit the TTVHL website

Question 8 of the survey required participants to rate the likelihood of recommending others to the site. Only three participants (2.5%) offered no response to this question. The greatest response was 'likely' to recommend, which came from 52 (42.6%) of the respondents. The second largest group comprised 36 persons (29.5%) who chose 'very likely' (see Figure 5). These two selections represented the positive ratings for question 8. When both results were combined, it was evident that the majority of respondents 88 (72.1%) were willing to recommend the TTVHL website to others.

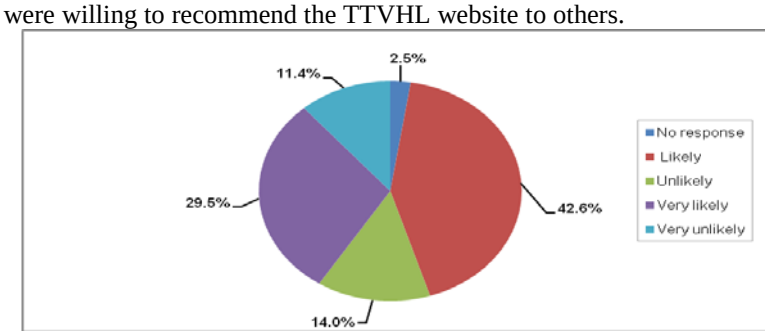


Figure 5. Recommending others to the TTVHL website

Some respondents used the other two options for expressing their disapproval. These include a few 17 (13.9%) who selected ‘unlikely’ and a smaller group (14 persons) or 11.4% chose ‘very unlikely’. By adding both options, it seems that 25.4% of the sample had formed a negative opinion of the site. Although this group represents the minority, the opinion of these 31 respondents is worthy of note.

4.7 Features that encourage use of the TTVHL website

Question 9 required participants to identify the features that would encourage continued use of the website. The results illustrate (see Figure 6) that ‘useful content’ was the most popular answer chosen by a majority 69 (56.6%) of respondents. Other options such as, ‘easy to navigate’ 13 (10.7%) and ‘visually appealing design’ 6 (4.9%) were much less popular. There was no response to question 9 by 7 (5.7%) persons.

The last option, which was listed as ‘other’, drew the second largest response to question 9 from 27 (22.1%) respondents. Of the 27 respondents, 7 (25.9%) gave no reason for their choice. From the remaining 20, some addressed the features and others offered their opinion of the website. Unfavourable comments came from 14 (11.4 %) persons and positive observations were offered by 6 (4.9%) persons. Examples of individual unfavourable responses are as follows: “Nothing grabbed my attention”; “I really was not that impressed”; “It did not seem pertinent to me at all”; and “This website will never be one of my options”. Positive observations made by individuals include: “Useful content and easy to navigate”; Interesting idea”; and “Data from different countries”. The value placed on content by respondents who chose “other” supports the finding whereby “useful content” as an option emerged as the most popular feature overall (see Figure 6). Findings thus far, suggest that “content” has the most potential to attract visitors and encourage them to become regular users of the site.

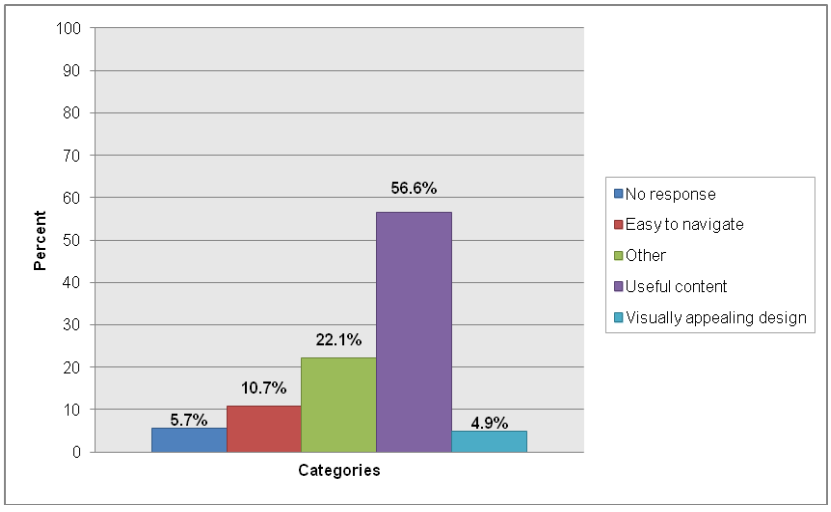


Figure 6. Website Encouragement Categories

4.8 Additional features that would benefit the TTVHL website

Participants were given the opportunity in question 10 to identify the additional features from which the website would benefit. It was one of two open-ended questions on the questionnaire. In all, 80 (66%) persons offered suggestions for improvement while 42 (34%) persons gave no response. It should also be noted that 33 (41%) of the 80 respondents offered more than one suggestion bringing the total number of suggestions to 92. Table 2 presents all of the survey responses in three categories—aesthetics, content, and redesign. Details of the areas incorporated by each category are as follows:

1. aesthetics—responses on the overall appearance and visual appeal of the website;
2. content—responses about subject matter presented to the user on or via the website (e.g., links to other sites, text, images, videos, sounds, and animation);
3. redesign—enhancing the website in terms of usability, layout, and functionality.

Table 2. User suggestions on TTVHL additions

	No.
Aesthetics	
Overall look	33
Content	
More / updated pamphlets	1
Access full text journals	1
Multimedia	6
More content and videos	27
More pictures / graphics	11
Similar headings	1
More content about Trinidad and Tobago	2
Notice	1
Dictionary	1
Various languages	2
Redesign	
Forum	3
Slow content download	2
My folder	1
Total responses	92

The feedback for question 10 revealed that the greatest response came from 53 (43.4%) persons in relation to the ‘content’ category. In particular, respondents desired more content and an increase in interactive media. Among all, 33 (27.0%) who wanted to see improvements in the ‘aesthetics’, 12 (36.4%) of them stated the need for more/brighter colours. Only 6 persons recommended aspects for ‘redesign’ viz: chat forums 3 (50.0%), slow response time of the site 2 (33.3%), and personalized folders 1 (16.7%). Respondents’ value for ‘content’ expressed in question 10 supports a related finding in question 9 where the most encouraging feature of the TTVHL website was identified as ‘useful content’.

4.9 Changes needed most by the TTVHL website

Just as question 10, question 11 was open-ended and allowed participants to suggest changes that would benefit the TTVHL website. The findings demonstrate that similar types of responses were received for question 11 and question 10. The main reason for the similarities is based on interpretation of these two questions. The key words ‘additional’

(question 10) and 'changes' (question 11) were interpreted generally as 'enhancement' and in some instances suggestions for 'changes' were not changes but additions of new features. Three such examples are the responses—'chat', 'forum', 'video and multimedia'—which were not on the site being viewed and were therefore additions to the TTVHL.

Findings showed that 68 (55.7%) respondents offered suggestions for change while 54 (44.3%) did not respond. During interviews with respondents, researchers noted that some gave their reason for no response as being unable to make a meaningful assessment of the website since it was their first visit. Table 3 highlights the suggestions for question 11. As with question 10, some respondents offered multiple contributions and 76 suggestions were made in all. Of these, 3 persons expressed the view that nothing needed to be changed.

Table 3. User suggestions on TTVHL changes

	No.
Aesthetics	
Overall look	46
Content	
Better content for non-professionals	3
Greater/updated content	11
Headings	2
Pamphlets	2
Video and multimedia	3
Redesign	
Search engine for contents	3
Chat	2
Forum	2
User friendly	2
Total responses	76

The changes identified are as follows: 'aesthetics' 46 (37.7%) was the most popular response with 22 (47.8%) of those respondents requesting colour on the site and another 21 (45.7%) respondents saying that the 'content' of the website required the most change. The participants' value for 'content' expressed in question 11 underscores the importance attributed to this feature in previous responses. Although just 9 (7.4%) persons recommended features for 'redesign', the particular response "search engine for contents" acted as a reminder that no respondent had discovered the site via a search engine (question 5).

V. Discussion

The survey captured responses on the TTVHL website from a target group and employed them in determining the value and level of usage as well as in identifying user-based requisite features for this BIREME/VHL site. The authors had come to recognize over a period of three years or so that few of the site's primary users, i.e. the health care personnel who they had served, were clients of the TTVHL website. This observation led the authors

to explore user response to the website experience via an evaluation exercise that would support stakeholder review and enhancement of the site. Findings of this study relative to persons returning to the site did indicate that user traffic was low, at just 28.7% of those with prior knowledge of the site. The value of applying usability methods to address questions of usage was confirmed by Jadav[5] who found that the usability study establishes the likelihood of success of a visitor's experience in the context of the business and communication objectives of the site.

To ensure an authentic evaluation of the usability of the TTVHL site, a research methodology was designed to generate valid and reliable data and by extension valid findings. After reviewing the relevant literature, decisions were made on the type of survey instrument, administration of the survey, sampling method and the tool for data analysis. The research methodology was successful, with 100% of the questionnaires being usable and the responses to all 11 questions being relevant and therefore useful for data analysis. The authors believe that they have contributed a valid study to the body of literature in the fields of Library and Information Science (LIS) in particular, and additionally to the field of Information Technology in the area of web development.

In the introduction, the authors shared their motivation to encourage health care and information personnel as well as persons seeking health information to become clients of the TTVHL website. Realizing such intent does seem possible when the following study findings are considered altogether: the survey was the main reason for most of the participants' first visit to the site; most participants felt encouraged to continue using the site; and most expressed the likelihood of recommending others to the site. Since both health care and library and information personnel represent sub-samples of the target group, it is true to say that all sample personnel from the Health Care sector and the LIS sector were introduced/re-introduced to the TTVHL website. It is also true that the undertaking was responsible for awakening interest/awareness in 77% of health care personnel (the largest group), and 95% of library and information personnel (the second-largest group) who were encouraged to continue using the site because of its positive features. Regardless of location or affiliation, these two groups will continue to be engaged in providing free access to health information and are ideally placed to empower individuals and their communities to access the global resource that is the virtual health library.

The VHL [launched in 1998] is the product of a joint effort by every country in the Region of the Americas to set up and operate a scientific network and websites with technical information on health, using information and communications technology[13]. This study highlights the unique initiative that is the VHL and illustrates its impact upon persons as they succeeded in locating useful content from within a virtual space**.** Saleem[14] in his study on assessment tools for health information websites advises developing countries to participate in initiatives much like the VHL, where a sound system of health information would be developed in local languages for their population through local and regional websites.

Another unique feature of this study is that it is based on the first evaluation of the TTVHL website that employed a usability model. Currently, 29 of the 30 member countries provide integrated health information sources from Latin America and the Caribbean via their BIREME/VHL websites. Among them are the following network

members reported by UNESCO[15] to be the most active: Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Honduras, Mexico, Peru, El Salvador, Trinidad and Tobago, Uruguay and Venezuela. Thus far, the authors have been unable to locate published works that describe evaluation/research exercises regarding these sites. This study is therefore timely with an easy to apply research methodology for publishers of existing sites, as well as for developers and designers of sites under construction who can test and upgrade before their website launch.

Further research is recommended via usability testing of the BIREME/VHL websites. It is a recommendation supported by Hinchliffe and Mummery[16] who confirmed that little research has been conducted in usability testing of interactive health websites. The authors agree that implementing formal usability testing can help an organization identify how users interact with the site. This study also highlights findings that prove usability testing does not require sophisticated and expensive methods to be successful[16]. The research possibilities in this area can therefore be as limitless for evolving economies as they can be for developed countries.

VI. Conclusions

The TTVHL website seems to have created a relatively favourable impression on participants of the survey. Overall, they were willing to re-visit the site as well as recommend it. For the most part, these groups of users have prioritized their website needs as 'useful content' and [more pleasing] 'aesthetics'.

It became clear from responses to questions about the discovery of the site, frequency of visits, and reason for visiting the site, that this survey was responsible for the majority of participants' awareness/visits to the site. A minority response on discovery of the site as well as on frequency of visits confirms some activity on raising awareness of the site prior to the survey. However, it seems to have affected more library and information personnel. With health care personnel making up the largest group of participants, this study has succeeded in raising awareness of the TTVHL website among another important sub-group.

Findings based on a relatively small sample such as this can only be indicative and they suggest that the health care professional in Trinidad and Tobago remains largely unaware of their country's virtual health library.

VII. Recommendations

The following recommendations are based upon the research and findings relative to this study and offer a practical approach for the TTVHL's usability upgrade exercise:

- Usability studies should be conducted periodically on existing websites.
- The overall aesthetics of the TTVHL website needs revisiting especially in the selection and the use of colour. The number of colours aside from the

neutrals on the current website if increased from two to four would satisfy users' needs for more/brighter colours. The colour scheme would benefit further from the vibrancy of complementary colours. As opposing colours, they provide better contrast, highlighting areas of emphasis, as well as increasing the overall attractiveness of the site to users[17].

- Multimedia additions would uplift the current website. Videos, graphics and even pictures would activate the Web pages, enrich the content, and encourage users to spend more time on the site. At the same time, in order to retain the overall positive impression of the site, its web designers and multimedia experts should ensure that a good balance of the main design elements exists and that users are satisfied with its functionality.
- Website use may increase with improvements to the site's communication style. Simpler headings, easy to understand terminology and up-to-date information as well as clearer and simpler language would encourage longer use and attract a wider range of users to the site.
- Site content reviewers should pay particular attention to dates of issue and the functionality of electronic links that connect users to external resources. In addition, the date and description of any significant change to the site should be located where it is immediately visible.

The TTVHL website became inaccessible by the time the survey exercise was complete. No notification regarding the continuing loss of connectivity to the site was in evidence for the would-be user. This occurrence brings to the fore the importance of timeliness of communication. In a case where users/clients are left to speculate about lengthy interrupted service, even the loyal among them may start searching for a reliable alternative.

In closing, it is noteworthy that from among the challenges/problems, possible solutions/ ideas, as well as strategies and recommendations presented by BIREME/VHL Working Groups[11] comes support for findings of this study. The results of the work and proposals that emerged from debates with VHL member states were presented for validation at the 6th Regional Coordination Meeting of the VHL (VHL6) held in October 2012. Of special interest is the presentation of Working Group 2, which speaks to the quality and innovation of the VHL's information products and services and the expansion of access and use of information in health.

References

[1] Library and Information Networks for Knowledge: Virtual Health Library [Internet]. WHO; c2012 [cited 2012 Mar 10]. Available from: http://www.who.int/library/databases/paho/en/index.html..

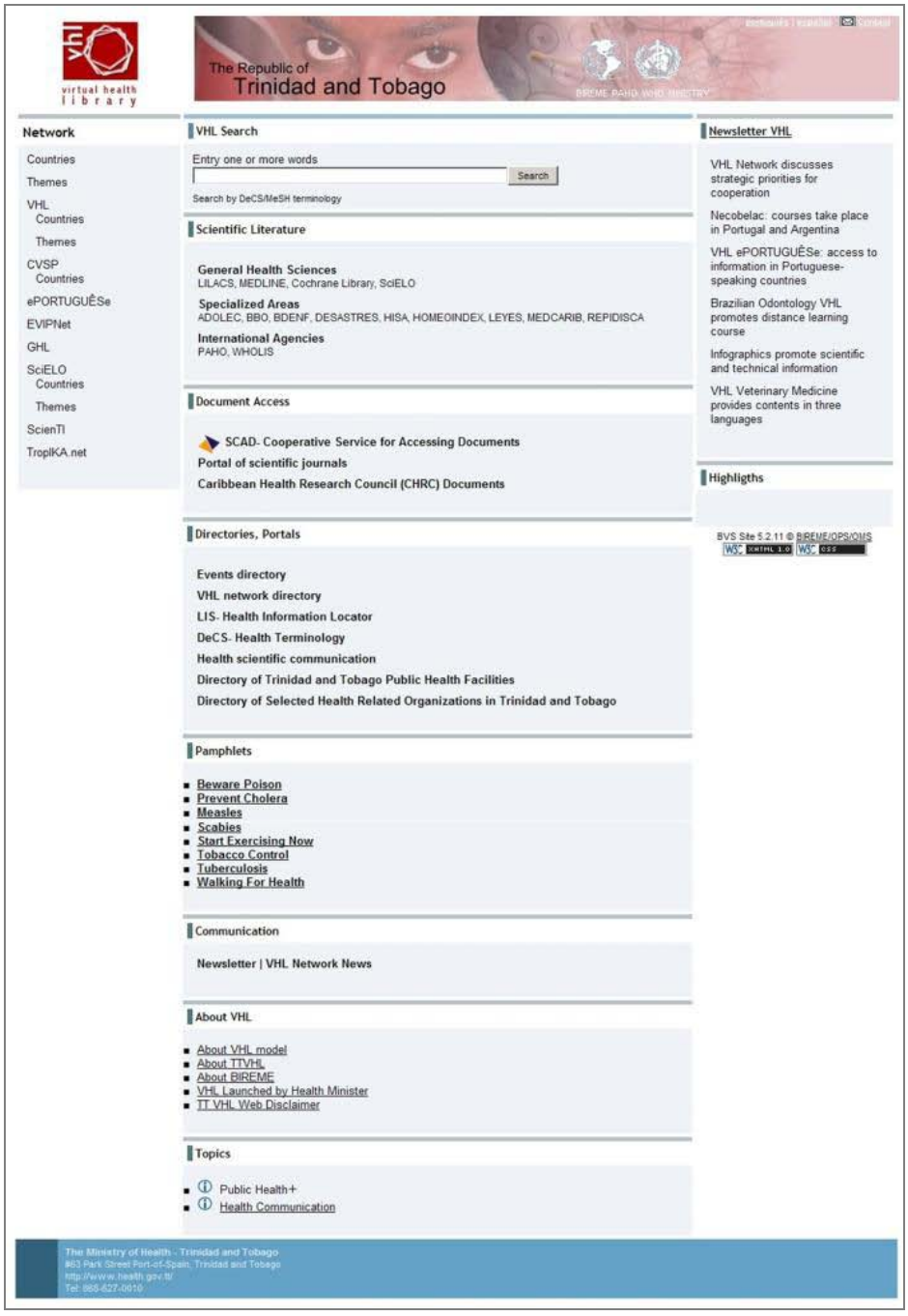
[2] Greenidge E. An overview of the PAHO Virtual Health Library. In: Massis BE, editor. Models of cooperation in U.S., Latin American and Caribbean libraries: the first IFLA/SEFLIN International Summit on Library Cooperation in the Americas, München: K. G. Saur; 2003. p. 45-51.

[3] VHL Guide 2011 [Internet]. BIREME / PAHO / WHO; 2011 [cited 2012 Mar 15]. Available from: http://modelo.bvsalud.org/en/vhl-management/vhl-guide/.

[4] Greenidge E. TTVHL project report 2008. In: 5th Regional Coordination Meeting of the Virtual Health Library. Rio de Janeiro, 14 to 16 September, 2008 [Internet]. BIREME; 2008 [cited 2012 Mar 15]. Availablefrom:

http://blog.bvs5.crics8.org/wp content/uploads/2008/07/bvs5_trinidad_tobago_100708.pdf.
[5] Jadav AD. Measuring the success of a web site. Designing usable web interfaces. Upper Saddle River, N.J.: Prentice Hall; 2003. p. 141-155.
[6] Battleson B, Booth A, Weintrop J. Usability testing of an academic library web site: a case study. J Acad Libr. 2001; 27(3): 188.
[7] Flavian C, Gurrea R, Orús C. Web design: a key factor for the website success. J Syst Inform Tech. 2009; 11(2): 168-84.
[8] Krynin J. What is the difference between web design and web development: what different web professionals do [Internet]. About.com; c2012 [cited 2012 Mar 30]. Available from: http://webdesign.about.com/od/jobs/qt/difference-web-design-web-development.htm.
[9] Zhang Z. Usability evaluation. In: Zaphiris P, Kurniawan S, editors. Human computer interaction research in web design and evaluation. Hershey, PA: Idea Group Pub.; 2007. p. 209-228.
[10] Lazar J. User-centered web development. Boston: Jones and Bartlett Publishers; 2001.
[11]WG2 Products and Services. In: 6th Regional Coordination Meeting of the Virtual Health Library. Washington DC, 20 to 21 October, 2012 [Internet]. BIREME; 2012 [cited 2012 Nov 12]. Available from: http://bvs6.crics9.org/en/category/gt2/.
[12]Tashakkori A, Charles T. Sampling, measurement, and quality of inferences. Mixed methodology: combining qualitative and quantitative approaches. Thousand Oaks, Calif.: Sage; 1998. p. 61-94.
[13]Tardelli A. BIREME and the VHL—two pillars of the regional eHealth strategy. eHealth Newsletter [Internet]. 2013 Mar [cited 2013 Mar 19]; Editorial:[about 1p.]. Available from: http://new.paho.org/ict4health/index.php?option=com_content&view=article&id=170:bireme-y-la-bvs-dos-pilares-de-la-estrategia-regional-de-esalud&catid=41:editoriales&Itemid=63&lang=en.
[14]Saleem T. Assessment tools for health information websites: using comparison of NHS Direct and MedlinePlus for health information about heart failure as an example. J Health Inform Dev Ctries. 2010;4(2)20-34.
[15]BIREME [Internet]. UNESCO; c1995-2012 [cited 2013 Mar 19]. Available from: http://www.unesco.org/new/en/communication-and-information/portals-and-platforms/goap/key-organizations/latin-america-and-the-caribbean/bireme/.
[16]Hinchliffe A, Mummery WK. Applying usability testing techniques to improve a health promotion website. Health Promot J Austr. 2008 Apr;19(1):29-35.
[17]Accessibility best practices [Internet]. Microsoft; c2012 [cited 2012 Jul 19]. Available from: http://msdn.microsoft.com/en-us/library/aa350483.aspx.

Appendix



Screen shot of the TTVHL