Chapter 6

Conclusions and Recommendations for future research

“Science ....... never solves a problem without creating ten more” - George Bernard Shaw

6.1 Introduction

This chapter reviews the aims and objectives of the study in the context of what was achieved. It also explores the next steps, limitations and work that could be carried out in subsequent research.

6.2 Study Overview

The web is a highly dynamic medium as it is open to numerous kinds of publishers and information providers. While the information that is printed can be reviewed to ensure quality, there is a lack of quality control measures on web. Moreover, the increasing number of websites makes the task of finding quality information or quality websites all the more difficult.

The situation becomes critical when it comes to the dynamic field of education. The educational websites are characterized by the instability of contents, decentralization of locations, multiplicity of forms, diversity of user groups and dynamics of environment (Pinto, 2009). This implies the need for evaluation and filtering of information from the web. As a result, a substantial number of studies have appeared in literature on the criteria and methods of evaluating educational websites. Still there exists a gap in
literature, of empirically grounded and potentially viable evaluation framework for educational resources that allow information consumers, administrators and librarians to identify quality educational websites/information more easily and effectively.

The aim of this research was to develop a framework for evaluation of quality of educational websites. The whole research was conducted in three stages as mentioned in chapter 3 (Figure 3.1). In the first stage, appropriate quality criteria were identified. This study used AHP to prioritize the criteria that can be included in a comprehensive evaluation of educational websites. In the next stage, the criteria along with their weights were incorporated into an evaluation framework and the developed framework was tested on live websites. The development of the framework has been given in chapter 4. The results from the evaluation phase of the research are outlined in chapter 5. The remaining part of this chapter discusses the conclusions that can be drawn from the findings of development of the framework as also from the finding of the testing of the evaluation framework. The chapter concludes by recommending possible further studies that could be conducted.

6.3 Restatement of Objectives

The objectives of the study were

6) To identify the criteria and sub criteria that determine the quality of educational websites

7) To prioritize the quality criteria and to calculate the weight of each criteria

8) To develop an evaluation framework for educational websites

9) To apply the evaluation framework on selected university websites in India

10) To assess the effectiveness of the proposed quality evaluation framework
### 6.4 Phase 1- Conclusions

When attempting to discuss the results and conclusions from a research, it will be useful to consider them in relation to the objectives of the research. The first objective of the research was to identify the criteria and sub criteria that determine the quality of educational websites. In order to identify the criteria and sub criteria for educational websites, a thorough literature study was done. The criteria and sub criteria used in various evaluation studies, irrespective of the domain they were assessed, were listed out. Twenty major frameworks from 1996-2006 were analyzed in detail. The most common criteria and their frequency of occurrence were analyzed and important criteria were determined. Before the commencement of evaluation, the important criteria and their degree of importance in educational websites needed to be found out in light of the literature study which revealed that most of the studies with educational websites were usability, accessibility and heuristic studies and also that most of the studies were of holistic nature to web evaluation without considering the nature of the domain under study and specific individual needs. But, in web evaluation one size does not fit all. Web evaluation should be domain specific and the dimensions and criteria that are appropriate for one domain may not suitable for another. Therefore, focusing on a particular domain or sub domain, gives a website evaluation framework a better chance of being successful. So these research results may not suitable for a number of domains and sub domains. This research rather concentrated on identifying the specifying criteria and sub criteria for educational websites. The various criteria and sub criteria used in this study are given in table 6.1.
6.5 Phase 2- Conclusions

While the criteria and sub criteria used in this study are not novel, what was unique, however, was when these criteria were prioritized and weighed in the context of educational websites using AHP and were combined to form the basis for a single comprehensive framework. In other words, all of these criteria have been employed by previous studies to evaluate different websites (Table 4.1). Before combining various criteria into a framework, a sort of grouping needed to be done to construct hierarchy for AHP. Many previous studies have based their evaluation on a variety of different dimensions; the vast majority of prior research was focused on content and design. So this research concluded that a comprehensive evaluation of a website cannot be successful without taking these areas into consideration. Again, considering the dynamics of educational environment and majority of the user group for an educational website is the younger generation, one more aspect, that is efficiency of the website dimension was added to the framework. These resulting findings were also very significant because by taking these three dimensions into consideration, most of the sub criteria could be grouped under these three categories, thereby creating hierarchy for AHP. Furthermore, a large number of studies used a high number of criteria for evaluation other than the criteria used in this study like usability, usefulness, believability, amount of data, reliability and ease of navigation. However, when inspected more closely, these criteria can be subsumed under the criteria, accuracy, completeness, accessibility, authority and navigability as taken in this study.
Many of the previous studies examined were structured in such a way as to ensure that all criteria evaluated had an equal contribution to the total overall score (Law et.al 2010). On the other hand, applying AHP for prioritizing and calculating the weight of each criterion, it is clear that all criteria and sub criteria are not all of equal importance and therefore, should not be weighted equally in an assessment of websites. Using AHP was absolutely critical in this study as it provided the exact weights of three major criteria and 14 sub criteria. The results of AHP showed content and design to be the most important criteria and efficiency to be least important.

6.6 Phase 3- Conclusions

While phase 2 identified what needed to be measured in an educational website evaluation, the next phase of the process was to decide how to measure it. The findings from phase 2 were formed into an evaluation framework. The evaluation framework was comprised of 3 major criteria and 14 sub criteria as illustrated in figure 6.1
The evaluation framework was then tested on 51 University websites in India. The purpose of the evaluation phase was to examine the ability of the evaluation framework to incorporate the findings from different criteria to assess the quality of educational websites. The evaluation took place from September 2012 to June 2013. The data were gathered by visiting each website and checking for indicators for each criterion.

The overall evaluation of university websites showed that almost half of the universities (42 universities) come under the category of poor and 8 universities come under the category satisfactory and only one university comes under the category good. This figure alone was useful as an indicator of how the university websites in India are
built. The evaluation framework not only assessed the overall quality of websites but also considered each criterion that influenced the overall quality.

The area that needed the most serious attention was the accessibility criteria. Most of the universities (94.11%) scored poor for accessibility. None of the websites were given any help on web structure making it difficult for a new user or a disabled person to access websites. Cluttering of contents in the homepage and lack of frames in web pages made most of the websites inaccessible for physically challenged persons, especially the visually challenged.

The power of the web is in its universality. Access by everyone regardless of disability is an essential aspect (Tim Berners-Lee, W3C, 2003) and if universities in India are to improve on this criteria in their websites they have to strictly adhere to the guidelines provided by w3c while designing their websites. Another criterion that did not show a positive mark was currency of the websites. Only six universities were good for currency criterion. Most of the websites did not give a statement of last update and deletion of old links was not happening at all.

Although it was not immediately obvious, another criterion that deserved attention was the multi language support. Only 5 university websites scored good and one university scored excellent for this criterion. However all the websites were compatible with different types of browsers.

Another positive outcome of this study was that this evaluation framework was successful not only in evaluating quality of individual websites but also useful in comparing a number of websites for their quality. Since each criterion carries a weight
and the quality is determined by the multiplication of weight with equivalent grade, the framework highlights the problem areas in a website. The major criteria analyzed in this study are extremely beneficial for websites for content decides the duration of time a user may spend on a website, design decides how easily a user is welcomed in a website and efficiency of a website decides how the website caters to the needs of its user.

The aim of evaluation phase of the research was achieved in that it successfully examined the ability of the evaluation framework to assess the quality of educational websites. Not only did the framework provide a clear indication of the quality of website being assessed, but it also provided an understanding of the areas that needed to be addressed.

6.7 The Merits of New Framework

This section aims to discuss the merits of this study and proposed framework comparing it with the research gap mentioned in chapter 2.

According to Boklaschuk and Cassie (2001) educational websites should be examined for their content and technical aspects or design to determine their quality. By dividing the quality criteria into three aspects- Content, Design and Efficiency, the first research gap of not taking the important aspects content and design is overcome. This research has taken this division further, dividing quality aspects to sub criteria that can be easily recognized. These criteria and sub criteria and their links to overall quality of website have been determined by empirical study.
The prioritization of criteria and sub criteria and by determining their weights in educational context removes the second gap in literature of assigning equal variance to all criteria. Moreover in this framework, the mere presence or absence of the criteria does not determine the quality of websites; but rather the criteria along with their weight determines the quality.

In this research, the developed framework has been evaluated and tested by an empirical study of university websites. It shows that the framework is effective in guaranteeing quality on website and it can be used to prioritize certain websites over others. One of the weaknesses identified in the existing research is the lack of empirical testing. The evaluation of university websites in this study fills this research gap.

This framework can be applied to any system that fits the criteria of educational website and it has the possibility of being expanded with more techniques.

Moody (2005) suggested that new evaluation frameworks should try to incorporate any new knowledge into a consolidated framework. In this study AHP has been used to prioritize various criteria and sub criteria in the development of framework.

6.8 Limitations of the New Framework

The flaws of this framework are possibly its practicality and simplicity which are the strengths as well as weakness. This framework is specifically designed for evaluating educational websites which makes it difficult to generalize it to be used to other types of websites thus making it strictly domain specific.
6.9 Limitations of the Study

As mentioned in chapter 3, this study does have limitations that could be revisited in future studies

iii. The educational websites used in this study might not represent all types of educational websites. This study included only institutional websites for testing of the framework and informational websites are not included in this study

iv. The study was conducted with relatively small sample (51 websites) but adequate for testing of an evaluation framework

6.10 Recommendations for Future Research

Several areas could be considered and addressed in future research

i. Future research can repeat this study in a longitudinal way to examine the progress of criteria over a prolonged period of time. Moreover, a longitudinal study would enable to test the framework and components more rigorously.

ii. Future research can use the same framework on informational websites so as to bring the effectiveness of the framework in all types of educational websites.

iii. This study is based on AHP method, measurement instruments for each criterion were not developed. Further studies using different statistical methods (regression, structural equation modeling) to develop the instruments are recommended.
6.11 Conclusion

To conclude, this research presents a comprehensive evaluation framework for the evaluation of educational websites. While other evaluation studies were more generic and not concentrated on particular type of website, this evaluation framework developed was constructed from scratch using a combination of qualitative and quantitative techniques and specifically meant for educational websites. The evaluation framework integrates a comprehensive set of weighted evaluation criteria to assess websites. The approach used to generate these rating is highly measurable, repeatable and can be easily updated and refined. The evaluation phase of the research demonstrated that the framework developed provides a feasible method to measure and manage the quality of educational websites. The success of any website requires continuous innovation, management and evaluation. So the evaluation framework should work as a corrective procedure. This framework not only provides the overall quality of a website but is also useful in comparing a number of websites and finding the problem areas. In other words, the findings of evaluation using this framework allows one not to look upon as a history of what happened on a website but to use it as a window to the future (Burby, 2004).