Chapter 1

Introduction

“Chance only favours invention for minds which are prepared for discoveries by patient study and persevering efforts” – Louis Pasteur

1.1 Research Background

The World Wide Web (WWW) is a relatively new and dynamic medium whose emergence has made information exchange and knowledge sharing possible. The World Wide Web has been available for public utilization on internet since 1991. The World Wide Web defines a high level communication protocol for computers connected via the internet.

The internet provides the physical possibility for computers to communicate through a line connection. The internet was developed in the 1970s so as to allow the communication between mainframe computers over some distance. The emerging availability of end user computers, and their rapidly increasing popularity caused the internet to become more widespread. Over a very short period of time, owing to the advancements in the information and communication technologies, internet became a more user-friendly medium for information exchange.

Tim Berners-Lee, whose first ever website and browser began the internet revolution, paved way for further expansion of WWW. Gradually, installation of web
servers and the use of web browsers spread, and it was by 1993, when the mosaic browser was released, that the technology really achieved serious momentum.

After the World Wide Web was available to public use, users could avail themselves of an internet connection and through that, publish information on World Wide Web, or access information published by other users via a browser. The World Wide Web has made the sharing of information feasible in ways that was not possible before. The availability of information without spatial or temporal constraints made World Wide Web hugely popular with an exponentially increasing amount of information added to or modified continuously.

1.2 Need for Evaluation of Web Resources

The exponential growth of web, information overload and dynamism of the environment raised the question of quality in web resources. Many users consider the web to be a virtual library and therefore, when information need arises they use the web by default. Unfortunately there are no regulatory standards for the people producing and publishing the information on the internet as opposed to information that is printed. Information that is printed can be reviewed or put through refereeing processes before it is actually published. Therefore, information retrieved from the web does not always originate from recognized or qualified sources and possesses varying information qualities compelling the user to perform an independent assessment of information each time they search for information online. The internet as a common vehicle for information distribution has raised the question of the quality of that information and the lack of web publishing standards. (Liu and Huang, 2005)
1.3 Education and Internet

According to Internet World Statistics (2011), the number of internet users in the world has grown from 360 million in 2000 to over 2.2 billion in 2011 with 32.7% penetration. At the same time the corresponding number in India has grown from 5 million to 1.2 billion in 2011 with 10.2% penetration. According to IAMAI (Internet and Mobile Association of India) report 2011, 64% of the internet users access internet to search education related content following e-mail checking and social networking purposes. The number of people who use the internet for education and other purposes increases each year. The World Wide Web has captured the imagination and interest among all educators around the world. The internet is rich in information and the quickness with which one can access the needed information makes web all the more wanted. The web has also overcome the physical boundaries of traditional classroom. Aware of the potential of www in education, more and more educational institutions are also making their presence felt in web environment.

1.4 Types of Educational Websites

Educational websites are of different types according to the purpose of the website.

- Repository of information

A repository site does not contain information generated from within the site itself, but acts like a library, storing information generated by outside sources.
- Links Database

The information in a links database is organized into subject areas in hierarchical fashion. These sites allows user to select progressively more specific descriptors to access resources on the site.

- Informational

Informational sites provide information on a particular issue or topic on a variety of topics.

- Educational

A truly educational site will have not only just facts and data, but also activities and lesson plans that allow students to think critically about an issue and come to understand the underlying principles.

- Interactive

An interactive site allows users to interact with the site by selecting or inputting answers and receiving some sort of feedback from the site.

- Institutional

An institutional website provides users with online information and information related services of an institution and forms a channel of communication with the site owner and users.
1.5 Quality Characteristics of Educational Websites

As internet access in educational setting expands and the amount of source in the web becomes wider, its quality becomes doubtful. Websites may present rich and motivating materials, but also contain misinformation or biased information, incomplete instructions, contradictions and out-of-date material. The inconsistent quality of internet resources may be partly due to the lack of a review mechanism to determine the quality and accuracy of published websites. Quality of websites has not missed the eyes of the researchers. A considerable number of studies have been done on the factors that influence the quality of information on websites. In general, research on evaluating educational websites agrees on two important factors: the suitability of the content and format of the website for the intended educational purpose.

1.5.1 Web Design

The format of the website is vital because it is a key factor for the visitor to decide whether to stay or to leave the website. The following points are essential for a good working website:

- Rapid start up and quick with user interactions
- Has good working links and has download facilities and plug-ins
- Has a search engine
- Good accessibility for persons with disabilities and site does not need additional hardware or software that are difficult to install
1.5.2 Web Content

The information has to satisfy the following:

- Up-to-date: The site content must be recent and updated regularly
- Complete: The information given in the website should be complete and adequate for users.
- Correct Information: The identity and contact information of the one who is responsible of the information has to be clear and visible. There must be no doubt about the integrity of the information in the site or source of information.

1.6 Current Web Evaluation Approaches

Several evaluation studies have been conducted in recent years. However, missing from these evaluations was the use of validated evaluation model that would provide guidelines and methods to evaluate the educational websites. The approaches followed in evaluating the quality of educational websites are:

1.6.1 Heuristic Evaluation

Heuristic evaluation involves having a small set of evaluators examine the website and judge its compliance with recognized usability principles. This evaluation has relatively high operational cost due to the experts that are needed to analyze and produce a report.
1.6.2 User Testing

This is the most commonly used means to evaluate a website. Questionnaires form the basis of this type of evaluation. This evaluation aims to assess the user perception using a checklist. This method has the disadvantage of users with different qualifications and background doing the evaluation.

The time and effort needed to carryout heuristic evaluation or user testing is in conflict with two fundamental pragmatic aspects of current websites. Moreover web technologies evolve extremely fast thereby making this approach dated quickly.

1.6.3 Automatic Evaluation Tools

Automatic evaluation tools examine source code of web pages to determine the compatibility of web pages with specific guidelines. These guidelines may cover universally accepted guidelines or guidelines accepted in specific society. However there are a number of drawbacks to such methods. These include the following:

- The result of automatic evaluation tools may contain extremely valuable information but can be long and detailed, making them difficult to interpret, particularly to non experts.
- Automatic evaluation tools cannot uncover all problems in a website, and requires additional manual inspection to supplement results. For example only a human can decide whether a text alternative for a graphic contains the equivalent information of the graphic.
Automatic testing tools are able to detect only features related to internal attributes; they cannot determine external attributes.

1.7 Need for Specific Evaluation framework for Educational Websites

In the light of the limitations that existing evaluation tools have, along with the uncontrolled growth of the web that has escalated the problems of quality, authenticity and veracity, there is a need to design a framework that addresses the problems. Any website beset by above mentioned issues, is bound to create barriers in accessing factual information, in the absence of qualitative bench marks and direction providers. A considerable number of studies have been done on the factors that influence the quality of information on websites and many researchers have developed frameworks for the assessment of quality of information on websites. Relatively few researchers have tackled the difficult task of quantifying the information quality dimensions. The issue is more crucial where there is a focus on educational websites. Very few researchers have addressed the quality of educational websites. There are not many frameworks for measuring the quality of information on educational websites. There is a lack of comprehensive methodology for the assessment of quality of educational websites. Most of the studies conducted in the field of educational websites are either heuristic evaluation or empirical usability testing, both with disadvantages, as the first one needs an expert to conduct evaluation and the second requires a range of users for evaluation. Among the several website quality models available, most only provide website quality
criteria and only few are designed for the purpose of evaluating websites in particular domains like museums, tourism, hotels, government, education and commerce. Moreover, the number of website quality evaluation frameworks that can be used right away for evaluating educational websites by a person with limited computer knowledge is small in number. As a result, the general frameworks are used to evaluate the quality of educational websites. These models do not consider the specific aspects of website under consideration, except listing broad quality criteria.

Additionally, there is lack of advanced statistical techniques in website evaluation studies for educational websites along with general tendency to define very general criteria, not considering the specific type of site or page. There are differences between museum websites, e- government websites and e- commerce websites and evaluation frameworks should take these differences into account. Another limitation is to assume equal variance in all criteria and sub criteria. In fact, each criteria and sub criteria possesses its own individual significance and meaning and hence it is unreasonable to assume that the importance of each dimension and attribute is equal.

There are relatively rich set of quality assessment frameworks and tools for evaluating websites but there is no single practical framework for evaluating quality of educational websites. In view of limitation of prior studies and lack of accurate framework in evaluating the quality of an educational website, this research presents a scientific model to evaluate the quality of educational website by using Analytic Hierarchical Process (AHP). This model could be useful for evaluating educational websites. In addition, AHP has been used to assist the evaluation process. It is a decision making tool for analysts to organize the critical aspects of a problem into hierarchical
structure. By reducing complex decisions into a series of one-to-one comparisons, AHP not only help the analysts to find the best decision, but also clear rationale for choice made (Zaim, Sevki, Tarim 2003).

1.8 Scope of the Study

This study aims to develop a framework for evaluation of educational websites. Though website evaluation studies have been widely conducted in western countries, there is a lack of ready to use, domain specific standardized framework for evaluating quality of educational websites. However several models, criteria and classification for quality of websites have been presented in literature, due to the above mentioned reasons and dynamics of educational websites. Thus a necessity to develop particular framework for its context arises.

1.9 Statement of the Problem

The purpose of the study is to develop a framework for evaluation of educational websites so the problem can be stated as “Evaluation of Educational Websites: Development of a Framework and its Initial Implementation on University Websites in India.”

1.10 Operational Definition of Terms

i. **Evaluation**: Evaluation can be defined as making judgements about the value of ideas, works, solutions, methods, materials etc. It involves the use of criteria as well as standards for appraising the extent to which particulars are accurate, effective or satisfying.
ii. **Educational Websites:** A collection of web pages relating to the process of education.

iii. **Development:** The process of systematic use of scientific knowledge to add improvements to get a new or advance product to meet specific objective or requirement.

iv. **Framework:** A framework is a multidimensional structure consisting of general concepts, relations, classifications and methodologies that could serve as a resource and guide for evaluation.

v. **Implementation:** Implementation can be defined as carrying out, execution or practice of a method for doing something.

### 1.11 Research Aim and Objectives

The aim of this research is to develop a framework for evaluating quality of educational websites. In order to achieve this, the following objectives were set:

1) To identify the criteria and sub criteria that determine the quality of educational websites,
2) To prioritize the quality criteria and to calculate the weight of each criteria,
3) To develop an evaluation framework for educational websites,
4) To apply the evaluation framework on selected university websites in India,
5) To assess the effectiveness of the proposed quality evaluation framework,
1.12 Significance of the Study

1.12.1. Theoretical Contributions

Although there is a sizable literature on website quality evaluation models, there is a lack of scientific models which numerically evaluate the websites. It is important to measure the most important criteria in context of evaluating domain since it could help the website developers focus on factors with highest weight and then improve their websites. Also one of the limitations of previous studies is to assume equal variance on all criteria and sub criteria. In fact each criteria and sub criteria possesses its own individual significance and meaning. Thus it is unreasonable to assume that the importance of criteria and sub criteria is equal. In this study, AHP was adopted to contribute to the website evaluation by applying a multiple criteria decision making model.

1.12.2 Practical Contributions

1.12.2.1 For the field of Library Science

- Websites are now reviewed in order to be linked to an organisation’s own website or library websites. This framework can serve as a reviewing tool.

- Librarians ‘collect’ and catalogue websites as they do other materials and they need quality standards. This framework provides quality standards for educational websites. Academic librarians will be benefited from it.

- Automated evaluation tools, heuristic evaluation etc. need an expert or computer professional to conduct evaluation. This simplified framework
can be utilized by librarians with basic knowledge of internet technologies.

1.12.2.2 Societal

- The main users of educational websites are students, researchers and teachers, who need learning tools so that they can understand how to judge websites to aid in assessing online information.
- Web developers can understand which level of importance of each quality criteria in educational websites is and can develop websites focusing on the important aspects so that users will be benefited.
- Using this evaluation framework, website owners can assess the quality of their websites and hence can make improvements in websites thus attracting new users and collaborators.

1.13 Assumptions of the Study

Following are the assumptions of the study

- Websites are a form of information system and that therefore theories and quality criteria related to information system are therefore applicable.
- Each of the criteria is a distinct construct capable of varying independently from others.
- The developed framework could be applied to educational websites directly to find out the quality of websites.
- It is possible to study the effectiveness of the framework.
1.14 Delimitations of the Study

i. This research is limited on designing a framework for educational websites and therefore the focus will be on website quality characteristics of educational websites.

ii. This research goal is to develop and test a new framework for educational websites. University websites have been selected for the purpose of testing the framework and demonstrating the possibilities of the framework. So this study will not explore other aspects of university websites like world university ranking or comparison of the ranking of university websites of this study with previous studies conducted in the same area.

iii. This study utilizes a manual method of evaluation. Hence, the aspects of websites which needs an automatic tools to identify are not taken into consideration in this study

1.15 Thesis Layout

The following summarizes the remaining chapters of the thesis.

Chapter 2: Review of Related Literature

This chapter reviews and analyses the relevant literature to identify challenges faced in web evaluation. This chapter provides theoretical foundation on which the research is based.
Chapter 3: Methodology

This chapter describes the research design and methodology used in this research.

Chapter 4: The Proposed Framework

This chapter defines the various quality criteria and develops a new framework for the evaluation of educational websites.

Chapter 5: Testing of the Framework

This chapter describes the application of the framework onto live websites of selected universities in India to measure the effectiveness of the new framework and the results were analyzed.

Chapter 6: Conclusions and Recommendations for Future Research

This chapter summarizes the whole thesis relating the achievements to the aims and objectives set out in the introductory chapter and provides recommendation for future research.

References and appendices are presented at the end of the thesis.