School of Information Systems

Development and Evaluation of a Methodology For Developing Websites

Tomayess Boutros Issa

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DECLARATION

This thesis contains no materials which has been accepted for the award of any other degree or diploma in any university.

To the best of my knowledge and belief this thesis contains no materials previously published by any other person expect where due acknowledgement has been made.

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Tomayess Boutros Issa

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ABSTRACT

This research focuses on the development of a new methodology for creating effective websites, especially those used for marketing. It was found that existing methodologies were missing some key stages - user participation and "real interaction" (i.e. monitoring of user interaction with a prototype site). This has led to users being frustrated and lacking loyalty to the website. There is great potential for combining aspects of methodologies from different disciplines; however, these need to be integrated in a coherent way. To address these problems, a new integrated methodology was developed in this research.

The new methodology was created from basic concepts derived from: lifecycle models; Information Systems development methodologies; methodologies with explicit human factors aspects; websites methodologies; marketing methodologies; and additional techniques such as task analysis and detailed website design and implementation. After studying the lifecycle model, the researcher identified four key principles, which were the foundation of the research: user participation; iteration; usability and "real interaction". The way in which these four principles were incorporated in each methodology was evaluated in order to choose the strongest stages to utilize in the new combined methodology. After reviewing techniques for methodology integration, a new draft methodology was produced.

To assess the new methodology, two research phases were used - interviews and a questionnaire. In the former phase, the researcher interviewed representatives from nine website development companies in Western Australia to discuss their current methodologies and compared these with the new methodology. Most of the industry participants were pleased with the structure of the new methodology, as most agreed that it incorporates the necessary requirements to develop a successful website. The interviews generated some recommendations for revisions to the methodology, which assisted the researcher to improve the new methodology. In the latter phase, an online questionnaire was completed by a total of website industry participant and Information Systems Professionals, in order to assess the revised methodology. Results from the interviews and questionnaire supported the research hypothesis –

i.e. that the new integrated methodology can provide a more effective way of developing websites, utilizing the four key principles.

This thesis points to the need for further research, including the development of a website describing the new methodology. This website will incorporate a software tool to facilitate selection of particular stages, steps and techniques from the integrated methodology to produce a tailored methodology for any specific project, thereby implementing the concept of “contingency”.

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"In that day you will not ask me anything. Truly, truly, I say to you that whatever you ask my Father in my name, he will give it to you Hitherto you have asked nothing in my name; ask and you will receive, so that your joy may be full John 16:23-24".

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

The Internet, (Cyberspace or Information Superhighway) is a network of thousands of computer systems utilizing a common set of technical protocols to create a worldwide communication medium. The Internet will have an estimated population of "*over 1.5 billion users by the end of 2011*" (ClickZ[1] 2007). These massive groups of users reach the Internet through their computers and terminals via educational institutions, commercial Internet access providers and other organizations. This Internet provides numerous benefits to consumers in relation to access to information, entertainment, research, business and marketing.

The Internet allows, "*Consumers to educate themselves about the information or products at their own pace, and consumers can instantly access only that information which is pertinent to their needs*" (Issa 1999, p. 11). The Internet "*provide(s) a low-cost "gateway" to the global market for companies intending to or engaging in exporting, especially for small-to-medium enterprises located in peripheral economies and those operating in global niche markets*" (Dou, Nielsen and Tan 2002, p. 105).

The Internet was invented by Tim Berners Lee, a scientist at CERN[2], in 1989 and the first implementation appeared in 1990 (CERN[3] 2002). He was examining various ways to make large amounts of data accessible without using complicated software. Finally, he found "*the solution in plain text files, which we now know as HTML*" (Hoekstra[4] 2000; Gray[5] 1995; CERN[6] 2002). Development of the Internet has

[1] ClickZ : http://www.clickz.com/showPage.html?page=3626274
[2] CERN: is the European Organization for Nuclear Research
[3] CERN: http://public.web.cern.ch/Public/about/achievements/www/history/history.html
[4] Hoekstra: http://www.weballey.net/webdesign/history.html

provided the basis for implementation of the World Wide Web (WWW). *"The World Wide Web contains a large and exponentially increasing number of websites, ranging from single personal homepages, to large corporate sites containing thousands of individual pages"* (Cunliffe 2000, p. 222). In addition, the web is considered as a "*giant international exhibition hall where potential buyers can enter at will and visit prospective sellers*" (Berthon, Pitt and Watson 1996, p. 42)

1.2 Purpose of Research

The purpose of this research is to develop a new methodology for developing websites for promotion and marketing that meet the requirements of users and designer simultaneously. These days, businesses are using the Internet as the new tool to develop new and enhanced aspects of business including vendor contact, provision of information, recruitment, customer service, research, entertainment and of course marketing and promotion. Ellsworth and Ellsworth declared (1997, p. 51-52) that marketing on the WWW must "*take place in reaction to interest from customers and other site visitors*". Therefore, the marketing website must "*first attract customers to the page by providing services and information that will be useful to the users"*. Successful marketing on the World Wide Web relies on careful use of appropriate methodologies to create an effective website, with expenditure of minimum time and money.

However, most of these methodologies address specific aspects such as page design, typography, graphics and multimedia, while missing some approaches such as user participation and "real interaction" (i.e. usability evaluation using a prototype). These latter approaches are important in website design especially from the marketing perspective. User participation will allow the users to play a role in the testing and evaluation stages and have a better understanding of the system to produce "*increases in both user information satisfaction and system usage"* (Baroudi, Olson and Ives 1986, p. 233). Real interaction will "*track the behavior of web site visitors,*

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[5] Gray: http://www.mit.edu/people/mkgray/growth
[6] CERN: http://public.web.cern.ch/Public/about/achievements/www/history/history.html

not just "hits," number of visitors, and page views, but which pages they view, how long they linger, how often they return" (Robinson and Peroff 1999, p. 62). This information is very useful as "real interaction" as it will help the designer to enhance and improve the system development process. Therefore, this research focused on investigating and developing a new methodology for designing a simple and friendly website, which meets user and designer needs simultaneously. The researcher also evaluated the new methodology with the assistance of companies which are dealing with website design in Western Australia.

1.3 Internet Marketing Opportunities

Marketing is "*a social and managerial process by which individuals and groups obtain what they need and want through creating, offering, and exchanging products of value with others*" (Kotler 1997, p. 9). Marketing can be divided into two aspects: "***traditional media*** *include both mass media (e.g. television, radio, newspaper, magazines, direct mail), and* ***personal communications*** *(e.g. word of mouth). New media encompass interactive media, such as videotex[t], interactive CD-ROM, on-line services, and hypermedia CMEs, as well as emerging so-called interactive multimedia, such as pay-per-view, video-on-demand, and interactive television"* (Hoffman and Novak 1996, p. 54).

Internet marketing is a "*new branch of an old tree marketing, which can be defined as the process of satisfying human needs and wants with information, services or products, through the exchange of money*" (Janal 1995, p. 22). Consequently, Internet marketing "*is a system for selling products and services to target audiences who use the Internet and commercial online services by utilizing online tools and services in a strategic manner- consistent with the company's overall marketing program*" (Janal 1995, p. 17). Therefore, to be a successful online marketer, the basics of the marketing process should be established first, which are, "*needs assessment, market research, product development, pricing, distribution, advertising, public relations, promotions and sales*" (Janal 1995, p. 22).

Internet marketing has its roots and "*basis in traditional marketing concepts but branches out in a most important manner - "interactivity*"" (Janal 1995, p. 22). Today, suppliers have the capability to deal interactively with consumers at any time of the day or night in their home or office. The buyers can interact with their suppliers in two-way, not one-way, communication.

Therefore, the basic difference between Internet marketing and traditional marketing is the new potential provided by the technology. For example, the designers need to consider the following aspects in relation to Internet marketing: a) layout design principles; b) typography and art. Communications messages on computers replace paper with on-screen displays of information, text, art and sound. In addition, computers allow communication to develop into an interactive, two-way process, unlike television and print advertisements, which are one-way processes. "*Simply uploading ads to online services will mean a company will miss the chance to take advantage of technology and its tools to empower the messages"* (Janal 1995, p. 22).

It is obvious now that there are various advantages to companies in using online retailing such as "*quick access to the information, capturing a global audience 24 hours a day, seven days a week. Lately, the longer working day is driving customers away from queues at shopping malls and turning them to the convenience of the Internet*" (Lindstrom[7], 1999). Furthermore, the benefits to consumers and marketers include the ability "*to create dialogues that lead to long-term relationships*" (Janal 1995, p. 6).

Internet marketing opportunities can be "*neatly divided into two areas: products and services"* (Segal 1998, p. 10). The usefulness of the Internet depends directly on the products or services of each business. There are different benefits depending upon the type of business, whether a supplier, a distributor or a retailer. The Internet is rapidly becoming an active marketplace for buyers and sellers for a fast-growing pool of consumer goods and services. Though still a small slice of the total shopping pie, the World Wide Web in just a few years has become an important outlet for manufacturers and retailers of everything from information, clothes, food and books

[7] Lindstrom: http://www.clickz.com/experts/archives/ebiz/onl_commerce/article.php/814621

to computer toys and travel arrangements. Online ordering is also becoming increasingly common. Often this involves an initial setting up of an account for an individual by providing a credit card number or other sensitive information by completing an on-line form or via fax, telephone or postal mail.

By using the capabilities of the Internet, businesses can become more efficient and produce higher quality products, improving the commercial market for consumers. It is a magnificent research tool and communications device. By searching through databases and discussion groups, businesses can find information on their competitors, generate new product ideas, solicit the opinions of consumers, and learn new approaches to the way they conduct their business. However, successful Internet marketing still relies on "*many of the same basic principles that apply to any marketing efforts: knowledge, reputation, customer services and consistent image"* (Franklin 1996, p. S2).

Internet marketing also improves customer relations as businesses can interact more closely with the public and understand their customers' needs. By using their resources, businesses can make larger quantities of information available to the public than by using traditional marketing media. For example:

- Consumers can easily access web pages with lists of commonly asked questions and answers when they have difficulties with products;
- Consumers can shop from the privacy of their own homes 24 hours per day without the interference of sales people;
- By posting important information about their products, businesses allow consumers to educate themselves about the products at their own pace, and;
- Consumers can instantly access only that information which is pertinent to their needs.

By using the Internet in the business sector, two important outcomes can be achieved: a) time and money can be saved, increasing business profit; and b) increasing consumer satisfaction. Since this media spans many countries throughout the world, companies are able to achieve an international presence for their products

and services at low cost. Additionally, on the Internet, every business has an equal opportunity to sell its products and the companies with higher quality products and better customer service will succeed. The effects of commercial Internet use will benefit both businesses and consumers and change the marketing techniques of the future.

Researches found that Internet marketing provided faster and more up-to-date information than traditional search techniques, allowing businesses to find essential information to integrate into their products more effectively. In addition, companies can exchange data with suppliers and test new products more easily. As the Internet makes information readily available to employees, it encourages independence in the workplace, causing more employees to take the initiative to find their own answers and ideas on the net. Furthermore, businesses are less likely to hire several specialists to iron out specific problems since answers can be found through Internet resources such as discussion groups.

The Web has opened the entire Internet for sales activities for 24 hours a day. Ellsworth et al. confirmed that (1997, p. xviii) "*the web is a system on the Internet that allows anyone to have a 24-hour-a-day 'presence' on the Internet"*. The web page can accept data entry, and can allow for direct secure sales, either through a web site or in a cybermall or virtual storefront. Most companies with web pages offer a large assortment of information-rich files about their products, their industry and related subjects. Most business web sites contain product descriptions, pricing and purchase information; however, it is more important for them to make the web site interactive, interesting and provide reasons for it to be visited repeatedly. The most common benefit of using the Internet is marketing.

In addition, the users are using the Internet for various purposes such as "*entertainment, international value, purchase utility and use the web to socialize, to gather information and to save money on products*" (Hoffman, Novak and Schlosser 2003, p.42). There can be said to be two types of Web users: those who seek primarily utilitarian value from websites; and those more interested in experiential value. Utilitarian value is an "*overall assessment of functional benefits incorporating the traditional price savings dimension, a service dimension, a*

timesavings dimension and a merchandise selection dimension" (Lee and Overby 2004, p. 55). An example of utilitarian value are users who consider the price of an item before purchasing it. While the experiential value stand for as an "*overall representation of experiential benefits from the entertainment, the escapism, the visual appeal and the interactivity involved with online shopping*" (Lee et al. 2004, p. 56). An example of experiential users are those who interact with the web to gain more information or exchange information and ideas with other users by using various tools such as forums, blogs and chat rooms.

Today, most consumers are looking for various ways to streamline their shopping to get it done quickly without sacrificing their need for low price and high quality. At the same time, they demand a high level of service and they really appreciate personalized contact, so "*the online medium allows even small retailers and cataloguers to deliver that kind of service cost-effectively*" (Janal, 1995, p. 6). According to the survey conducted by "NFO Interactive", it was found that nearly "*35% of the 2,321 recent online shoppers said they would buy more if they could interact in real time with a sales person from an e-commerce site"* (Pastore[8] 1999). Finally, a web site is considered as a virtual corporate headquarters for a business as it projects the corporate image and provides details about the business.

The *"Internet has become a major component of the marketing strategy and operations of businesses" (*Kalaignanam, Kushwaha, Varadarajan 2008, p. 300). Although Websites have great power for marketing and spreading the good word about a business, it also has the power to damage a business's reputation. The key is the effective design of websites; however, currently users are not very satisfied with website designs (see Section 5.2). Therefore, this research will focus on developing a new methodology to develop effective websites, which meet the users' requirements.

[8] Pastore: http://www.clickz.com/stats/big_picture/demographics/article.php/6061_153731

1.4 Internet Marketing Problems

Although the Internet offers huge opportunities for Internet marketing, there are also many potential problems. A website must meet the users' expectation in terms of content and ease of use. Websites, which meet users' expectations, will enjoy many advantages as a result of their effective design. According to Donahue (cited in McCracken and Wolfe, 2004) the four most important advantages are:

- *Gaining a competitive edge;*
- *Reducing development and maintenance costs;*
- *Improving productivity;*
- *Lowering support costs.*

(McCracken et al. 2004, p. 1)

Other advantages of good website design are that they facilitate the users to enjoy working with websites without any frustrations and aggravation. Studies and research have indicated that usable websites consistently have the highest conversion rates (completion of sales and repeat visits) "*if customers have an enjoyable experience, they are likely to spend more time on a site,[to] make purchases, and return to the site for further shopping*" (McCracken et al. 2004, p. 2).

In contrast, some users will search the websites for an item or try to find out how to buy it, they quickly become frustrated and leave the website and undeniably will not return to it, if most of the facilities are unfriendly and unapproachable (McCracken et al. 2004). Website designers should anticipate their target users' needs in order to prevent the frustrations, which often occur.

Frustration can result from failure to complete a task when working with a website or a system, or when goals are not achieved. For example, reading a web site to find information which will "*allow you to take some type of action and get stuck wading through long sentences and paragraphs*" (Spyridakis 2000, p. 360). This failure can be take place if the users:

- *Spend a lot of time hitting the wrong buttons;*
- *Get error messages;*
- *Feel confused;*
- *Curse at the screen; and*
- *Need to ask customer support for help.*

(McCracken et al. 2004, p. xii)

The key principles behind designing a website are "*to help people find the content they need quickly and to present content in the most readable format*". Also important is the use of Meta data such as "*who, what, where and when, date of publication, author name, keywords and summary*" (McCracken et al. 2004, p. 27). Moreover, Jakob Nielsen argued (cited in Sullivan (2000)) "*people want to get to the business of your Web site in a hurry, so focus on things that speed this process and get rid of things that slow it down* (Sullivan 2000, p. 411).

The designers should also provide clear instructions to the users concerning the purpose and limitations of the site. For example, this web site will serve only local and not global users. By providing this information, "*they may not be happy about your inability to serve them*", however, "*they will certainly appreciate saving time and frustration by learning your site's interests and limitations up front*" (Clare 2002, p.25).

If a website lacks usability, the users will ask themselves this question "*How could the people who created this site think this was acceptable?*"(McCracken et al. 2004, p. xii). Often this happens because the designers are inexperienced or they disregard the users' needs. Perhaps the designer focused on the technical aspects of the project and did not pay any attention to the users' expectation and requirements. Some designers try to mimic successful sites by copying attractive images off the Internet and create their home page without a basic knowledge of design principles. Hence, the website will lack a kind of unity, since the graphics and the texts were written and created by different writers and designers, and it will "*stay a jumble of loose parts, lacking coherence.*" However, "*If you make your own site, it is your work. It will radiate something of your personality, your preferences and your taste*"

(Hoekstra[9] 2000). These days, users are "*becoming more sophisticated and as they do so, their expectations and behaviors are changing; don't get caught designing for yesterday's audience -- stay on the cutting edge with this kind of research so that you can design for tomorrow's audience!*" (Sheridan[10] 1999). Moreover, "*users are in control of their own destiny. Get over it, you don't own them"* (Nielsen 2000, p. 66).

For these reasons, designers need to work with a specific methodology to create an effective website that meets the requirements of the users and to encourage them to revisit the website. These users need to feel comfortable, confident and satisfied by working with the site, and a site should "*give visitors a reason to stay and help them grow their business*" (Gardner 2003, p.75).

The Internet can bring various types of drawbacks, which make the consumers fear buying more products online. These drawbacks can include the following issues: security, privacy, speed of access, and lack of navigation standards. In addition, two other problems need to be addressed in website design: user participation and 'real interaction'. These aspects are very important to prevent the frustration of consumers who are using the web, as most of them are annoyed by a lack of responses from the websites and customer services. Unfortunately, the majority of website designs focus on problems such as security, privacy, lack of information on quality and a lack of trust in the retailer, while failing to recognize the most important concepts: participation and 'real interaction'.

Participation refers to the role that users can play in assisting with the design and development of an effective website or system. According to Hartwick and Barki (1994, p. 441), participation is defined as the "*behaviors, assignments, and activities that users or their representatives perform during the ISD[11] process*", and it "*reflects **what** specific behaviors are performed, **how many** of these behaviors are performed and **how often** they are performed*" (Hartwick and Barki 2001, p. 21). If the designers work very closely with the users to produce a successful system (or website), then less time will be required for the implementation and testing stages,

[9] Hoekstra: http://www.weballey.net/webdesign/history.html
[10] Sheridan: http://www3.sympatico.ca/cypher/web-design.htm
[11] ISD: Information System Development

and this will lead to the user working with this system (or website) with less frustration and dissatisfaction. However, "*few empirical studies have clearly demonstrated a relationship between user participation and two key indicators of system success:* ***system usage*** *and* ***user information satisfaction*****"** (Olson and Ives 1981, p. 183). Hence, a clear methodology incorporating user participation needs to be developed and evaluated.

Another aspect that needs to be addressed in website design is 'real interaction'; that is, the actual way that real users interact with the site. Real interaction can be tracked to trace the performance of website visitors and how often they return to the website, either at the prototype stage or after initial implementation. For example, according to Ramey (2000), real interaction can be tracked by using the server log file[12] data to enhance the structure of the website. Analysis of the following types of data will help the designer to learn and understand how real interaction can be captured for use in the design process:

- The patterns of the dates and times of transactions;
- The IP addresses, translated into domain names or counties of origin;
- The number of hits and the number of page views;
- The referring pages from which visitors come to a site;
- The amount of time spend on each page;
- The search terms used to hit the website pages;
- The search terms used to search within the website;
- The most frequent paths through the site;
- The most and least frequently visited pages.

This information is very useful to the designers to enhance the structure of the website to attract more users to visit it. This set of analysis guidelines "*focuses on marketing or technical issues rather than rhetorical issues like audience analysis*" (Ramey 2000, p. 397).

[12] Server Log File: the record of activity on a site (Ramey 2000, p.398)

However, website designers cannot easily utilize these processes unless they are incorporated into a website development methodology. Therefore, this research focuses on investigating, developing and evaluating a new methodology for designing a simple and friendly website. This methodology will address the two key issues in designing Internet marketing websites with high usability: participation and 'real interaction'. This proposed new methodology has been developed in the context of "for profit" organizations, however, it may well be useful also for development of website for "no-for-profit" organizations.

1.5 The Importance of Making Technology Intuitive and Retaining the "Human Touch"

Effective human-computer interaction is a critical factor in website design. This aspect is very important in e-commerce websites to prevent any frustration to the consumers. "*To make the business booming and fruitful, the vendor needs to answer and meet user requirements regarding services, products and prices; if end-user demand and requirements are dispersed, frustration will occur*" (Issa 1999, p. 89).

It is important to understand 'real interaction' (what actually occurs) and how to improve a website. Tracking is considered an important aspect in web design as it is the means by which the designer can study real user behavior: "*Tracking, tells marketers where visitors cluster. More than anything else, these behavioral patterns demonstrate what attracts and engages visitors*" (Robinson et al. 1999, p. 62). Forrester Research found that "*98% of site owners use traffic, such as hits and unique visitors, to gauge performances. While such indicators are useful, it's impossible to draw accurate conclusions about site performance from this data"* (Carroll[13] 2004). Hence, a more detailed approach is needed.

[13] Carroll: http://www.theusabilitycompany.com/news/media_coverage/pdfs/2003/NewMediaAge_270303.pdf

Detailed information about user behaviors is very useful to enhance a website. According to Robinson et al (1999, p. 62) "*using this information, marketers can build more intelligent and interactive environments that continue to attract more visitors, keep them engaged longer, and create the opportunity to build(ing) lasting relationships*".

With the current growth in the power of the desktop computer and the growing availability of dedicated graphic rendering hardware, Human Computing Interaction theories and techniques are used increasingly in design and evaluation of websites. Every successful business model needs to focus on service. Currently, most businesses around the world have combined in their business both traditional and online approaches. The user needs to appreciate both types of business. The web site allows customers to do the work "themselves"; however, as a web site cannot answer all the questions, sometimes a consumer needs to talk to a human. David Orenstein suggests that: "*Traditional retailers at the National Retail Federation convention seemed convinced that online stores are a must. But analysts and some retailers said a critical element of success will be transporting the customer service and human touch from the real stores to virtual ones, not focusing just on technology*". (Orenstein 1999, p. 8) Elizabeth Van Story, a vice president at Delray Beach said, "*Our Company designed its site to help customers narrow down product choices in some cases and see alternatives in others. Additionally, some of its catalogue call centre staff is trained to handle questions about the site*" (Orenstein 1999, p. 8). A study of 'real interaction' will assist in knowing when this 'human touch' is required.

1.6 Users

The analysis in the previous sections indicated that the involvement of users (participation) is very important for the development of effective websites, as this participation should not be restricted to the computer people but should involve the users, both the internal and external. This thesis distinguishes between two types of users: end-users (internal to the client organization) and client-customer users (external). End-users (Internal) are the real users in the client organization, who test

and evaluate the website and use it to respond to the client-customer's queries. The client-customer users (external) are those who interact with the website to accomplish their goals such as purchasing goods or services from the client organization. It is important to understand the needs, desires and characteristics of both types of users. To date, most designers of websites have "*assumed that their users had the same background and expectations that they did*"; therefore, "*the more you know about your users and their work, the more likely it is that you will develop a usable and successful website*" (McCracken et al. 2004, p. 37). These two types of users (see Figure 1) should both participate in the development process under the methodology developed during this research, to make sure that the website meets the requirements of end-users, client-customers and designers simultaneously. The purpose behind this participation has various benefits: 1) to reduce the time in the implementation and testing stages; 2) to familiarize the end-users and client customers with the new system before the implementation; 3) and provide job satisfaction and meet the task effectiveness needs of the end-users and client-customers.

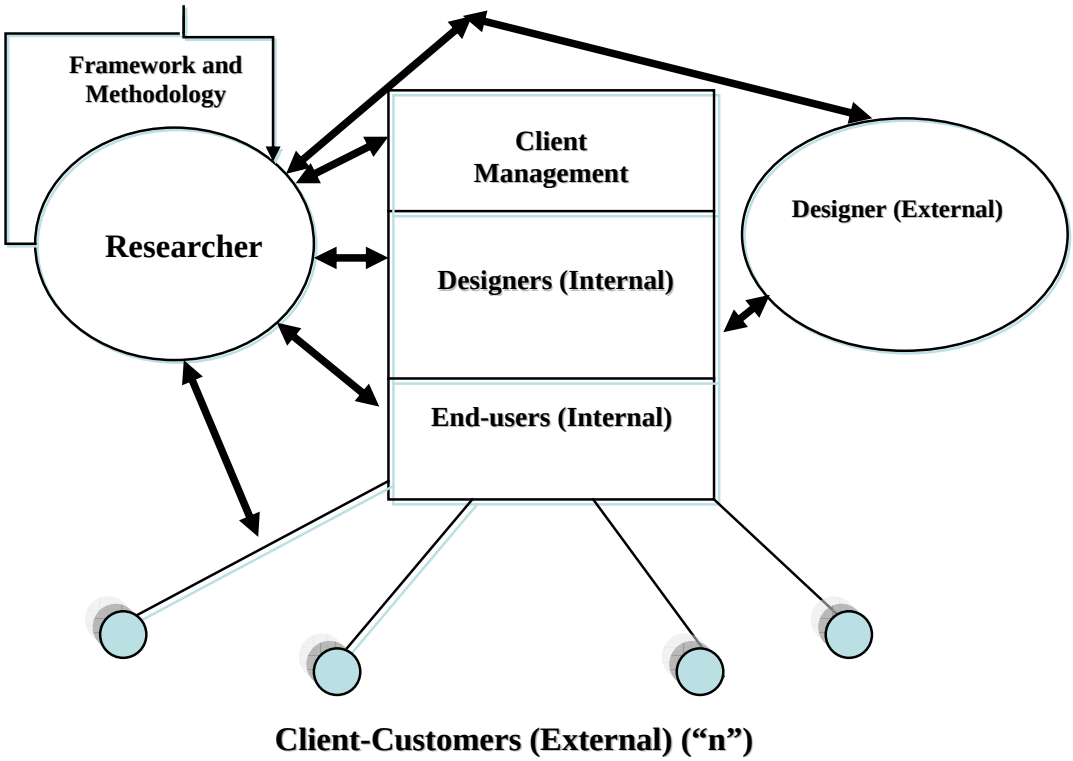


Figure 1: Users (End-User and Client-Customers)

1.7 Research Questions and Significance of the Research

This section presents the research questions for this project and show how the minor questions are used to address the major research question. These major and minor questions were examined in this research study to better understand key aspects of new methodology adoption in industry. The main objective of this research is to develop and confirm whether or not an integrated design methodology will help the designers to meet users' requirements. In conjunction with the major research question, there are several minor research questions that this research will attempt to examine, to serve each particular purpose and to contribute toward validation of findings by providing a degree of triangulation to the major research question. The minor research question objectives are:

- To investigate whether the website development process will benefit from participation by both end-users and client-customers;
- To consider how designers can address (in the website development process) various requirements before creating a website such as usability, Human Computer Interaction (HCI), iteration and real interaction;
- To evaluate whether or not this new methodology will satisfy the needs of the website industry in Western Australia;
- To evaluate how the integrated new methodology can be "contingent" in an effective way, with designers and users choosing the particular techniques and tools which suit the specific problem situation.

This research was conducted to identify the problem that currently exists in the web design industry and present some solutions and suggestions to resolve current problems and assist to fill the gap in the current methodologies.

1.8 Overview of Research Methodology

This section provides an overview of the method which was carried out by the researcher to accomplish the research – more detail is provided in chapter 5. Literature relating to various system development methodologies from different perspectives will be discussed in Chapters Two, Three and Four. This allowed the researcher to prepare the draft of a new, comprehensive methodology and the questions for the interviews which constitute the first phase of evaluation of the proposed new methodology. To undertake these interviews, the researcher needed the assistance of some top website development companies in Western Australia who were prepared to participate in this research. Data from all the interviews were interpreted and analyzed to allow the researcher to prepare the second phase of the evaluation, which was the questionnaire. Data from the questionnaires were analyzed to provide research conclusions.

1.9 Outline of the Thesis

This chapter has briefly described the background of using Internet marketing via the new medium, which is the Internet. Through this medium, Internet marketing has started to provide faster and more up-to-date information to customers about products. It is also far superior to traditional client research approaches, allowing businesses to find essential information to integrate into their products. As well, this chapter has defined two problems which face Internet marketing: participation and real interaction. These problems will be taken into consideration by the researcher in developing the new participative methodology for developing websites.

Chapter Two – "Human Aspects of System Development", moves on to explain the meaning of Human Computing Interaction and its usefulness in designing a user interface or website. This chapter discusses the usability evaluation stage to identify the positive and negative aspects of prototypes of the new system, in order to make the necessary changes before the system is delivered to the target users. It looks into issues related to participation, especially user participation in the system

development process and discusses why users need to participate and how this can be achieved.

Chapter Three – "Models and Methodologies", begins by conducting an extensive review of various types of lifecycles models; Information Systems Methodologies; website methodologies and marketing methodologies. It discusses the advantages and disadvantages of each methodology and analyzes the difference between them. This is followed by identifying the strongest stage (or stages) in each methodology, which will help the researcher to develop the framework for a new participative methodology for developing websites. In addition, four key principles (user participation, usability, iteration and real interaction) are identified as fundamental aspects to develop systems in an effective manner. The final part of this chapter provides a new participative framework for developing websites.

Chapter Four – "Integration of Methodologies", presents a detailed overview of combining and integrating methodologies. It examines an attempt at integration of methodologies for the system development process and identifies its pros and cons. It discusses the two fundamental modes of integration - embedding and grafting. The main purpose behind integration is to combine different paradigms in realistic ways, to provide a compatible means of incorporation into the new methodology. The final part of this chapter presents the new participative methodology for developing websites.

Chapter Five – "Research Methodology", discusses various issues including: Significance of the Research; Research Goals/Questions; Research Method and Design. Under these sections, the researcher will addresses the "why" of the research under the Significance of the Research. Under the Research Goals/Questions section the "what" will be presented to explain the goals and the aims of this research. Finally, the "how" will be discussed to examine the various research methodologies and to justify the reasons behind adopting these in this research.

Chapter Six - "Interviews with the Industry", discusses how the researcher accomplished interviews with representatives from the website design industry in Western Australia, to compare their work with the new participative methodology for developing websites.

Chapter Seven - "Analyzing the Questionnaire", discusses how the questionnaire was designed; setting the questionnaire online; and the target population for the questionnaire. In addition, the researcher will discuss how the questionnaire was administered and how the data was analyzed. Finally, the researcher will summarize the changes to the new methodology from the questionnaire outcomes.

Chapter Eight - "Conclusion and Future Research Directions", outlines the outcomes from the interviews and questionnaires and the changes to the new methodology which were carried out by the researcher. In addition, in this chapter the researcher will discuss the importance of contingency in the website development process and discuss the practicality of the new methodology. Additionally, this chapter summarizes the main findings of the research and suggests possible options for further research. Finally, the researcher will draw conclusions including the significance of the research and recommendations for its adoption by industry.

1.10 Conclusion

This chapter has focused on providing a background of using marketing via the Internet. This facility will allow the users to gain more current information about the products and the services which are provided by these websites. In addition, this chapter identifies the Internet marketing problems, which are user participation and "real interaction", which are very important aspects in the website development process. The rest of the chapter also provided a summary of the research questions, the significance of the research and a summary of the research methodology. The other segment of this chapter has provided a small glimpse as to what content each chapter of the thesis contains.

Chapter Two discusses the human aspects of system development by explaining the meaning of Human Computer Interaction and its effectiveness in a website or user interface.

CHAPTER TWO

HUMAN ASPECTS OF SYSTEM DEVELOPMENT

2.1 Introduction

Chapter One discussed how businesses have benefited from using the Internet, especially the users of Internet marketing. However, in Chapter One, two problems were identified regarding website usability, especially from a marketing perspective, participation and 'real interaction'. It is noted that "*high participation leads to greater interest in the gathering of information about products"* (Barki and Hartwick 1989, p. 53). Also participation "*will increase system quality, decrease resistance to change, and increase user commitment to new systems*" (Olson et al. 1981, p. 183). In addition, 'real interaction' is an essential concept in website design, since, via the outcomes of 'real interaction', the designer has the ability to enhance the structure of the website to attract more users to visit it, not only the previous visitors but new visitors also. Therefore, this research focuses on investigating and developing a new prototype methodology for designing simple and user-friendly websites, and this methodology will address the two problems in developing effective Internet marketing: participation and 'real interaction'.

Chapter Two discusses the value and the meaning of Human Computing Interaction (HCI) and its usefulness in designing a user interface or website. "*Human Computer Interaction (HCI) is about designing a computer system that supports people so that they can carry out their activities productively and safely*" (Preece, Rogers, Benyon, Holland, and Carey, 1994, p. 1). HCI plays an important role in the development of computer systems and websites as it helps to develop "*interactional techniques and to suggest where and in what situations these technologies and techniques might be*

put to best use" (Booth 1989, p. 6). Thus, a commercial websites with effective HCI are likely to be more useful and profitable. HCI is a "*very important concept in the system development process as it is about understanding and creating software and other technology that people will want to use, will be able to use, and will find effective when used. And the usability concept and the methods and tools to encourage it, achieve it, and measure it are now touchstones in the culture of computing"* (Carroll 2002, p. xxvii). In addition, this chapter addresses the topic of Usability Evaluation, as usability "*is concerned with both obtaining user requirements in the early stages of design, and with evaluating systems that have been built*" (Booth 1989, p. 103).

There are various methodologies to create effective websites; these methodologies address detailed issues such as page design, typography, graphics, sound, navigation, and multimedia. However, they do not provide an adequate overall approach to HCI and usability.

2.2 User-Centered System Design

In order for computer-based systems to be widely accepted and used effectively, they need to be well designed via a "user-centered" approach. This is not to say that all systems have to be designed to accommodate everyone, but that computer-based systems should be designed for the needs and capabilities of the people for whom they are intended. In the end, users should not even have to think about the complexity of how to use a computer. For that reason, computers and related devices have to be designed with an understanding that people with specific tasks in mind will want to use them in a way that is seamless with respect to their work. Additionally, it is very important to "*define style, norms, roles and even mores of human and computer relationship that each side can live with, as computers become more complex, smarter and more capable,"* and as we allow them to "*take on autonomous or semi-autonomous control of more critical aspects of our lives and society"* (Miller 2004, p. 34).

Systems designers need to know how to think in terms of future users' tasks and how to translate that knowledge into an executable system. This can be accomplished by establishing a good interface design to let the user interact and deal with the computer without any difficulties and to have more control of the system. Alice Head (1999, p. 6) stated that good interface design "*is a reliable and effective intermediary, sending us the right cues so that tasks get done – regardless of how trivial, incidental, or artful the design might seem to be*".

Recently, as we know, user-centered design has become an important "*concept in the design of interactive system[s]. It is primarily concerned with the design of sociotechnical systems that take into account not only their users, but also the use of technologies in users' everyday activities, it can be thought of as the design of spaces for human communications and interaction"* (DePaula 2003, p. 219).

HCI "*is recognized as an interdisciplinary subject"* (Dix, Finlay, Abowd, and Beale, 2004, p. 4). HCI needs input from a range of disciplines; for example, "*computer science (application design and engineering of human interfaces), psychology (the application of theories of cognitive processes and the empirical analysis of user behavior), sociology and anthropology (interactions between technology, work, and organization), and industrial design (interactive products)*". Therefore, HCI has *"science, engineering and design aspects"* (Hewett[14], Baecker, Card, Carey, Gasen, Mantei, Perlman, Strong and Verplank 1992).

2.3 Human Computer Interaction (HCI)

Before detailed consideration of the topic of Human Computer Interaction, two terms should be defined which are related to the development process: 'Interface' and 'Interaction'. According to Head, Interface is the "*visible piece of a system that a user sees or hears or touches*" (Head 1999, p. 4). Interaction is a more general term

[14] Hewett: http://www.acm.org/sigchi/cdg/cdg2.html

covering the users' activity. For instance, when the user types something by using the keyboard or clicks with a mouse, this activity is called interaction.

The general concepts of HCI apply to website design. Website designers have noticed that creating a "user friendly" site is important to maximize user response. However, designers *"did[not] know any effective ways to discover what made a product user-friendly or how to design a product that was friendly"* (McCracken et al. 2004, p. 3). Designers often have a poor understating of HCI issues. Therefore, designers need to know how to think in terms of future users' needs, values and supportable tasks and how to translate that knowledge into an executable system. This can be accomplished by establishing a good interface design to let the user interact and deal with the websites without any difficulties and to let the user have more control of the site.

Furthermore, in order to work effectively in the development process, HCI needs to be part of this process. According to Head, HCI has two critical dimensions in the development process: firstly, involving the user during the building and implementation of the new systems; secondly, evaluation studies about "*cognitive and other behavioral factors that come into play when people interact with computers*" (Head 1999, p. 9). These dimensions are consistent and mutually dependent, thus "*the evaluation side of HCI becomes(s) a basis for decision making about design trade-offs during product development*" (Head 1999, p. 9).

In the past, HCI experts tended to be consulted later in the design process, but most of the research found that this was a mistake. "*The Interface is not something that can be plugged in at the last minute; its design should be developed integrally with the rest of the system. It should not just present a "pretty face"; but should support the tasks that people actually want to do, and forgive the careless mistakes"* (Dix et al. 2004, p. 3). Thus, it is important to consider how HCI will fit into the overall design process for websites.

2.3.1 What is HCI?

The term Human-Computer Interaction (HCI) was adopted in the mid-1980s as a means of describing this new field of study. "*This term acknowledged that the focus of interest was broader than just the design of the interface and was concerned with all those aspects that relate to the interaction between users and computers"* (Preece et al. 1994, p. 7).

HCI "*is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them*" (Preece et al. 1994, p.7). Therefore, the reasons for studying HCI in the development process are to create interactive computer systems that are usable and practical as well (Head 1999).

The term HCI relates to several stages in the development process, including the design, implementation and evaluation of interactive systems, in the "*context of the user's task and work*" (Dix et al. 2004, p. 4). The implementation of HCI can be perceived as an art as well as a science because it requires a comprehensive range of skills, including an understanding of the user, an appreciation of software engineering capabilities and application of appropriate graphical interfaces. "*If we are to be recognized as developers with professional capabilities, as competent practitioners, then it is critical to understand what makes an application interactive, instructional and effective*" (Sims[15] 1997).

HCI "*is concerned with the design of computer systems that are safe, efficient, easy and enjoyable to use as well as functional*" (Preece, Rogers, Keller, Davies and Benyon 1993, p. 11). Vora (1998) describes a framework, which provides for effective HCI for websites, with the main task being to have a clear understanding of user needs: who the users are, and what their tasks and environments are. Additionally, HCI is "*concerned not only with how present input and output*

[15] Sims: http://www.gsu.edu/~wwwitr/docs/interact/

technologies affect interaction, but also with the consequences of new techniques such as speech recognition and generation (input and output)" (Booth 1989, p. 5).

2.3.2 HCI as Process

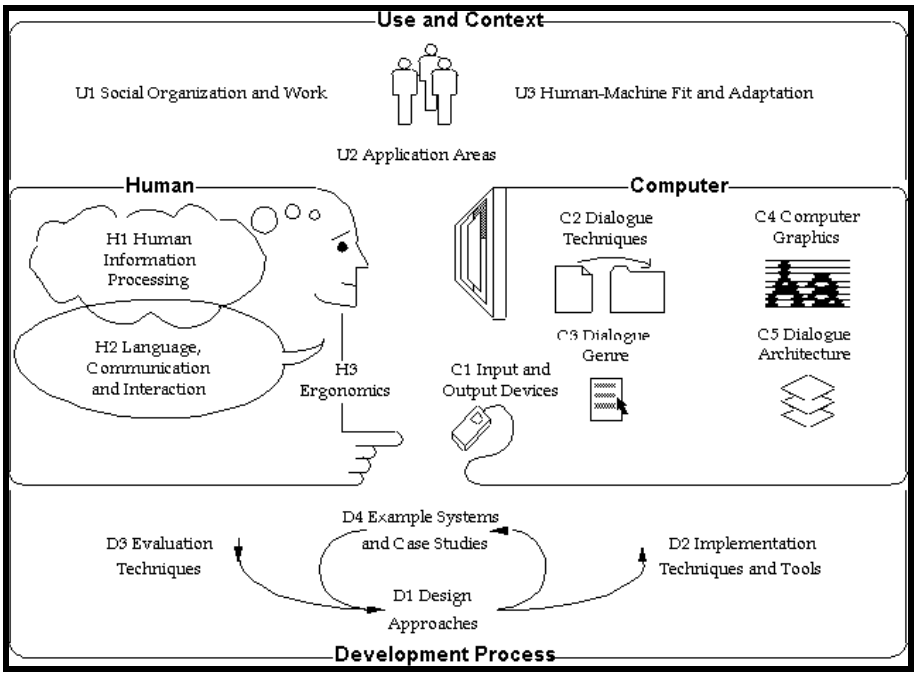
HCI is a discipline focusing on design, evaluation and implementation of interactive computer systems. By adopting HCI principles and practices in the development process, the system should be easy to use by people within their work settings. The purpose of integrating HCI techniques in the overall development process is that it incorporates good design "*both in practice and in understanding"*, and to achieve this goal, HCI addresses "*what occurs on the human side of interaction as well as what happens on the machine side"* (Head 1999, p. 12).

Basically, HCI is concerned with two issues: studying the relationship and the communication between the human and the computer, and discovering the methods for "*mapping computing functions to human capabilities and effectively using input and output techniques so that computers and users have more seamless interactions*" (Head 1999, p. 12).

Figure 2 presents the *interrelationship* between the two sides of interactions, the human side and the computer side (Hewett et al., 1992). The bottom of the graphic illustrates an additional aspect of HCI, which deals with the way that systems are built. HCI places a special emphasis on "*creating and applying user-centered design techniques as well as using iterative usability testing methods*" (Head 1999, p. 13).

Consequently, the machine (computer) side involves several relevant issues including "*computer graphics, operating systems, programming languages and development environments"*. While on the human side, "*communication theory, graphic and industrial design disciplines, linguistics, social science, cognitive psychology and human performance are relevant"* (Hewett[16] et al., 1992).

[16] Hewett: http://www.acm.org/sigchi/cdg/cdg2.html



Source: (Hewett et al[17], 1992).

Figure 2: the Discipline of Human-Computer Interaction

2.3.3 Relationship between the HCI and Human Dialogue

HCI is the study and theory of the interaction between humans and complex technology and is concerned with how current input and output technologies affect interaction, and the situations in which these technologies and techniques might be put to best use. Therefore, the relationship between HCI and human dialogue may be summarized as follows: (Booth 1989, p. 54-55).

- *Human Computer interaction, like human dialogue, is a form of communication where a degree of understanding can be achieved. Admittedly, this understanding may be limited in some respects, but if designed properly, a computer system will do as its user wishes, provided the user knows what is possible and how to give commands.*

[17] Hewett: http://www.acm.org/sigchi/cdg/cdg2.html

- *Communications requires agreement on the terms used in the dialogue. When humans successfully communicate, they usually have a shared understanding of the words used and the concepts to which they refer. This is also true of human computer communication. When a user gives commands to a system, then the system must have an understanding of these commands if the interaction is going to succeed.*
- *Communications requires agreement, not only upon the terms and concepts used, but also upon the context of the communication.*

For example, if two people are speaking to one another, then there needs to be an agreed understanding of what they are speaking about. To illustrate this point further, let us consider an example where two individuals do not agree on the context of their conversation. Two people are sharing a car to travel to a conference. They stop at a garage for fuel and to check the car tyres. Bill is putting air into the tyres when Fred asks, "*How's the pressure?*" Bill replies, "*Not too good, the boss keeps getting on to me*." Fred explains, "*Sorry I meant the car tyre pressure, but how's work anyway*?"(Booth 1989, p. 55). In this example, we understand that Fred and Bill do not share a common context for their brief exchange. "*In their separate contexts, the necessary link of work and the context of car maintenance, some of the words can have different meanings (i.e." Pressure") and the result is a failure in the dialogue between the two individuals"* (Booth 1989, p. 55).

This sort of dialogue failure can also occur in human-computer communications. For example, "*consider a user of a word processing system who issues a command to print the document that is currently being edited*". Following the printing process, "*the user issues a command for the system to re-display the document on the screen, but instead nothing happen"*. The system, "*upon receiving the first command changed to the printing mode, but did not adequately inform the user who was unaware of the change in context and the subsequent legality of some of the commands"*. The lesson to be learned is "*that those involved in communication assign [meaning] to symbols and terms depend[ing] upon the context in which they are communicated*" (Booth 1989, p. 55).

The previous two examples reveal that perspective is not only important in conversation between humans, but is also a considerable factor in human-computer dialogue. To sum up, HCI is similar to human dialogue, as it is a form of communication where a degree of understanding is achieved. There must also be agreement between individuals involved in the process of communication on the meaning of the symbols and terms used. The context of the dialogue is also important, as it is the context that dictates the meanings of some of the symbols and terms used.

2.3.4 Goals of HCI

The goals of HCI are to produce usable and safe systems, as well as functional systems. These goals can be summarized as: safety, utility, effectiveness, efficiency and appeal. These goals focus on the services that the system provides, how quickly the tasks can be achieved, and ensuring that users like the system. In general, usability is an essential concept in HCI and is concerned with making systems easy to learn, easy to use, and with limiting error frequency and severity. To establish a simple system with good usability, the HCI specialists need to be aware of the following issues (Preece et al. 1994, p. 15):

- *Understand the factors such as organizational, social and psychological factors that determine how people operate and make use of computer technology effectively.*
- *Develop tools and techniques to help designers ensure that computer systems are suitable for the activities for which people will use them.*
- *Achieve efficient, effective and safe interaction in terms of both individual Human Computer Interaction and group interaction.*

These needs should be considered very carefully at the design stage, as most of the users should not have to change radically to 'fit in' with the system; rather, the system should be designed to match their requirements.

2.3.5 Purpose of HCI

The purpose of HCI is to design a computer system to match the needs and requirements of the users. The HCI specialists need to think about the above factors in order to produce an outstanding system. To achieve the goals of HCI, a number of approaches can be utilized. These approaches need to be studied very carefully in order to develop a system which provides the user with productivity and efficiency. These approaches are: (Preece et al. 1994, p. 46-47)

- *Involving the user: (involve the user as much as possible so that s/he can influence the system design).*
- *Integrating different kinds of knowledge and expertise: (integrate knowledge and expertise from the different disciplines that contribute to HCI design).*
- *Making the design process iterative: (testing can be done to check that the design does indeed meet users' requirements).*

From the above, it was learned that HCI design should be user-centered, integrate knowledge from different disciplines and be highly iterative. In addition, it is important to undertake effective usability evaluation. This will provide feedback regarding negative and positive aspects of prototypes.

It is important that the way in which people interact with computers is intuitive and clear. However, designing appropriate HCI is not always straightforward, as the many poorly designed computer systems testify. One of the challenges of HCI design is to keep abreast of technological developments and to ensure that these are harnessed for maximum human benefit.

The goal of this research is to develop a framework for rapid, integrated, incremental systems development that enables a group of designers and users working together to produce a friendly, effective and efficient website. Two terms – Interaction and Interactivity - need to be defined in order to understand how the user can communicate with the system to accomplish his/her goals.

2.3.6 Interaction and Interactivity

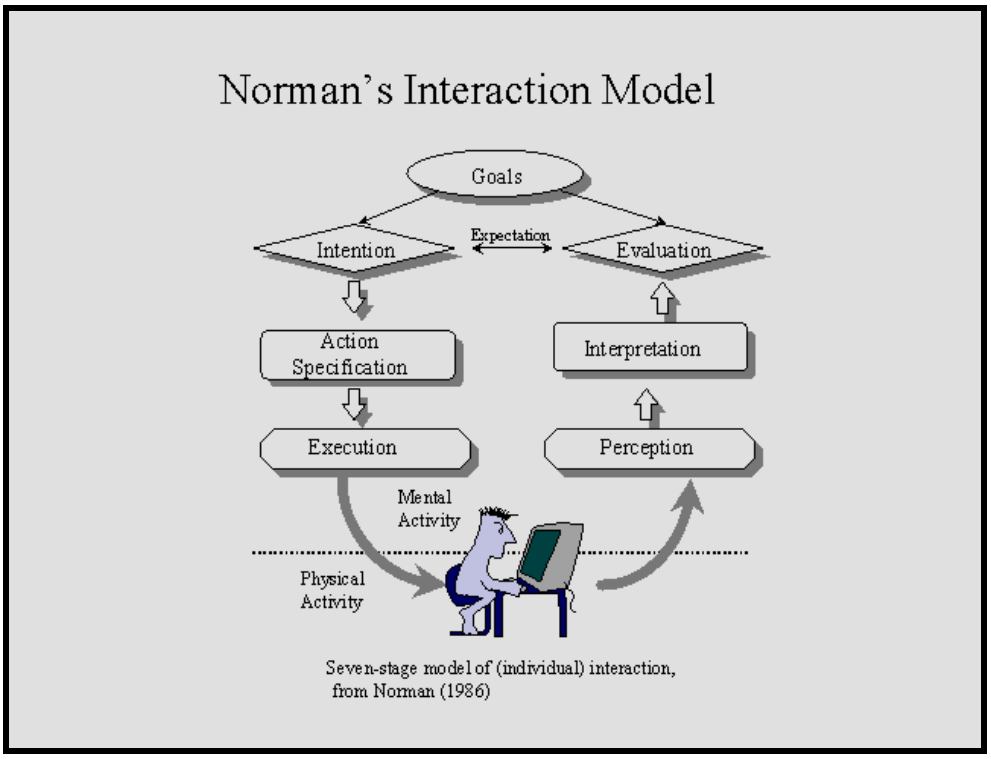
According to Dix, "*Interaction involves at least two participants: the user and the system. Both are complex, as we have seen and are very different from each other in the way that they communicate and view the domain and the task. The interface must, therefore, effectively translate between them to allow the interaction to be successful*" (Dix, Finlay, Abowd, and Beale 1998, p. 104).

Users can interact with computer systems in a variety of ways. At the lowest level is batch input, in which the user provides all the information to the computer at once and leaves the machine to perform the task. This approach is called indirect interaction. An approach which involves a real-time interaction between the users and the computer is called direct interaction, as a dialogue between the user and computer will be established and at the same time will provide feedback and control right through to achieving the task.

Study of interaction can help both the HCI specialists and the users simultaneously; for example, analysis of interaction will help HCI specialists to understand exactly what is going on in the interaction, and identify the likely root of difficulties. It can compare different interaction styles and take into account the interaction problems. On the other hand, the users are able to achieve their goals successfully. These goals relate to the particular application domain i.e. an "*area of expertise and knowledge in some real-world activity*" (Dix et al. 1998, p. 104). The user interacts with the system for a specific reason -i.e. to perform a task, in turn to achieve the goal, which was (for instance) the reason behind visiting a particular website. So the goal is "*the desired output from a performed task*" while the task is an "*operation to manipulate the concepts of a domain*" (Dix et al. 1998, p. 104).

To understand the interaction concept, Norman's model of interaction can be utilized (see Figure 3). This model may be considered as a cycle between execution and evaluation, and these two stages can be subdivided into seven steps. The user begins the interactive cycle by defining the goal and the tasks in order to achieve his/her objectives. The user will define his/her goal by using the input mechanisms, so the

task must be "*articulated within the input language*" (Dix et al. 1998, p. 107). Then the input language will be translated into the system language (known by Norman as Core Language). Later, the system then "*transforms itself as described by the operation translated from the Input; therefore, the execution phase is complete*" (Dix et al. 1998, p.107). If the system responds to the user task in an appropriate manner to achieve the goal, then the interaction has been successful between the user and the system; otherwise, the user must "*formulate a new goal and repeat the cycle*" (Dix et al. 1998, p. 106).



Source: (Norman[18] 1986)

Figure 3: Norman's Interaction Model

Next, the evaluation phase begins, as the system will be in the new state and must communicate to the user the current values of the system since "*attributes are rendered as concepts or features of the output*" (Dix et al. 1998, p. 107). Thus, the user can see the consequences of the task s/he initiated.

[18] Norman: http://www.ipd.bth.se/bai/iea329/Intro/sld005.htm

Finally, is up to the user to interpret the output and to match the results of the "*interaction relative to the original goal*" (Dix et al. 1998, p. 107). At this stage, the evaluation phase has ended as has the interactive cycle. A new cycle may then commence.

Norman's model is very useful as a means to understand the principles behind the interaction framework. This model allows the user to define his/her goals firstly and then will let them interact with the system to accomplish these goals. However, other researchers suggest that Norman's model considers only the "*system as far as the interface, and is only focusing on the user's view of the interaction*" (Dix et al. 1998, p. 106). A more complex approach is needed.

The second way in which to discuss the users' communication with the system is interactivity. Interactivity can be defined in general terms as "*the facility for individuals and organizations to communicate directly with one another regardless of distance or time"* (Ghose and Dou 1998, p. 30). For instance, in an educational context, interactivity "*refers to the activity between two organisms - which are learner and the computer*" (Jonassen 1998, p. 97). In the context of HCI, "*Interactivity is the defining feature of an interactive system. This can be seen in many areas of HCI such as recognition rate for speech, recognition and 'feel' of a WIMP environment element: windows, icons, menus, pointers, dialog boxes, and buttons*" (Dix et al. 1998, p. 136). This process is iterative with a sequence of steps and procedures followed by the user to interact with the machine (or system) to further his/her goal.

2.3.7 Factors in HCI Design

To achieve a safe and user friendly system, the HCI specialists need to consider the main issues and factors involved in interaction and interactivity, and hence in HCI design (see Figure 4). These factors can be divided into (Preece et al. 1994, p. 31):

- *Organizational factors (training, job design, politics, roles, work organization);*

- *Environmental factors (noise, heating, lighting, ventilation);*
- *Health and Safety factors (stress, headaches, musculo-skeletal disorders);*
- *The User (motivation, enjoyment, satisfaction, personality, experience level);*
- *Comfort Factors (input devices, output displays, dialogue structures, use of color, icons, commands, graphics, natural language, 3-D, user support materials, multi-media);*
- *User Interface (input device, output displays, dialogue structures, icons, 3-D, multi-media) ;*
- *Task Factors (easy, complex, novel, task allocation, repetitive, monitoring, skills, components);*
- *Constraints (costs, timescales, budgets, staff, equipment, building structure);*
- *System Functionality (hardware, software, application);*
- *Productivity factors (increase output, increase quality, decrease cost, decrease errors, decrease labor requirements, and decrease production time, increase creative and innovative ideas leading to new products).*

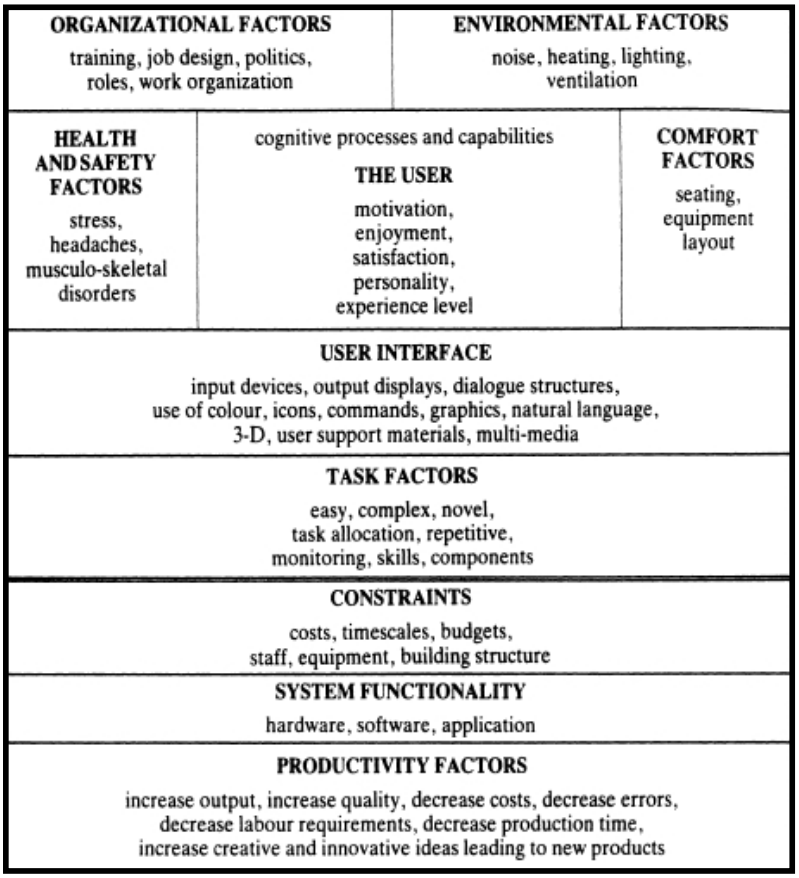


Figure 4: - Factors in HCI Source: (Preece et al. 1994, p. 31)

Many factors are involved, therefore, during the development process, disagreement can arise between ways to address each of these factors depending on various aspects of the system development context, such as product, team members, users and company. According to Head (1999, p. 33) "*making careful trade-offs between these numerous factors, while supporting design principles and approaches, remains a challenge of the HCI field"*. Consequently, most designers support involvement of the user in the design process from the beginning to reduce conflicts during the development stage.

2.4 What is USABILITY?

Usability refers to the "*quality of the interaction in terms of parameters such as time taken to perform tasks, number of errors made and the time to become a competent user*" (Benyon, Turner and Turner 2005, p.52). Alternatively, Usability "*is a **quality attribute** that assesses how easy user interfaces are to use. The word "usability" also refers to methods for improving ease-of-use during the design process*" (Nielsen[19] 2003). The usability evaluation stage is an effective method by which a software development team can establish the positive and negative aspects of its prototype releases, and make the required changes before the system is delivered to the target users. Usability evaluation is about observing users to "*see what can be improved, what new products can be developed*" (McGovern[20] 2003). It is "*based on human psychology and user research*" (Rhodes[21] 2000). HCI specialists "*observe and talk with participants as they try to accomplish true-to-life tasks on a site (or system), and this allows them to form a detailed picture of the site as experienced by the user"* (Carroll[22] 2004).

From the user's perspective, usability is considered a very important aspect in the development process as it can mean the difference between "*performing a task accurately and completely or not*" and the user "*enjoying the process or being*

[19] Nielsen: http://www.useit.com/alertbox/20030825.html
[20] McGovern: http://www.gerrymcgovern.com/nt/2003/nt_2003_04_07_usability.htm
[21] Rhodes: http://webword.com/moving/savecompany.html
[22] Carroll: http://www.theusabilitycompany.com/news/media_coverage/pdfs/2003/NewMediaAge_270303.pdf

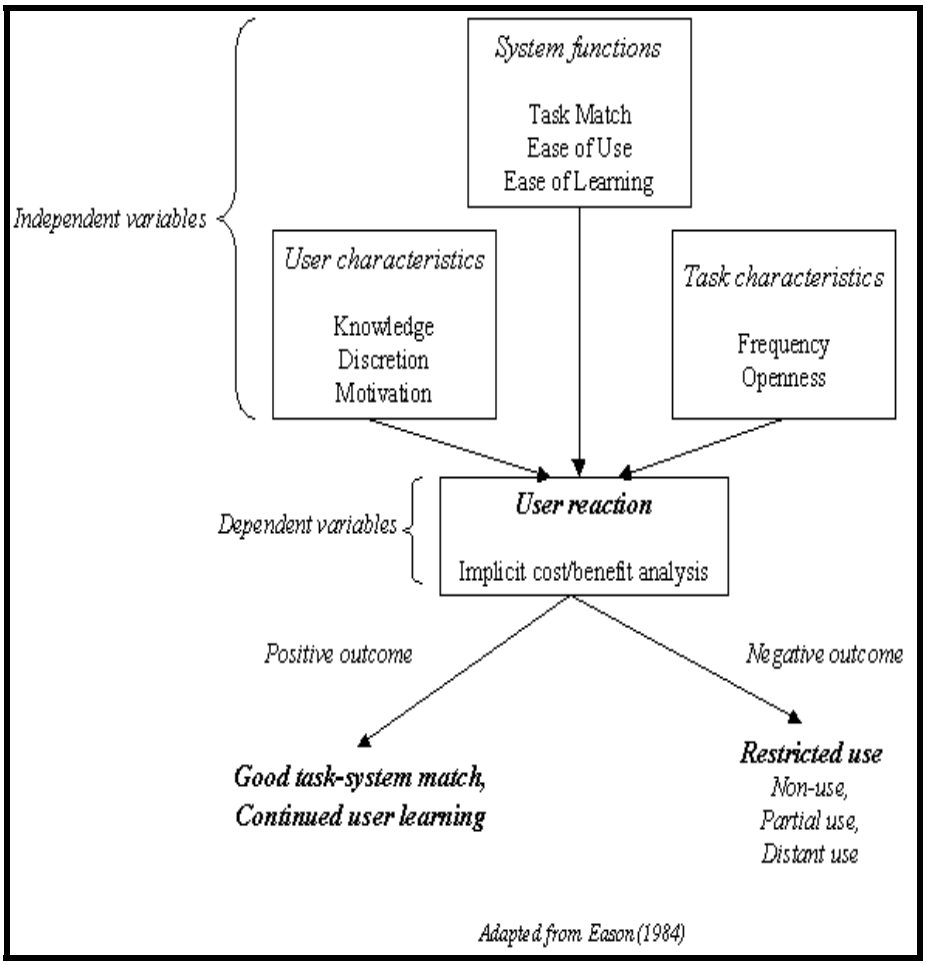
frustrated" (Bullet[23] 2002). Alternatively, if usability is not highlighted in website design, then users will become very frustrated working with it. For example, according to Nielsen (2003), people will leave the website: a) if is difficult to use; b) if the users get lost on a website; c) the information is hard to read; d) it does not answer users' key questions; e) and lastly, if the homepage fails to define the purpose and the goals of the website. "*Usability rules the web. Simply stated, if the customer cannot find a product, then s/he will not buy it.* In addition, *the web is the ultimate customer-empowering environment. S/he who clicks the mouse gets to decide everything. It is so easy to go elsewhere; all the competitors in the world are but a mouse-click away"* (Nielson 2000, p. 9).

Usability is a critical issue for websites as it improves competitive position, improves customer loyalty and drives down costs (Rhodes 2000). Therefore, if usability is highlighted in website design, it will keep the organization in a powerful position compared with their competitors, as "*Usability = simplicity = user satisfaction = increased profits***"** (Rhodes[24] 2000).

2.4.1 Concepts of Usability

To understand fully the concepts behind the term "usability", we need to realize that usability is not "*determined by just one or two constituents, but is influenced by a number of factors"* which interact with "*one another in sometimes complex ways*" (Booth 1989, p. 106). Eason (1984) has suggested a sequence of models (see Figure 5) that clarify what these variables might be. This figure displays the relationship between independent (task, user and system characteristics) and dependent variables (User Reaction) with each variable having specific requirements and needs.

[23] Bullet: http://www.usabilityfirst.com/intro/index.txl
[24] Rhodes: http://webword.com/moving/savecompany.html



Source: (Booth, 1989, p. 106)

Figure 5: Eason's (1984) Causal Framework of Usability

First, task characteristics are divided into frequency and openness. The frequency term refers to "*the number of times any particular task is performed by a user*" (Booth 1989, p. 107). If users perform a task infrequently, then help and assistance should be available via the interface so that users know which step must be taken next to accomplish the task. On the other hand, if users perform a task frequently, then it will be easier for him/her to remember the steps which are required in order to accomplish the task.

The openness term refers to the "*extent to which a task is modifiable*" (Booth 1989, p. 107). This means that the information needs of the user are variable and the task must "*be structured to allow the user to acquire a wide range of information*". According to Eason (cited in Booth (1989)), the user information needs should be

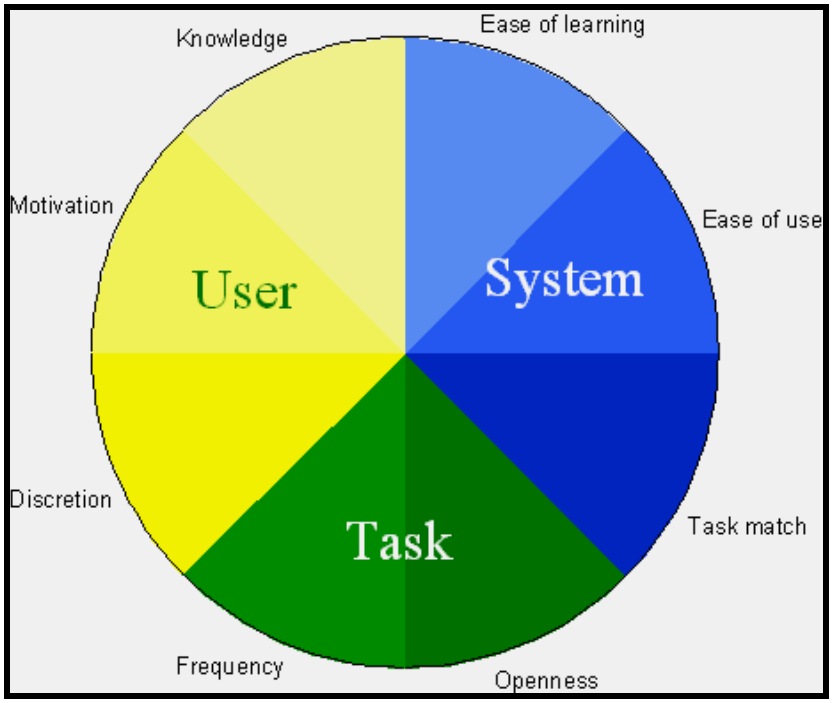
fixed. If this is the situation at that time "*the task need not be open and flexible, as the same information is required each time the task is performed"* (Booth 1989, p. 107).

The system function is described as being the most important concept under the causal framework for usability. The main concept of this variable is to improve the usability under the development process. To achieve this, the system function must address the three major system variables carefully within the development process. These are: ease of learning, ease of use and task match. The ease of learning term refers to the effort "*required to understand and operate an unfamiliar system*"; and this term depends on the user's knowledge. The ease of use term refers to the effort that is "*required to operate a system once it has been understood and mastered by the user*" (Booth 1989, p. 107). The task match, refers to the "*extent to which the information and functions that a system provides matches the needs of the user*" (Booth 1989, p. 107); in other words, whether the system will provide the necessary functions that are essential as well as the information that the user needs to accomplish his/her goals.

The final set of independent variables concerns user characteristics, focusing on who is using the system, i.e. knowledge, motivation and discretion. Knowledge refers to the user's level of knowledge about computers and the tasks required. The motivation and discretion factors are very important concepts in the user characteristics variable with respect to the user's desire to use the system. If the user "*has a high degree of motivation then more effort will be expended in overcoming problems and misunderstandings"* (Booth 1989, p. 108). On the other hand, discretion refers to the *"user's ability to choose not to use some part, or even the whole of a system" (*Booth 1989, p. 108). In other words, high discretion means that there needs to be satisfaction and fulfillment, via working with the new system, or the user will not bother.

According to Eason (see Figure 6), usability not only focuses on the user characteristics, but the most important aspects that need to be added in the usability chart relate to 'task' and 'system'. Therefore variables of task, system and user all work jointly to establish the usability aspect of the system.

The dependent variable in Figure 6 refers to the user's reaction, which Eason describes as being created by a type of cost-benefit analysis. Therefore, this variable focuses on the negative and positive outcomes of adopting the new system. Positive outcomes will lead to success of the system, while the negative outcomes will lead to suspension and discontinuation of the system. In other words, the user "*accumulates a knowledge base of task-system connections as the system is used in a sequence of task episodes. The emerging strategy for use may represent a positive outcome in which the user locates and uses appropriate system functions for every new task and progressively masters the system. The reverse scenario occurs when negative outcomes prevail and use of the system is discontinued. Eason points out, based on his field studies, that under realistic conditions the user appears to approach a state of equilibrium where further learning about the system is minimized"* (Lowgren 1995, p. 5).



Source: (Booth 1989, p. 109)

Figure 6: A re-iteration of Eason's (1984) interacting task, system and user variables

2.4.2 Usability Criteria

Various principles need to be followed in order to support usability, making systems easy to learn and easy to use. These principles are (Dix et al. 1998, p. 162 and Nielsen 2003):

- *Learnability: by which new users can begin effective interaction and achieve maximal performance;*
- *Flexibility: the multiplicity of ways the user and system exchange information;*
- *Robustness: the level of support provided to the user in determining successful achievement and assessment of goals;*
- *Efficiency: once the user learns about the system,[the speed with which s/he] can perform the tasks;*
- *Memorability: how easily the user will remember the system functions, after a period time of not using it;*
- *Errors: "How many errors do users make, how severe are these errors, and how easily can they recover from the errors? (* Nielsen[25] 2003*);*
- *Satisfaction: how enjoyable and pleasant is it to work with the system?*

These principles can be applied to the design of an interactive system in order to promote its usability. Therefore, the purposes behind adopting these principles are to give more assistance and knowledge to system developers (and the users) regarding the system design. Alongside the above principles, an important key additional factor is Utility. Utility refers to the functionality so users can "*do what they need or want to do*" (Preece, Rogers and Sharp. 2002, p. 16). In other words, "*does it do what users need?*" (Nielsen 2003). For that reason, usability and utility are equally important in the development process and they need to be integrated.

[25] Nielson: http://www.useit.com/alertbox/20030825.html

2.4.3 Usability Specifications

Once the designer has gathered and analyzed information about the tasks, problems and steps to work with the proposed system, the next step is to answer the question: How will we know if the interface is usable? This is laid out in a usability specification.

A usability specification defines the measure of success of a computer system or website and serves as an indicator about whether or not the development of the website is on the right track. A usability specification should be developed during the first stage of the development process and monitored "*at each iteration*", to determine whether the "*interface, is, indeed, converging toward an improved, more usable design*" (Hix and Hartson 1993, p. 222). Usability specifications should lay out explicitly how usability will be evaluated and can be divided into two sections:

- **Performance Measures:** are directly observable by watching a user complete a task within a specific time. This includes monitoring the number of errors and time needed to accomplish the task. These types are 'quantifiable measures' which means that they can be communicated with numbers. For example "*you can count the number of minutes it tasks a user to complete a task or the number of negative comments that occur*" (McCracken et al. 2004, p. 53).

- **Preference Measures:** give an indication of a "*user's opinion about the interface which is not directly observable*" (McCracken et al. 2004, p. 53). Preference measures can be determined by using questionnaires or interviews.

Usability specifications are needed to determine when the iteration of prototypes has produced a system with sufficient usability. Therefore, without usability specifications, the key factors that "*generally determine an end to the iterative refinement process are when developers run out of time, patience, and/or money*" (Hix et al. 1993, p. 243). Usability specifications are very important to the

development process since they define "*a quantifiable end to the seemingly endless iterative refinement process*" (Hix et al. 1993, p. 242).

In addition to the option of user testing, the website may be evaluated by experts:

- **Heuristic Evaluation:** this evaluation was developed by Nielsen and colleagues, which allows a group of "*experts guided by a set of higher level design principles or heuristics, evaluate whether interface elements conform to the principles* "(Te'eni, Carey and Zhang 2007, p.147).

- **Consistency Inspection:** this evaluation will allow expert reviews "*all of the Web pages on the site to ensure that the layout, terminology, and color are the same*" (Lazar 2006, p. 213).

- **Cognitive Walk-Through:** The experts will examine the interface by a cognitive walk-through to discover the usability problems, which means, "*involve simulating a user's problem-solving process at each step in the human –computer dialog, checking to see if the user's goals and memory for actions can be assumed to lead to the next correct action"* (Te'eni et al 2007, p. 151).

The website developer should, in collaboration with the client, develop a sound usability evaluation plan, based on the most effective evaluation option for this case.

2.4.4 Strategies for Achieving Effective HCI in Marketing Websites

The general principles of HCI and usability evaluation can be applied to the development of effective websites for use in marketing products and services. Cohn (1999) stated that in order to refine and enhance HCI aspects of marketing on the Web, designers need to be aware of the following ten steps, which focus mainly on utilizing understanding of 'real interaction'. Through the use of the following steps,

businesses will achieve two goals: improving their on-line facilities and pleasing the consumer.

- **Define the mission:** The Internet environment needs to define and provide the right answers, the first time, within 24 hours. Cohn said, "*Decide if you want world-class support or if a simple auto-response will suffice. Be honest about your dedication to quality, availability of budget and timeline for results*" (1999, p. 32). The consumers need a quick and live response from the business, especially for consumers who have difficulties and problems in surfing the Internet to gain answers.

- **Define service levels:** Keep the service level simple and standard so that it can be used to evaluate the product. Cohn said, "*It is necessary to clarify your mission by defining a simple service level or quantitative measurement of performance. The most current framework is a certain high percent completed within a reasonable time period - for example 95% completion in 24 hours*" (1999, p. 32).

- **Build the Business Case:** Automated systems can be even cheaper if they reliably provide the correct answer the first time. According to Cohn, "*The downside of automation is that, if it does not work well, customers tend to call the help line. That scenario not only misses the savings opportunity, but also incurs an extra expense in implementing the new, unsuccessful automated technology*" (1999, p. 32).

- **Map the Interface Points:** "*Be proactive about activities in other parts of the company that will impact [upon] the service level - for example, product launches or technical glitches*" (Chon 1999, p. 34). Therefore, the Web needs to have clear standards, responses, and accurate information within the company policy.

- **Select System:** Allocate some time to test the system against your particular needs, and check that the system reports adequately support your service-level reporting needs. Cohn said, "*Ask about any capabilities that you will want in*

the near future, such as foreign language, or allowing customer service representatives to work remotely from home. If you are considering outsourcing, be sure that your systems support that option" (1999, p. 34).

- **Build the Knowledge Base:** Invest time in building a list of common answers, check the answers for internal consistency, spelling and grammar. "*A good knowledge base is the key to scalability. Once the answers are in place, it is relatively easy to hire and train new reps to handle sudden increases in volume. Without a knowledge base, quality and throughput will not improve*" (Chon 1999, p. 34).

- **Hire and train Cyber Reps:** Businesses need to consider this step very carefully as simple mistakes can accidentally cancel a valued customer's account, which can be costly and embarrassing. People remember the worst support mistakes, so hire people who are reliable and consistent. "*Test all applicants for their knowledge of the product, the Internet, writing style, typing skills, and genuine interest in the role*" (Chon 1999, p. 34).

- **Pilot Extensively:** To test your offering carry out pilot programs, starting with a small volume of messages for a period of one month or less and measure performance against the service level. "*A good pilot program will reveal unexpected challenges and will confirm many of your initial assumptions. Once the pilot is complete, you may want to spend several weeks "tweaking" your offering before going to prime*" (Chon 1999, p. 34).

- **Scale Up:** It is necessary to have good systems, a quality team, knowledge and pilot experience. The only remaining issue, which needs to be considered, is to expand the program to accommodate the entire volume of incoming messages within the confines of the service level. "*If all previous work was done correctly, scaling up is easy. Focus on daily performance level and routine improvements to the knowledge base*" (Chon 1999, p. 34)

- **Repeat:** Iteration needs to be considered in order to enhance the Internet support and include additional products and functions, and the ability to allow

customer service representatives to work from home. "*New products will need new support, competitors will exert new pressures, customer expectations will mutate, systems will crash, and the Internet itself will evolve. Be prepared to reinvent the Internet support program every 18 months*" (Chon 1999, p. 34).\

2.5 User Participation in System Development

This section focuses on users, their work, and their environment and the reasons for involving them in the design process. In addition, it will explain the difference between "user participation" and "user involvement" with respect to the design process.

2.5.1 What is Participation?

Participation is "*A process in which two or more parties influence each other in making plans, policies or decisions, it is restricted to decisions that have future effects on all those making the decisions or on those represented by them*" (Mumford 1995, p. 12). It can also be defined (in the context of systems development practices) as the "*extent to which the user engages in systems analysis activities such as project definition and logical design decisions"* (Doll and Torkzadeh 1989, p. 1154). Furthermore, user participation is defined as the "*behaviors, assignments, and activities that users or their representatives perform during the information system development*" (Hartwick et al. 1994, p. 441). A high level of user participation is likely to enhance user "ownership" of, or identification with the resulting system – in this sense "'*user involvement' refers to the set of all such user subjective attitudes toward, or psychological identifications with, information systems and their development"* (Kappelman 1995, p. 70). However, the term 'user involvement' can also refer to a low level of participation, where users have little power to influence decisions.

This research focuses on "user participation" not "user involvement" as the former term implies a role for the users which is more powerful and influential in the development process, especially in website design, as the user will be actively engaged throughout the development process. This will assist the user to accept and comprehend the system. Participation is more "*effective when an individual's desire or "motivation to participate" is in congruence with perceptions of actual involvement"* (Doll and Torkzadeh. 1991, p. 443). Decisions about the role of the user need to take into consideration that users are "*becoming more knowledgeable and active in defining their information requirements*" (Doll et al. 1989, p. 1154).

User participation assists system development by providing a "*more accurate and complete assessment of user information requirements, providing expertise about the organization the system is to support, expertise usually unavailable within the information systems group, avoiding development of unacceptable or unimportant features and importing user understating of the system"* (McKeen, Guimaraes, and Wetherbe 1994, p. 427-428). Tait and Vessey stated that participation "*reduces the risk of system failure in complex projects"* (cited in Amoako-Gyampah and White 1993, p. 2). Therefore, in order to make the system more successful, participation needs to be an integral part of "*the design and implementation process*" (Tait and Vessey 1988, p. 91), not just a convenient add-on.

Participation in the development process can be "*viewed as "sharing" in decision making or engaging in activities*" (Doll et al. 1989, p. 1155), and to determine "*information requirements by encouraging users and other to indicate what they do and what information they need to do it*" (Hepworth, Vidgen, Griffin and Woodward 1992, p. 122). Research has shown that user participation in system design will greatly assist in producing a successful system. It results in less time in the implementation and testing stages as users are more knowledgeable about the system.

The user's participation is very important since the lack of "*user involvement as the chief reason IS projects fail*" (Engler 1996, p. 3), and "*developing an information system without user participation tends to result in the delivery of systems that fail to meet the users' needs*" (Hawk and Dos Santos 1991, p. 317). After reviewing the role

of user participation in different types of projects, Hirschheim asserts that "*more user participation was undertaken by organizations when the systems were complex*" (cited in Amoako-Gyampah et al. 1993, p. 2).

User participation should be introduced in the development process to ensure that the system is successful and easy to implement as user participation may lead "*to improved system quality as well as increased user acceptance, reflected in increased use of and satisfaction with the system"* (Baroudi et al. 1986, p. 233). In addition, it will decrease resistance and increase acceptance of planned change (Baroudi et al. 1986). User participation will change "*the attitude of user towards data processing and vice versa*" (Doll 1987, p. 27).

Research and experience have shown that to run a successful application development process without any frustrations and dissatisfaction, the designer needs to involve the users, set clear objectives and recognition of organization factors. This will help the designer incorporate the views of users in all of the following stages: planning, design, implementation and testing.

To implement such an approach, a designer may adopt, for instance, the ETHICS[26] methodology, as it considers both human and technical factors when designing a new system. In other words, this is known as a "socio-technical" approach, which "*recognizes the interaction of technology and people, and produces work systems which are both technically efficient, have social characteristics which lead to high job satisfaction and create high quality products*" (Mumford 1995, p. 2).

Before adopting this approach, a designer needs to understand, and take into account, that each user will have different characteristics, such as interest, values and needs. These considerations need to be met by both parties – employee and the management to "*accept major change willingly and enthusiastically*" (Mumford 1995, p. 2). Some researchers indicate that some organizations will let the management play a large role in developing a new system, while the users will participate in a small way,

[26] (ETHICS: Effective Technical and Human Implementation of Computer Systems); more details about the ETHICS methodology are provided in Chapter Three.

or sometimes they will not participate at all. Hence, user participation can be at various levels and in different ways. According to Tait and Vessey , there are various types of participation, for example:

- *No participation: users are not invited to participate;*
- *Symbolic participation: user input is sought but ignored;*
- *Participation by advice: users are consulted;*
- *Participation by weak control: users may have sign-off responsibility;*
- *Participation by doing: users are members of design team:*
- *Participation by strong control: users may pay for the system development.*

(Cited in Saleem 1996, p. 147)

The use of options involving little user participation will create numerous problems for the users as well as the management, as users will most likely find that this system is not meeting their needs and desires and is very hard to cope with. This may lead to "*serious morale problems*" (Mumford 1995, p.2) resulting in reduced job satisfaction, low efficiency "*low commitment to the system, together with increased resistance to any future change*" (Mumford 1995, p. 2). In the context of this thesis these issues relate to "End-users (Internal)" – see Section 1.6.

2.5.2 Change Processes.

To be successful and meet user requirements, the development of a new system requires a number of "change process" aspects to be considered by the designer, user and management simultaneously. These aspects are: objective setting and attainment; adaptation; integration; and stabilization.

- **Objective Setting and Attainment:** this should involve all the groups (not only the senior management) from an organization who intend to use the system. Each group (or every individual) will have special interests and values. Consequently, designing a system for today and the future needs to involve various sessions of brainstorming between the users to exchange

opinions and views to enhance the system. Today "*non-technical users are familiar with, and knowledgeable about, the advantage and disadvantages of technical systems*" (Mumford 1995, p. 6). Users are "*becoming more sophisticated and as they do so, their expectations and behaviors are changing. Don't get caught designing for yesterday's audience -- stay on the cutting edge with this kind of research so that you can design for tomorrow's audience!*" (Sheridan[27] 1999). Moreover, these groups are "*able to make informed choices on the hardware and software that will best meet their needs*" (Mumford 1995, p. 6).

- **Adaptation:** this process is "*moving from one kind of technical and organizational structure and state to another, and the means by which this change is assisted to take place smoothly and successfully*" (Mumford 1995, p. 7). Adaptation occurs in the implementation phase of the new system. The adaptation needs to address issues such as values, interests, attitudes, motivations and the conflicts between the groups who are working together to implement a new system. Therefore, support and assistance needs to be provided from the top management to understand and study any potential conflicts between groups of users. This step is very significant to reduce any struggle between the groups and to certify that the system is running smoothly, according to the users' needs.

- **Integration:** "*is the action taken, once the system has been designed and is being implemented, to ensure a new situation reaches a state of equilibrium*" (Mumford 1995, p. 7). The purpose behind integration is to gather different aspects such as task, technology, people and organizational environment into a valuable relationship between themselves. The relationship between these aspects should be stable and capable of adoption. Organizations should respond directly to all the changes which occur in their environment "*while at the same time either maintaining a state of equilibrium or being able to make adjustments which restore equilibrium if internal relationships are*

[27] Sheridan: http://www3.sympatico.ca/cypher/web-design.htm

distributed" (Mumford 1995, p. 8). Introducing a new technology to the above aspects (task, technology, people and organizational environment) will bring a new relationship between them, which should integrate "*both opportunities and constraints*" (Mumford 1995, p.8). Since tasks are influenced by technology, the task structure of "*functions or departments using the system will be altered*" (Mumford 1995, p. 8). New tasks will have new demands; therefore, in this scenario, job satisfaction will be affected as new tasks will have new demands and requirements that will produce negative or positive feedback. Consequently, technology, people and tasks will interact with the environment to provide a new structure "*for the achievement of the organization's objectives and interaction may start the looping process again by making new demands of technology*" (Mumford 1995, p. 8). Thus, integration requires adaptation in order to produce a good relationship between technology, people, tasks and organizational structure.

- **Stabilization:** this is the last step in the change process. Stabilization requires that "*once new patterns of behaviour have been successfully initiated; they must be established and reinforced*" (Mumford 1995, p. 6). This means that the relationship between the aspects (task, technology, people and organization) should incorporate the new patterns of task performance, which is required by the system to ensure that they meet the values and interests of groups who are involved.

In summary, designers need to take into account the above change processes during the development process of a new system, and these changes should be considered from the human perspective, not from the technical aspect. This means that user participation should be a priority from the beginning, involving the user in all stages of the process from planning to implementation. This action will achieve two desirable outcomes: a successful system and job satisfaction.

Previously, users were involved only in the analysis and design phases, as most of the methodologies are "*designed around the needs and capabilities of analysts instead of users*" (Dean, Lee, Pendergast and Hickey 1997, p. 186). Nevertheless, these days users should be involved from the beginning to the end as s/he will be

able to interact with the system more and to provide more feedback to support effective iteration at each step.

Designers need to select as participants the users who are dealing with the system on a daily basis, not the management and technical personnel. The human aspect has the positive aim of "*encouraging the setting and achieving of human objectives as an integral part of the design process*" (Mumford 1995, p. 11).

2.5.3 Managing User Participation in Development Processes

Before adopting a participative approach to system development, it is very important to estimate the functions, structures, and processes of participation and to understand the relationship between the management, technical personnel and finally, the more important source, the users. Participation can play a significant role in promoting and endorsing the development process, as participation will "*lead to successful outcomes in terms of more information system usage, greater user acceptance, and increased user satisfaction*" (Lin and Shao 2000, p. 283). Indeed, "*participation is morally right – people should be able to determine their own destinies*" (Mumford 1995, p. 13). It enables users to learn more about the system before implementation, producing an "*interested and committed group of staff and therefore assisting in the avoidance of morale and job satisfaction problems*" (Mumford 1995, p. 13).

Typically, user responsibilities in the participation stage will extend from the beginning until the end of the development process, including the testing and evaluation of the system. For example, user responsibilities can involve "*project initiation, determining system objectivities and information needs, identifying sources of information, analyzing information flows, developing input and output formats/screens, and specifying aspects of the user interface*" (Doll et al. 1989, p. 1155).

Participation is considered a valuable experience for some users who will be involved in the development process since they will obtain more knowledge and experience about the system before it is implemented and "*can assist an organization to realized it objectives more effectively; alternatively, that such knowledge will enable any negotiations to take place with all interest groups operating from an informed position*" (Mumford 1995, p. 13). Additionally, "*individuals who are active in the system development process are quite likely to develop beliefs that the system is both important and personally relevant and the feeling that the system is good*" (Hartwick et al. 1994, p. 443).

Users will be interested in and attracted to the participation process, as it will:

- Enable them to "*prevent things that they believe to be undesirable from happening";*
- Avoid and prevent the "*users to undertake tasks that they regard as time-consuming and irrelevant or even being made redundant";*
- Help the users to make their job more interesting, providing "*better services to the client-consumers, promotion, and improved quality of working l*ife;"
- Enhance group harmony, as it develops a "*sense of cooperation and community and produces a willingness to accept group decisions*".

(Mumford 1995, p. 13)

Although these theories of participation have been primarily developed in the context of design of information systems, they apply equally to the development of websites. Merrick (2001, p. 67) states that "*it's important to reach online-users because they are generally the most profitable*"

2.5.4 How to Participate?

Participation has a different significance and sense for different groups and individuals, as they have different objectives. Management and designers need to act as a team to present a set of processes and structures that will help the users to

achieve their objectives. These gains "*will not necessarily be all of the same kind but they should enable each group to say with conviction "participation has clear benefits for us"* (Mumford 1995, p. 13).

The participation process needs to be examined very carefully by both parties (designers and management) to decide which participative approaches should be adopted for the particular development process. There are two main types of participation: indirect "*where user representatives participate in the system development process*"; and direct "*where the users themselves fully participate in the development process*" (Barki et al. 1989, p. 54).

Each participation type has special techniques and particular requirements when it is adopted for the development process. For example, if the indirect approach is chosen, then the most important issue that needs to be addressed is to ensure that all interests are represented. Users should decide "*how the members of the participative forum are selected or elected and whether a number of groups at different organizational levels are required*" (Mumford 1995, p. 14). Whilst, if the direct participation approach is adopted in the development process, the designers and management need to define various issues at the beginning; for example, the degree of participation and the degree of influence that users will have regarding changing aspects of the design, before the implementation.

Users can play a significant role in the development process and this involvement and participation can be in the beginning, middle or at the end of the development process. Each step of this participation has specific requirements and procedures that must be followed so that users can play their role in developing the new system, with anticipation that it will meet their desires and requests.

Mumford (1995) provides a slightly more complex model of participation options. She notes three types of involvement: consultative, representative and consensus. Each one has specific requirements from the users' and designers' perspectives.

- **The Consultative approach:** is very useful to secure agreement and settlement between the users and designers at the beginning, to define the

objectives of the new system. This approach will allow the full hierarchy of people (top, senior, and low management and interested subordinate staff) to work together to define organizational future needs with respect to the new system. However, "c*onsultative structure must exist or be created so that this sounding out of opinion can be thorough and accurate*" (Mumford 1995, p. 18).

- **The Representative approach:** is very appropriate at the definition stage. It is considered useful and powerful since a hierarchy of people will contribute to system definition and setting the boundaries of the new system. A representative approach requires input from all the functions and levels in those parts of the organizations that are using the information system. The design group "*will see an important part of its task as involving its departmental colleagues in the design activities and in the decision taking on how work is to be reorganized around the technical system*" (Mumford 1995, p. 18).

- **The Consensus approach:** is more popular in most organizations as it enables all the staff associated with developing a new system to take part and have a role in designing the new system for an organization. This is achieved "*when efficiency and job satisfaction needs are being diagnosed through feedback and discussion in small groups*" (Mumford 1995, p. 18).

It is important to note that each approach has specific time constraints, needs, activities, and potential problems. For example, the consensus approach "*does not always emerge easily, and conflicts which result from different interest within a department may have to be resolved first*" (Mumford 1995, p. 19). Hence, the other approaches (representative or consultative) are often adopted when developing a new system for an organization.

A participative approach is very useful at all stages, as it will "*lead to efficiency gains, the creation of high quality customer care and a good work environment, and more job satisfaction for staff*" (Mumford 1995, p. 19). According to Mumford, two

types of groups should carry out the stages in the process of systems development (i.e. planning, design, implementation and evaluation):

- **The first group** is responsible for steering the project. The purpose of this group is to provide the link between the different people involved in the project. Moreover, the role and responsibility of this group is to define the "*objectives and constraints under which the new system is to be developed*" (Mumford 1995, p. 19).

- **The second group** is responsible for defining the system design, to support the function or department where the new system will be implemented and introduced. The role and responsibility of this group is to define the problem, environment, system goals, and (the most important aspect) to identify the impacts of the new systems at each level in the organizational hierarchy.

User participation during the system design will lead the user to understand more about the system firstly, and hence, the system will be more productive and efficient. User participation will "*improve the quality of design decisions and resultant applications, improve end-user skills in system utilization, develop user abilities to define their own information requirements, and enhance user commitment to and acceptance of the resultant application*" (Doll et al. 1989, p. 1152). Moreover, "*user satisfaction with a system is a component of job satisfaction, one would anticipate a positive relationship between user involvement and user satisfaction*" (Lawrence and Low 1993, p. 196). Participation by users in the development process will provide a more accurate and complete assessment of user "*information requirements, avoiding development of unacceptable or unimportant features; improving user understanding of the system and finally will lead to decreased user resistance*" (Amoako-Gyampah et al. 1993, p. 2).

Rondeau, Vonderembse and Ragu-Nathan (2002, p. 151) stated that "*involving product development managers and manufacturing managers (i.e. end-users) in IS-related activities enables firms to build an IS infrastructure that supports cross-functional decision making"*. System requirements information can be obtained from the user by using the interview method. This method should be introduced in the

development process of web sites to gain more information about the "*basic content areas of the site*" (Fleming 1998, p. 213). Consequently, to meet the user needs, Fleming suggests that a three-tiered system of goals-(basic), purpose-(oriented), and topic (or audience) should be considered. The basic goals relate to navigation questions such as "*Where am I? Or "Where can I go?"* (Applen 2002, p. 305). Moreover, such design approaches should involve user participation. Effective "*communication and positive relationships must be cultivated and planned as any other successful component of project management*" (Jiang, Chen and Klein 2002, p. 20).

According to Natalie Engler (1996), these are the steps, which need to be followed, by designers and management simultaneously during the development process:

- **Identify the correct user:** throughout this step the designer will define the full range of users and plan for gaining customer input, not just internal user input.

- **Involve the user early and often:**
  - Get the user involved in the development process at all stages (i.e. development, implementation and maintenance);
  - Rules and procedures should be established to motivate the users during the development process;
  - Educate and negotiate with the users regarding their roles and responsibilities - "*listen to the users' expectations, what does "involvement" mean to them*." (Engler 1996, p. 72);
  - Assign a Facilitator who comprehends the required relationship between designers, management and the users. On other words "*someone with a foot in both worlds*" (Engler 1996, p. 72).

- **Create and maintain a quality relationship:** this step can be achieved by meeting, understanding and listening very carefully to the users.

- **Make improvement easy:** finally, the designer needs to learn the following concepts with respect to the users:

- *Learn the user's language;*
- *Proactively solicit the user's opinions;*
- *Show the user that his/her opinions make a difference;*
- *Make sure there's a demonstrated benefit for user involvement.*

(Engler 1996, p. 72)

2.5.5 Some Problems with the Participative Approach

A participative approach is very practical and valuable to the designer and users simultaneously. It is considered "*an important mechanism for improving system quality and ensuring successful system implementation*" (Baroudi et al. 1986, p. 232) and "*is used to gather local intelligence about particular needs and difficulties at different project sites*" (Kawalek and Wood-Harper 2002, p. 18).

However, some system developers believe that a participative approach will create problems for the people who are involved in it, especially to the users. Participation in the system's development process can be seen as "*manipulative, will impair labor shedding, will entrench poor practice, can lead to poor design, is not cost-effective, and can be dysfunctional because it can lead to political problems*" (Lawrence et al. 1993, p. 195). Hirschheim (1985, p. 295) states that participation can lead "*to systems which are not only sub-optimal, but take much longer to develop, and is extremely difficult to operationalize"*.

According to Mumford, a participative approach can create a few problems for some of the people who are involved in the development process, particularly the users. For example, decrease in trust, conflict over election versus selection of representatives, conflicts of interest and stress. Key issues include communication and consultation; professional systems designer's role; and finally, the functional or departmental manager role. These problems can occur if the management did not determine the desires and requirements of the people who are involved in the development process, particularly the users.

To prevent and resolve these conflicts, the management needs to address two objectives: a) firstly, establish good communication mechanisms - for instance, establish a weekly group meeting to provide consultation and commutations skills; and b) secondly, the management must be in continuous contact with the users to confirm whether or not they are on the correct track with the development process. All problems need to "*be recognized, brought out into the open, negotiated and a solution arrived at which largely meets the interest of all parties in the situation*" (Mumford 1995, p. 25). Finally, Ives and Olson stated that "*much of the existing research is poorly grounded in theory or methodologically flawed; as a result, the benefits of user involvement have not been convincingly demonstrated*" (Cited in Hirschheim 1985, p. 295).

2.6 How We Know Our Users

This section will discuss the following aspects: defining who the users are in general; user's goals, activities, and environment; their special effects on usability specifications; and the techniques for observation of, and listening to, users.
In this research, two types of users are relevant to the website development process: end-users (internal to the client) and client-customers users (see Figure 1).

Users include "*those who manage direct users, those who receive products from the system, those who test the system, those who make the purchasing decision, and those who use competitive products*" (Preece et al. 2002, p. 171). The different types of users are very important concepts in this research as, through them, the interface can be developed in a way which meets their needs.

The rationale behind involvement of users in website development is: 1) to reduce time in implementation and testing stages; 2) to familiarize the end-users and client customers with the new system before the implementation; and 3) provide job satisfaction and meet the task effectiveness needs of the end-users and client-customers. A user-centered, task-based approach to system development is required as both User and Task analysis needs must be determined and analyzed very clearly

at the beginning of the development process, to prevent any problems with respect to high maintenance costs and user frustration. For example, to make the business booming and prosperous, the supplier needs to answer and meet user requirements regarding services, products and prices.

2.6.1 User Characteristics

In order to design effectively for users, there are a few user characteristics which need to be defined for any web project, such as "*Learning style, tool preference, physical differences and cultural differences*" (McCracken et al. 2004, p. 38). Unless the system is customizable by the users, then it is the 'average' or, most likely, characteristics of the target user population which need to be considered.

- **Cognitive and Learning Style:** Users will have different cognitive and learning styles. For instance, it is useful to distinguish between the user types "'*read then do' people or 'do then read*'" people (McCracken et al. 2004, p. 38). In other words, do your users want and expect full instructions before starting, or do your users directly work with the interface without any help and instructions?

- **Interface/Interaction Preferences:** the developer also needs to define user differences with respect to their preferred web interaction techniques (Pull down menu, Windows …etc) and pre-fined mode of interaction with the interface (Mouse or Keyboard). Other questions which need to be asked about the users include:

- *What computers, interfaces and browsers are users currently using?*
- *Do they always use the same ones or are they familiar with a range of versions?*
- *Where did they learn these tools? School? On-the-job training? On their own?*

- *How familiar are they with the tools? How often do they use them? When did they learn?*
- *Are they familiar with technology that is similar to your intended design? Do they understand frames? Pop-up windows? Search commands?*

(McCracken et al. 2004, p. 39)

Besides the above information, the designer needs to learn more about the user's knowledge and background in dealing with the interface; for example, are the "*users just starting to use the Internet?*" (McCracken et al. 2004, p. 39). If they are novices, it is better to observe them and to assess whether the interface will cause problems and frustration. This experience will help the researcher to find out about problems, which could cause frustration, and how these issues can be resolved before the implementation. Other user classifications relate to:

- **Physical Differences:** The designer needs to gather more information about the typical user, such as age, gender, color blindness, and other physical disabilities.

- **Application Domain Differences:** the designers should also collect more information about the background of their users. For example, if the designer needs to design a website for education, then the vocabulary is different from that used for users from different applications domains – dentists, architects or bankers and so on. According to McCracken "*What the 'default'"* means to a banker is different from what it means to a programmer. Using the appropriate vocabulary will prevent the user from being forced to ask, *"Is this the link I want?"* and will empower the user with the conviction, *"I want this link"* (McCracken et al. 2004, p. 41).

From all the possible types of user characteristics, a particular set of user classifications (taxonomy) must be selected for a specific website project. For instance, Turk (2001) recommends consideration of the following key user characteristics:

- *Age*
- *Culture*
- *Disabilities*
- *Education Level*
- *WWW/IT Experience*

(Turk 2001, p. 163)

The designer should consider these various user characteristics in relations to the design of the website, i.e. the level or particular option for each characteristic – for the average user (and the range) for the target user population. Moreover, more questions need to be asked of the users with respect to visiting a website, for example: the purpose behind visiting this website, how they will work with it, and if they are familiar with this website or ones similar to it. These questions will help the designer to gain more information about the users' knowledge of websites.

2.6.2 Knowledge of User Tasks

This stage in the design process focuses on the purpose behind using the website. For example, if the website is part of a formal work procedure, the designer could expect that the users will be well trained to work with the website. The designer also needs to know if their website-based activities will fit into the workflow of the users' business, and they need to understand "*what has been done before the work gets to them, and do they know what happens afterwards*" (McCracken et al. 2004, p. 42).

Consequently, designers should understand and recognize two things before they work with the users. Firstly, the designer needs to know the purpose behind visiting the website – is it (for instance) to gain information, shopping or entertainment? Secondly, the designer needs to gain more information about the users' job and the degree of "*familiarity they have [with] the basic tools of technology*" (McCracken et al. 2004, p. 42).

McCracken et al. (2004) suggest that it is important to understand the users' level of expertise. Users with the lowest level of expertise are termed "Novices". This type of user is "*learning a skill for the first time"*. Novices have a poor understanding of the parts of the website and typical use scenarios. Novices "*only recognize a few positions and have not developed any such sequences*" (Preece et al. 1994, p. 163). As a result, the purpose of visiting the website is often just to complete a particular task, which they believe will achieve their goals. More advanced users may be classified as follows:

- **Advanced Beginner:** this type of user "*is focused simply and exclusively on getting a job done as painlessly and quickly as possible*" (Hackos and Redish 1998, p. 82). These people are at the developing stage of expertise and they have knowledge of how to deal with this application and to go through it without any tribulations, especially when the steps are direct and easy to follow. However, these users will be very confused if there are many alternatives to choose from, and if they "*encounter difficulties, they have trouble diagnosing or correcting the problem*" (McCracken et al. 2004, p. 43).

- **Competent Performer:** these types of users are those "*who have learned a sufficient number of tasks that they have formed a sound mental model of the subject matter and the product*" (Hackos et al. 1998, p. 84). These people are willing to learn and study by themselves the principles of how to work with this website. These people may prefer working with the website (or system) via a user manual and documentation to accomplish their goals.

- **Expert:** these users "*perform the task automatically without consciously having to think about each move*" (Preece et al. 1994, p. 163). These people have the knowledge to perform a wider range of complex tasks and "*suggest solutions to problems"* (Preece et al. 2002, p.346). Experts can develop a "*repertoire of sequences of moves"* (Preece et al. 1994, p.163), unlike the novices who are able to utilize only a small set of use scenarios.

Preece et al. (2002) provide a further way of classifying users: the 'Primary users' who are likely *"to be frequent hands-on users of the system"*, while the 'Secondary users' are "*occasional users or those who use the system through an intermediary*, and 'Tertiary' users are those who *are affected by the introduction of the system or who will influence its purchase"* (Preece et al. 2002, p. 171).

2.6.3 Recruiting Users

With regard to users, "*a representative sample must be involved throughout the design process, from the very beginning*" (Cato 2001, p. 41), as they can help the designer not only in one stage but also in all the stages. Users need to be selected according to their profile of characteristics and according to the areas, which need to be tested in the interface or website. According to Cato, for "*observed testing trails, you need to carry out six individual test sessions with users to obtain meaningful and useful results. Recruit six users for think aloud tests, and twelve for co-participation*" (Cato 2001, p. 196). These sessions should be "*clearly focused, objective, fast and cost-effective*" (Cato 2001, p. 196). More users can be recruited for website testing by putting messages on appropriate bulletin boards, or via a recruitment agency.

When recruiting users for involvement in participative design, it is best to use real users who are dealing with the interface (i.e. website) very frequently. On the other hand, if real users cannot be recruited, the designer needs to work with "surrogates" such as students from universities and colleges who have an interest in working closely with the interface (i.e. websites) and who are reasonably representative of actual users.

Besides the above, designers need to include:

- *Members of the steering committee for the project;*
- *Members of [the] design team or workshops;*
- *Reviewers who access the user interface;*

- *Test users [for] usability tests,*
- *Test users who exercise the system at delivery time to check that everything works correctly; and*
- *Knowledge sources of how task and business procedures are currently carried out"* (Lauesen 2005 p. 474).

Preferably, the designer should work very closely with the users to understand why they will use the website and to know exactly how and why particular tasks occur (and in what sequence), the types of problems that are facing the users, and the reasons for these. The designer needs to keep in mind that neither the manager nor the developer will be the type of users working with this website (or system), as both of them are in a different category from the users who are dealing with the website as part of their day-to-day work.

Users who are not in the expert category need support and help (i.e. documentation) from the developer to know how to work with this website (or system) to achieve their goals. Help and support are very important to the users, as via this information, the users can figure out which steps are needed to carry out their task. Therefore, documentation should contain clear, sequential steps in the correct order to allow the users to work efficiently to achieve the target.

2.6.4 Techniques for Observing and Listening to Users

Users are the main source of information for developing an interface such as a website. Therefore, a designer needs to acquire this information to develop and build a website. According to McCracken, there are a few golden rules which need to be taken into consideration from the designer's perspective, which include listening to users, "*preferably in the context of the place where they will use your website*"; and talking to the people who "*use your website as part of the work they do on the job and to users who access your website without assistance or interaction with others, at home or work*" (McCracken et al. 2004, p. 44).

In this section, several techniques are discussed that will help the designer to gather more information about the users and their tasks. McCracken states, "*Users are in the business of doing their jobs, not explaining how they do their jobs, so simply asking 'How do you do your job?' will not give you the insights you need*" (McCracken et al. 2004, p. 49). Hence, appropriate techniques must be used in order to obtain information from users in an efficient and effective manner. Among the available techniques are: Interviews; Questionnaires; Think Aloud; Talk Right After; Protocol Analysis; Focus Group; and Mailed Surveys. They may be described as follows:

- **Interviews:** Set questions should be asked the users to gain more information about the system. Usually, the interviews occur face to face or via telephone. The purpose behind using this technique is to "*gain information about a system and how it is, or will be used" (*Bonharme[28] 1996). Generally three types of interview can be used:

  - **Unstructured**: are not directed by a script; data, it is rich but not replicable.
  - **Structured:** are tightly scripted, often like a questionnaire. Replicable but may lack richness.
  - **Semi-structured:** combine features of structured and unstructured interviews and use both closed and open questions. (Preece et al. 2002)

- **Questionnaires: "***Collecting users' subjective opinions about a system can remove unpopular and unusable parts early in the design or after delivery. While interviews provide qualitative data, surveys and questionnaires provide quantitative data which can be statistically analyzed*" *(*Bonharme[29] 1996). Generally, two types of questions can be used - open or closed.

[28] Bonharme: http://www.dcs.napier.ac.uk/marble/Usability/Evaluation.html
[29] Bonharme: http://www.dcs.napier.ac.uk/marble/Usability/Evaluation.html

- **Open Questions**: the user is free to provide his/her own answer; however, open questions *are difficult to analyze in any rigorous way, or to compare, and can only be viewed as supplementary* (Dix et al. 1998, p. 433) .
- **Closed Questions:** the user is asked to select an answer from a choice of alternative responses. For example, "*there are several rating scales to choose from including, 3-point (yes/no/don't know), ranked order (numbering the options in order of preference), and bi-polar (good/bad)*" (Bonharme 1996).

- **Think Aloud:** This technique is very simple and easy to use. It involves asking users to comment on their activities and aspects of the interface while working. This technique was developed by Erikson and Simon for investigating people's problem-solving strategies, and is known as "*cooperative evaluation as the user sees himself/herself as a collaborator in the evaluation and not simply as an experimental subject"* (Dix et al. 1998, p. 427). This technique requires people "*to say out loud everything that they are thinking and trying to do, so that their thought processes are externalized"* (Preece et al. 2002, p. 365). The role of the designer is very important as s/he tries to keep the users talking while they are working at their task, whatever that task is, be it simple or difficult. The most important aspect of this technique is to listen very careful to the users discussing the work, their experience and the environment in which they work. One drawback of this technique is that "thinking aloud" consumes some of the users' cognitive capacity and hence may inhibit their use of the system, biasing the results.

- **Talk Right After:** This technique can be used as an alternative to "Think Aloud" technique as some users cannot speak to the designer while they are working, for example a "*travel agent, who is helping someone with questions, can't speak to the designer and the customers simultaneously*" (McCracken et al. 2004, p. 50). Therefore, to prevent any disruption to the user's performance of the task, the designer can take notes about the tasks and later s/he can discuss it with the user.

- **Protocol Recoding:** There are a number of methods and techniques for recording user actions, for example:

  - **Paper and Pencil:** This is a low-technology technique, but a cheap and simple method for collection information from the user. This method "*will allow the designer to note interpretations and extraneous events as they occur.* However, this method has limitations in obtaining "*detailed information as it is limited to the analyst's writing speed*" (Dix et al. 1998, p. 428).
  - **Audio and Video Recording:** In this technique, the user will be taped during his/her work, and later, the designer will study this tape and take notes of the user's activities. Therefore, this technique is very sensitive and responsive, so the user should be informed in this case, to avoid ethical problems.
  - **Computer Logging:** is to get the system "*automatically to record user actions at a keystroke level"* (Dix et al. 1998, p. 428).

- **Focus Group:** This technique is very common in marketing, political campaigning, and social science research. In this technique, a small number of people (between 5-10 users) gather together to discuss a number of prepared questions. A mediator runs the meeting. The most important issue is that actual users should be involved in this step to provide more information and to bring consideration of real problems into the discussion. Normally, the session runs for an hour to an hour and a half.

  The **advantages** of using this technique are:

  - Focus group is low cost and easy to do. In addition, it provides quick results and is easy to scale to gather more data.

  The **disadvantages** of working with this technique are:

  - Facilitator needs to be skillful so that time is not wasted on irrelevant issues.
  - Serious problems can occur if one or two people dominate the entire discussion; therefore, the information will be gathered only from two

instead of all the users (Preece et al, 2002). Therefore, an "*effective facilitator will attempt to draw everyone into the discussion but will not always be successful*" (McCracken et al 2004, p. 51)

- **Mailed Surveys:** This technique is cheaper for distribution to the users who are dealing with the interface. However, a lot of disadvantages can occur while working with this technique, for example: (McCracken et al. 2004)

  - Takes a lot of skill to write questionnaires that will obtain the information you want;
  - Some groups may interpret the questionnaires in their own way and this will affect the results at the end;
  - Very few people respond to the mailed survey and this will affect the results

- **Web Surveys:** are "*powerful tools for maintaining respondent interest in the survey and for encouraging completion of the instrument"* (Couper, Traugortt and Lamias 2001, p. 251). This technique is self-administered and involves computer-to-computer communication over the internet, by asking the users to respond to the survey by clicking on radio buttons and adding additional comments in a specific area within the survey regarding the survey questions. Couper et al. (2001, p. 246) states, "*Radio buttons are preferred because this allows mouse-only entry*. In addition, "*radio button version would take less time to complete than the entry box version, given the added burden of typing numbers versus clicking a button*". Web surveys are cost savings, speedy with "*high response rate*" (McBurney and White 2007, p. 245) compared with the previous techniques since they are "*designed so as to provide a more dynamic interaction between respondent and questionnaire than can be achieved in e-mail or paper surveys*" (Dillman 2007, p. 354). However, conducting webs surveys can be difficult to people who did not have knowledge and access to Web.

- **Field Study:** Field studies are "*done in natural settings with the aim of increasing understanding about what users do naturally and how technology*

impacts them" (Preece et al. 2002, p. 342). Field studies help the designers to identify opportunities for new technology, determine requirements for design, facilitate the introduction of technology, and evaluate technology. Furthermore, field studies get the team "*immersed in the environment of their users and allow them to observe critical details for which there is no other way of discovering*" (Spool[30], 1997).

The designer must consider carefully the data requirements before an interview (or other data gathering technique) is conducted with the users. The designer needs to address the following issues before the interview:

- Understanding the concepts behind the interface;
- Defining the issues, which need to be clarified from the user such as - tasks, problems, and procedures, which need to be followed to accomplish a specific task.

Throughout the above stages, the designer will gather some information about the interface itself, the tasks, problems and the steps to accomplish the tasks. If the information does not meet their requirements, then it may be better to apply an alternative information gathering technique before moving to the next step in the methodology.

2.6.5 Internet Marketing and User Responses

There are other ways of determining website users' needs and desires. Internet marketing is a new approach, where customers can define "*what information they need, what offering they are interested in, and what price they are willing to pay"* (Sheth, Eshghi, and Krishnan 2001, p. 6).

[30] Spool: http://www.uiconf.com/8/articles/field_studies_article.html

According to Hoffman et al. (1996, p. 51), the Internet is an important focus for marketers for several reasons:

- *Consumers and firms are conducting a substantial and rapidly increasing amount of business on the Internet;*
- *The market prefers the decentralized, many-to-many Web for electronic commerce to the centralized, closed-access environments provided by the online services;*
- *The World Wide Web represents the broader context within which other hypermedia CMEs (Computer-Mediated Environment) exit;*
- *The Web provides an efficient channel for advertising, marketing and even direct distribution of certain goods and information services.*

Consequently, Internet marketing is using the Internet and web as a medium to provide information to customers globally. Since it changes rapidly, with new tools being developed to attract more customers to use it, it is important to establish the requirements for interactive marketing. This depends on three issues- "*direct communication, individual choice and friendly technology*" (Hanson 2000, p. 95). These address the requirements by learning about each customer's attitudes and behaviors.

In the Internet, there are several tools that can be used by the user to gain more information about specific products or by asking the user to give some feedback about the products. Examples of these tools are: user response form, forums, and chat rooms. These tools have two advantages: 1) they encourage the user to provide feedback about the website layout or asking questions about the products in general; 2) they reduce the web master's job by posting all the answers in one place, thereby allowing the users to check the answers from one place.

- **User response form:** this type will allow the user to enter his/her message or checking some fields "*can vary from checkbox type responses to the provision of text areas*" (Darlington 2005, p. 65). Some systems will be capturing the data from the user response and sending the answer to the user via the e-mail.

- **Forums:** are called 'bulletin boards' or 'newsgroups'; this type of facility provides discussion forums for people with similar interests. For example, "*they can also serve as a source of feedback as someone can start a discussion by posting comments about a subject another person may answer, to be followed by other people joining and so on, so a thread of linked messages develops"* (Darlington 2005, p. 66).

- **Chat rooms:** are called Internet relay chat (IRC) channels and "*allow groups of people to exchange live text messages"* (Darlington 2005, p. 67).

- **Blogs:** are called "Web log" or "blogging"; this type of facility has the ability to create an online text diary, "*made up of chronological entries that comment on everything from one's everyday life to wine and food to computer problems*" (Jessup and Valacich 2008, p. 210). This facility can give an easy method of "*publishing web pages which can be described as online journals, diaries or news or events listings*" (Chaffey 2007, p. 99).

2.7 Conclusion

This chapter has outlined the basic concepts involved in Human Computer Interaction, usability and user participation in the system development process. These considerations are very useful to the business community, as they help to increase the efficiency of their staff, and thus, their profits. Hix et al. (1993, p.5) state, "*HCI is a new and exciting field of endeavor devoted to answering the question of how best to make this interaction work*". Hix (et al.1993) comment that this term focuses not only on the system itself, but also on the need to take into consideration usability evaluation which:

> …."*includes user interface hardware and software, user and system modeling, cognitive and behavioral science, human factors, empirical studies, methodology, techniques, and tools. The goal of most of the work in human-computer interaction is in one way or*

> *another, to provide the user with a high degree of usability"* (Hix et al. 1993, p. 5).

Finally, Human Interaction is a very important issue, which needs to be considered by the website designer and management simultaneously to attract more customers and enhance facilities. In addition, "*motivating user interaction is an important challenge for on-line marketers as the knowledge accumulated on their potential clients depends directly on their willingness to interact (*Spiekermann, Paraschiv 2002, p. 256).

The next chapter examines the various types of lifecycle models and methodologies for developing information systems and web sites, and for marketing methodologies. It will identify the strongest stage of each of these methodologies and examine the advantages and disadvantages of each. This will lead the researcher to establish the basis of the new participative framework for developing websites.

CHAPTER THREE

MODELS AND METHODOLOGIES

3.1 Overview

Chapter Two discussed the value and the meaning of Human Computing Interaction (HCI) and its usefulness in designing user interfaces and websites. HCI "*is a set of processes, dialogues, and actions through which a human user employs and interacts with a computer*" (Preece 1994, p. 7). The role of the users in the system development process was also emphasized.

This chapter examines the various types of models and methodologies for developing systems (including websites), which may incorporate such HCI processes, usability, and Internet marketing issues. It assesses the advantages and disadvantages of each methodology and analyzes the differences between them in order to develop the framework for a new participative methodology. To produce a successful "system" (or website), both designers and users should be working collaboratively. Such user participation has to be facilitated by a system development methodology consisting of a clear sequence of stages and steps to be followed by the designer and participating users. The Olle et al. (1998) approach of breaking a methodology into stages and steps will be adopted in this research to facilitate the design process by breaking down the activities into several major stages and smallest parts into steps (within each stage).

3.2 Introduction

In order for systems (or websites) to be widely accepted and used effectively, they need to be well designed. To achieve this, designers and users need to use a specific

methodology to produce the "system" (or website). A sound methodology is a very important component of the system development process, in order to produce a new system which meets the user's requirements. A methodology "*should tell us what steps to take, in what order and how to perform those steps but, most importantly, the reasons, 'why' those steps should be taken, in that particular order*" (Jayaratna, 1994 p. 242).

The term "methodology" is used significantly in information systems development, as each methodology should have a set of stages and steps, which need to be followed in sequence if the work is to be done successfully. 'Stage' is a "*convenient breakdown of the totality of the information systems life cycle activity"* (Olle Hagelstein, Macdonald, Rolland, Sol, Assche, and Verrijn-Stuart. 1998, p. 21), while 'step' is "*the smallest part of a design process*" (Olle et al. 1998, p. 21).

The sequence of the stages may not always be fixed, but it *"does suggest that there is a strict time scale applicable to all situations"* (Olle et al. 1998, p. 30). In some projects, iteration between stages will occur and this may have a range of impacts on the methodology, as an iteration may *"take different forms and thus impact differently on what one can do with a methodology"* (Olle et al. 1998, p. 30).

The main demand is for methodologies that can lead to improvements in the following three aspects according to Avison and Fitzgerald (1993, p. 264):

- *A better end product*
- *A better development process*
- *A standardized process*

For that reason, a designer needs to understand users' requirements for the project before choosing the methodology, in turn to successfully complete the work and to accomplish profitable results.

In this chapter, the researcher will discuss various types of models and methodologies, including: lifecycle models; IS development methodologies; methodologies with explicit human factors aspects; websites methodologies;

marketing methodologies; and additional techniques, such as task analysis and detailed website design and implementation. There are numerous similarities in respect to the stages between methodologies for developing information systems, websites, or marketing strategies. Integrating stages from information systems methodologies into website and marketing methodologies is very beneficial in order to develop websites that are more effective and efficient. Human factors experts should be involved in these methodologies to make sure that transaction processes, tracking, maintenance and updating of the website meet the users' requirements.

Firstly, the researcher will discuss the methodologies in this sequence to identify two aspects: 1) the stages needed for the system development process; and 2) the four key principles (user participation, usability, iteration, real interaction), in order to check the availability of these four key principles in IS development, website and marketing methodologies – (see Section 3.3.8). The system's development cycle will be discussed in order to identify the stages.

Secondly, the stages of information systems development methodologies will be checked to assess how effectively they match the four key principles at each stage and to identify the strongest stage in each methodology. Thirdly, for the website and marketing methodologies, the researcher will: check the availability of techniques covering the four key principles in these methodologies; list the extra stages which will be added to the new methodology; and identify the strongest stage in each methodology.

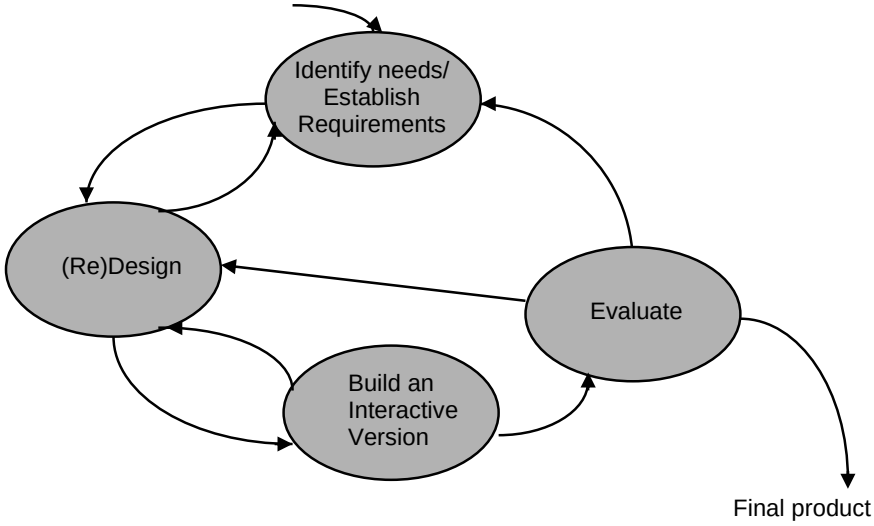
Finally, additional techniques (i.e. task analysis and detailed website design and implementation) will be discussed. The chapter will also identify any extra stages, which will be added to the new methodology, such as navigation, promotion and staff training. Such additional detailed techniques will play a key role in the new methodology, as most of the existing methodologies have neglected these.

3.2 Users

As was indicated in the previous sections, user participation is considered essential, to the development process of a website. This research identifies two types of users: end-users and client customer-users (see Figure 1). The two types of users and the client management will be working simultaneously with the designers (Internal and External) in order to meet the requirements for developing a website. Involving the users in the development process brings major benefits to the business: 1) it will reduce time and effort especially in the implementation and testing stages; 2) it provides an accessible and user friendly website.

3.3 Lifecycle models

The term 'lifecycle model' is used to represent a model that captures a set of system development activities and how they are related (Preece et al. 2002). The more sophisticated lifecycle models inform the designer about when and how to move from one activity to the next and provide a description of the deliverables for each activity.



Source: (Preece et al. 2002, p. 186)

Figure 7: A simple interaction design model

These lifecycle models are popular since they allow developers, and particularly managers, to get an overall view of the development effort so that processes can be tracked, deliverables specified, resources allocated, targets set and so on. As indicated by Figure 7, some lifecycle models include iteration - this *"model incorporates iteration and encourages a user focus"* (Preece et al. 2002, p. 186).

The stages in a typical development lifecycle model for interaction design are:

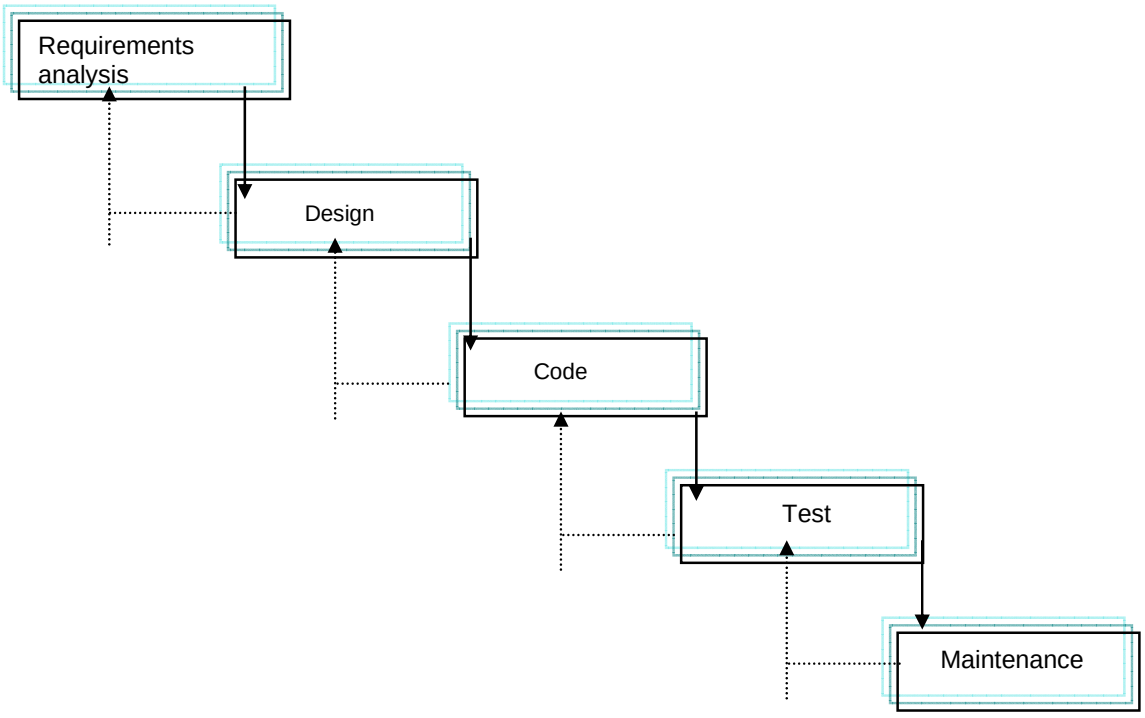
- Define the requirements;
- Prepare some alterative designs, which meet the needs, and requirements that have been identified previously;
- Select a preferred solution;
- Test and evaluate the design ;
- Iterate, if necessary. This option can be used either before or after the evaluation stage.

This section discusses and compares a historical sequence of increasingly complex models (i.e. Waterfall Lifecycle Model, Spiral Lifecycle Model and Rapid Applications Development) which focus on interaction design and adopt the general approach of the development Life Cycle Model.

Furthermore, two models will be discussed in this section from the Human Computer Interaction perspective, the Star Lifecycle Model and Usability Engineering. The former focuses on how the designer addresses Human Computer Interaction design problems, while the latter "*shows a more structured approach and hails from the usability engineering tradition*" (Preece et al. 2002, p. 192).

3.3.1 The Waterfall Lifecycle Model

Figure 8 shows the stages in the Waterfall Lifecycle Model. This model is basically a linear model where each stage must be completed before the next stage can be started. For example, requirements analysis has to be completed before design can begin. However, iteration can occur at each stage.



Source: (Preece et al. 2002, p. 187)

Figure 8: The Waterfall Lifecycle Model of software development

This lifecycle model is divided into five sequential stages, which may be described as follows:

- **Requirements Analysis:** this stage begins when an organization seeks to add, improve or correct a system, which is not meeting the requirements of the users. The requirements specification should be captured by the designer in consultation with users to know "*what the eventual system will be expected to provide, and how the system will provide the expected services*" (Dix et al. 1998, p. 181)

- **Design:** this stage will allow the designers to define the system specifications for the components, such as hardware and software, screen layouts, and documentation.

- **Code:** this stage involves converting design and system specifications into "*executable programming language"* (Dix et al. 1998, p. 182).

- **Test:** this stage will allow the users to test the new system to ensure that *"the system meets their requirements"* (Dix et al. 1998, p. 183).

- **Maintenance:** this stage involves the "*correction of errors in the system which are discovered after release and the revision of the system services to satisfy requirements that were not realized during previous development*" (Dix et al. 1998, p. 183).

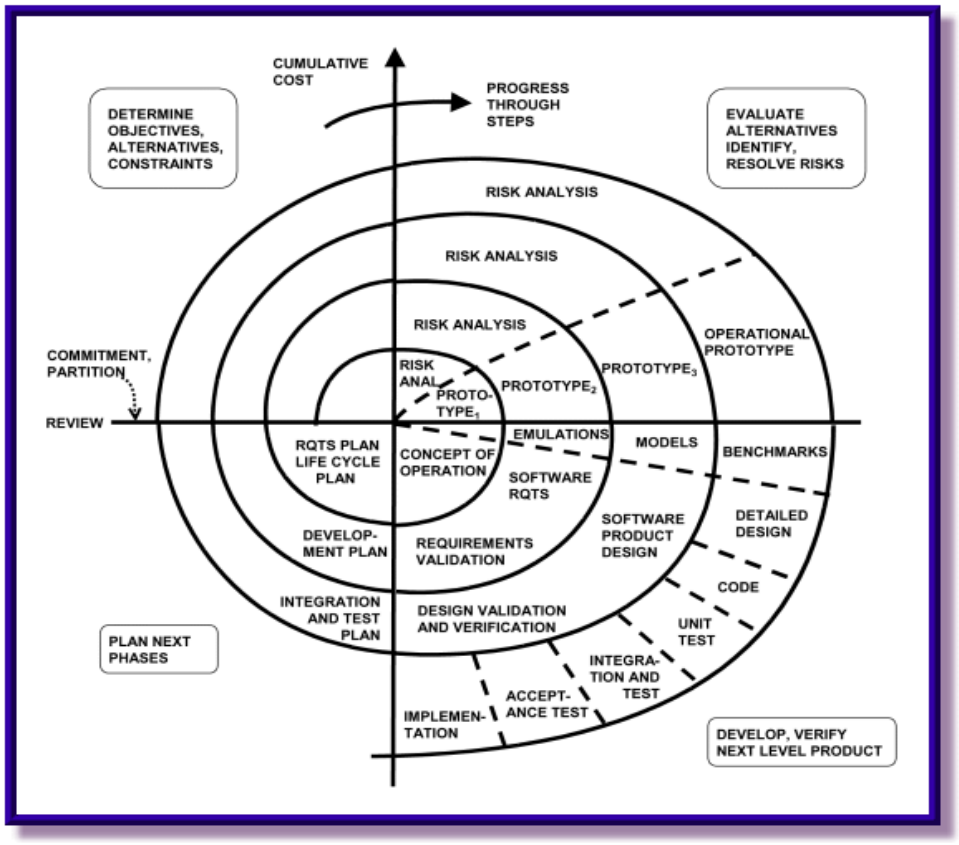
One of the main flaws with this model is "*that requirements change over time, as businesses and the environment in which they operate change rapidly*"; hence, it "*does not make sense to freeze requirements for months or years, while the design and implementation are completed*" (Preece et al. 2002, p. 188). In addition, although a limited (between stages) iteration option is available in this model, the opportunity to constantly review and evaluate a proposed system with users is not included.

In practice, developing a website by using the waterfall model is complex since most of the users are not "*clear how they would want the site to look*" (Darlington 2005, p. 34). To solve this problem, prototyping should be introduced since it can help to identify the website layout and the potential problems in the early stages "*functional requirements; navigational issues and visual aspects can also be clarified with the aid of a prototype*" (Darlington 2005, p. 34).

3.3.2 The Spiral Lifecycle Model

For many years, the Waterfall Lifecycle Model was considered the most popular model for the system development process. However, in 1988 Dr. Barry Boehm introduced the Spiral Lifecycle Model (see Figure 9). This model combines the waterfall model with an element called "risk analysis". It is divided into three major stages: 1) planning - to define the objectives, alternatives and constraints; 2) Risk Analysis - for each of the alternatives solutions risks are identified and analyzed; and

if this information is not enough, then the prototyping approach will be adopted, before finally, 3) Engineering the solution.



Source: (Boehm and Hansen[31] 2001)

Figure 9: The Spiral Lifecycle Model of software development

This structured model is very useful as the customer can decide whether any one phase has been completed to his/her satisfaction before the next phase can commence. S/he may elect, if the risks are unacceptably high, to terminate the project. In addition, client evaluation can also be incorporated to check whether or not the system is developing according to their needs.

This model is very useful for large and complex development processes. The regular feedback from the customer allows for any necessary changes to be acted upon immediately. It incorporates steps to identify and controls risks. This model

[31] Boehm and Hansen: http://www.stsc.hill.af.mil/crosstalk/2001/05/boehm.html

"*explicitly encourages alternatives to be considered, and steps in which problems or potential problems are encountered to be re-addressed*" (Preece et al. 2002, p. 188). However, if not all aspects of risks are discovered in time, problems will surely occur, thereby leading to the need to repeat the procedures from the beginning, and failure to meet the deadline for accomplishing the project. User involvement is not clearly defined in this model.

3.3.3 Rapid Application Development (RAD)

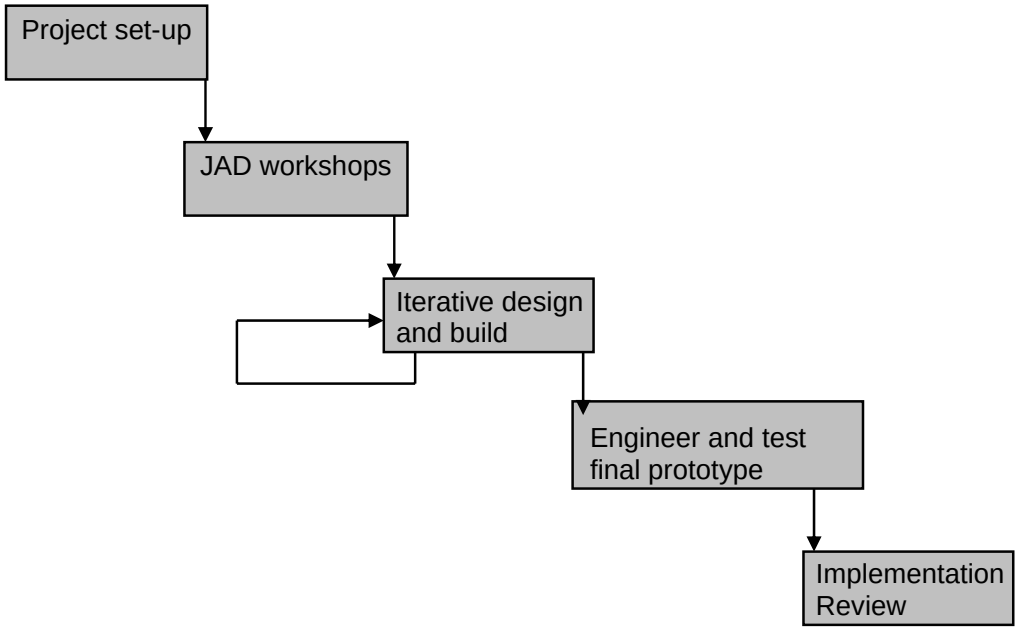
This model attempts to take a user-centered view and to minimize the risk caused by requirements changing during the course of the project by completing the stages as rapidly as possible. This model has five stages (see Figure 10) and each must be completed before the next stage can be started. However, an iterative approach is incorporated, requiring the developer to go "*back to the original data to gather and check the requirements*" to determine whether or not it is supporting the user's tasks (Preece et al. 2002, p. 64). RAD added two new key features to the previous development models: Time Boxing and Joint Application Development workshops.

- **Time Boxing** breaks down a large project into many smaller projects. This will allow the designers to deliver the products incrementally and enhances flexibility in terms of the development techniques used and the maintainability of the final system.

- **JAD (Joint Application Development)** workshops between the users and developers are used to gain more information about any difficult issues that are faced and for decisions about system design to be made.

This model also specifically incorporates user testing of prototypes; however, it lacks maintenance of the implemented system. The prototyping in this model should be used to evaluate the system design and to identify the potential problems without any haste. Rapid development and manipulation of a prototype should not "*be mistaken*

for rushed evaluation which might lead to erroneous results and invalidate the only advantage of using a prototype in the first place" (Dix et al. 1998, p. 207).



Source: (Preece et al. 2002, p. 190)

Figure 10 : A basic RAD lifecycle model of software development

3.3.4 Systems Development Life Cycle

Kendall proposed the Systems Development Life Cycle in 1992. This lifecycle is a "*project management technique that divides complex projects into smaller, more easily managed segments or phases*" (FFIEC IT Examination Handbook 2005[32]). The segmentation of projects is a very useful method as it allows the designers and analyst to check if the previous stages have been successfully completed before moving to the next stage. This life cycle is very constructive and useful as it prevents any tribulations to the designer, analysts and users towards the end of the project.

This development life cycle is divided into eight sequential stages (phases), with each needing to be completed before the next stage can be started. The stages are:

[32] FFIEC IT Examination Handbook 2005: http://www.ffiec.gov/ffiecinfobase/booklets/d_a/08.html

- **Initiation Phase:** this stage (phase) begins when an organization decides to add, improve, or correct a system, which is currently not meeting the requirements and needs for the organization and user simultaneously. Consequently, the management needs to define the following requirements before moving to later system development phases:

    - *Business Considerations (i.e. goals, objectives, budget and legal issues);*
    - *Functional Requirements (i.e. user requirements, hardware and software requirements and backup);*
    - *Project Factors (i.e. project and risk management methodology, and estimated completion dates and costs);*
    - *Cost/Benefits Analysis (including both tangible and intangible benefits and costs).*

    (FFIEC IT Examination Handbook 2005[33])

All these requirements need to be considered and support documentation prepared before moving to the planning phase.

- **Planning Phase:** this stage (phase) is very significant as both designers and analysts need to study the requirements very carefully. Throughout this stage, the management needs to address the following items before shifting to the next phase: *"communication, defined deliverables, control requirements, risk management, change management, standards, documentation, scheduling, budget, and testing and staff development"* (FFIEC IT Examination Handbook 2005).

- **Design Phase:** this stage (phase) allows both the designers and analysts to carry out the design of the new system utilizing the requirements identified by the previous two phases. In this phase, initial prototyping is used to build mock-up designs of items such as applications screens, database layouts and system architectures. This initial design needs to be reviewed by the users,

[33] FFIEC IT Examination Handbook 2005: http://www.ffiec.gov/ffiecinfobase/booklets/d_a/08.html

designers, analysts, network administrators and database managers to make sure it meets the requirements. The initial prototyping design is an iterative process, which means the system will remain in the stage and be reviewed by the participants *"until they agree on an acceptable design"* (FFIEC IT Examination Handbook 2005).

- **Development Phase:** this stage (phase) *involves converting design specifications into an executable program* (FFIEC IT Examination Handbook 2005[34]).

- **Testing Phase:** this stage (phase) will allow the users to test the new system to ensure the accuracy of *"programmed code, the inclusion of expected functionality and the interoperability of application and other network components"* (FFIEC IT Examination Handbook 2005).

- **Implementation Phase:** this stage (phase) will involve installing the new system into the real world environment. In addition, the users' training session for the new system will be carried out.

- **Project Evaluation:** this stage (phase) will allow the management to evaluate and review the "*completion of the project objectives and assess project management activities*" (FFIEC IT Examination Handbook 2005).

- **Maintenance Phase:** this stage (phase) involves changes and the correction of errors in the hardware, software, and documentation, which are discovered after the implementation stage.

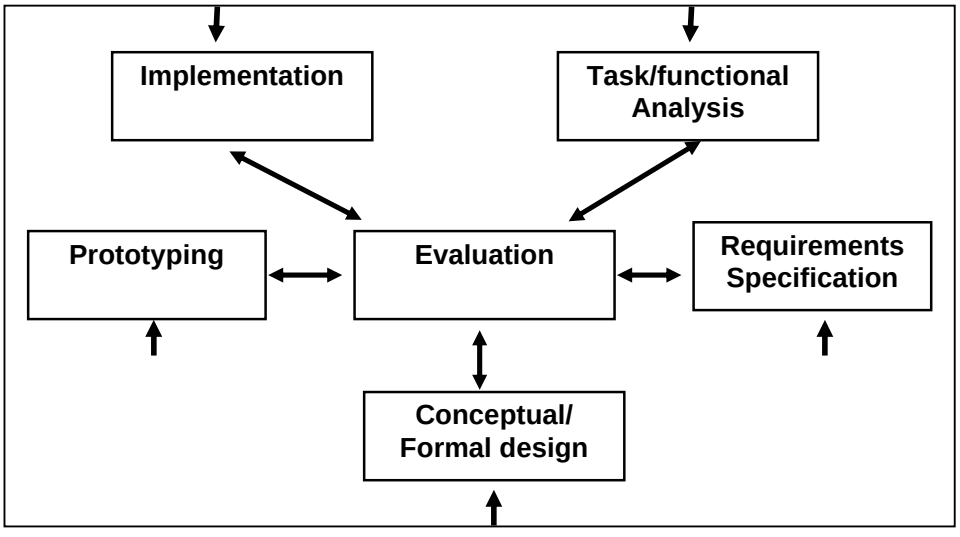
According to L. Peters (1988), this life cycle is a systematic breakdown of the software development process, "*… A Software Life Cycle is both a management and a technical tool for organizing, planning, scheduling and controlling the activities associated with a software development and maintenance effort*" (cite in Jayaratna

[34] FFIEC IT Examination Handbook 2005: http://www.ffiec.gov/ffiecinfobase/booklets/d_a/08.html

1994, p. 33). However, this life cycle does not allow for significant review and iteration between the stages; this means that suppleness and flexibility for responding to the particular needs of a specific project are missing. It also lacks detailed arrangements for user involvement at all stages.

3.3.5 The Star Lifecycle Model

The Star Lifecycle Model was proposed by Hix et al. (1993) to address Human Computer Interaction issues in system development in a more flexible way. This model incorporates two different modes of activity: the analytic mode and the synthetic mode. The former is described by concepts such as top-down, organizing, and working from the system view towards the user's view. While the latter is described by concepts such as bottom-up, free thinking, creative and working from the user's view towards the systems view (Preece et al. 2002 and Hix et al. 1993). The Star Lifecycle Model is extremely flexible and popular, especially with managers, enabling them to get an overview of the "*development effort so that process can be tracked, deliverables specified, resources allocated, targets sets and so on*" (Preece et al 2002, p. 193)



Source: (Preece et al. 2002, p. 193)

Figure 11: The Star Lifecycle Model

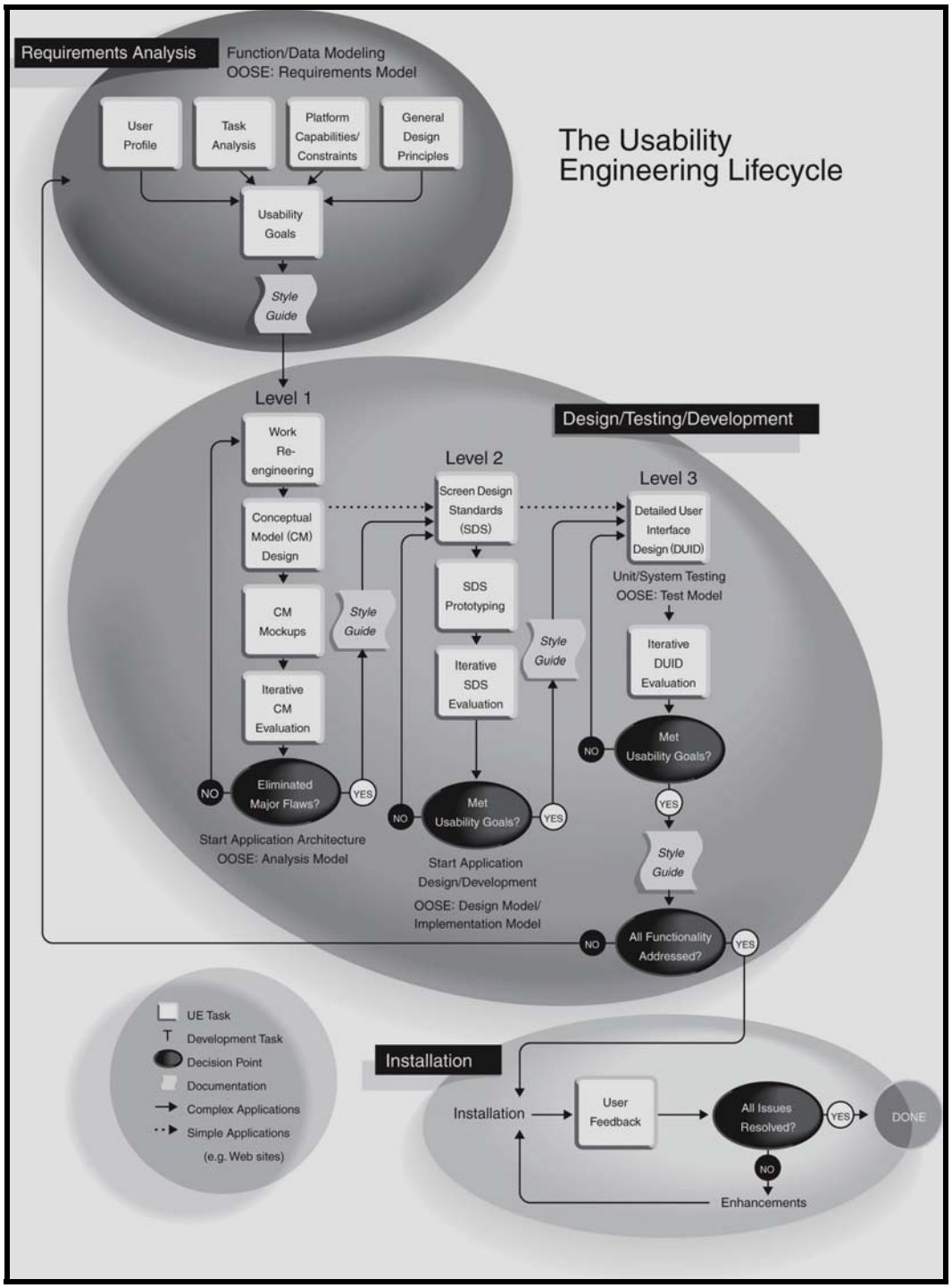
The star lifecycle model can be adopted in any system development process and the developer can move from any activity to any other without any specific order as the "*activities are highly interconnected"* (Preece et al. 2002, p. 193). The evaluation activity (see Figure 11) is at the centre of this model, since, before moving to another activity, one need to pass through the evaluation activity to evaluate the result from the previous activity. This model can be used for defining requirements for a new system, or for evaluating an existing situation and analyzing existing tasks. However, this lifecycle is very general and does not explicitly incorporate procedures for user participation or for system design and maintenance.

3.3.6 The Usability Engineering Lifecycle

Deborah Mayhew proposed the Usability Engineering Lifecycle in 1999, and the purpose of this model is to focus more on how usability design and evaluation tasks may be performed alongside more traditional software engineering activities (Preece 2002).

This lifecycle model presents a "*menu of choices that can be worked into the broader development context in order to increase usability"* (Instone[35] 2004). It has three main aspects: requirements analysis, design/testing development, and installation (see Figure 12). The production of a set of usability goals is the main aspect of the first stage since "*these goals [are] captured in a style guide that is [then] used throughout the project to help ensure that the usability goals are adhered to"* (Preece et al. 2002, p. 195). The middle stage in this model is the largest and most complex stage as many subtasks are involved to produce a detailed design. The final stage involves installation and user feedback.

[35] Instone: http://www.w3j.com/5/s3.instone.html



Source: (Mayhew 2003)

Figure 12: The Usability Engineering Lifecycle

The most important elements in the Usability Engineering Model are experiential user testing and prototyping, combined with iterative design. *"Because it's nearly*

impossible to design a user interface right the first time, we need to test prototype and plan for modification by using iterative design" (Nielsen 1992, p. 13).

It is anticipated that, via this life cycle, the software engineering discipline "*will embrace and incorporate usability engineering and it will become widely institutionalized in development organizations, similarly to how software engineering methodologies in general have become institutionalized"* (Mayhew 1999, p. 33). However, this explicitly 'human factors' approach is not easily integrated into the more general technical aspects of other models. This needs to be accomplished by operationalizing the model by using a methodology.

3.3.7 Summary of Lifecycle Models

Several stages were discussed in the lifecycle models section. The stages that are essential for the development of an information system, interface, or website, can be summarized as: planning, analysis, design, testing, implementation, evaluation and maintenance. These stages are vital if the designer is to develop an interface or website which meets the user requirements and needs. However, the models need to be opertationalized as detailed methodologies. As discussed in Chapter 2, a critical aspect of systems development is effective HCI; hence, methodologies must adequately address this aspect. Four key principles (user participation, usability, iteration, real interaction) are identified as fundamental aspects in order to develop systems in an effective manner by involving users from the beginning.

3.3.8 Four Key Principles

After studying the lifecycle models, it was decided that this research would benefit from identification of a set of key principles, which would match the research questions. These principles were chosen to address the main deficits identified in existing website development methodologies. Hence, four key principles were established as the main foundation for this research - so as to produce a new

methodology which will assist in development of websites with high usability, thereby:

- Involving the users in the design from the beginning;
- Avoiding frustrations for the users (End-user and Client-Customer)
- Making the website more approachable, friendly and interesting;
- Winning the trust of the site visitors by meeting users' requirements.

The four key principles are:

- **User participation:** the main purpose is to allow user participation in the website development process to gain more information about the problems, elicit alterative solutions from the users, and familiarize them with the website before it is released;

- **Usability:** to confirm that the website design is efficient, effective, safe, has utility, is easy to learn and easy to remember, usable, practical, provides job satisfaction, and incorporates performance measures that effectively assess the users requirements and requests;

- **Iteration:** to allow for effectiveness and self-correction, this approach will assist the designers to build up the new website and ensure that the project will be tested repeatedly until it meets users' requirements;

- **Real Interaction:** the designer will track users' behavior to present statistics and useful information to demonstrate what attracts or repel users. This can be achieved by adding two options to the web: 1) feedback form to outline users' needs; or 2) adding a counter to a webpage, which will provide detailed statistics (log file) to the designer. Information obtained will include which "*Web pages are viewed most often, which domains request Web pages, and what paths users follow as they navigate through a site* (Lazar 2006, p. 44).

In the subsequent sections, the presence of these aspects will be reviewed for each methodology. The rating used for these four key principles will be from 0 to 3. The

former presents zero availability while the latter is the maximum. Ratings of 1 and 2 indicate that these aspects are covered in a minimal or moderate way, respectively.

3.4 Information Systems Development Methodologies

System development lifecycle models may be opertationalized using methodologies. Information systems development methodologies (ISDM) are an "*organized collection of concepts, methods (or techniques), beliefs, values, and normative principles supported by materials resources"* (Iivari, Hirschheim, and Klein 2001, p. 186). The main purpose behind using an ISDM is to guide the designer in performing the work by following specific stages in sequence. When developing a system or website, the analyst needs to study the different types of methodologies in respect to their similarities and differences and select the methodology which best meets the project requirements.

Avison et al. (1993) describe the status of information systems development methodologies as a "methodology jungle". This status of ISDM is "*an unorganized collection of numerous methodologies which are more or less similar to each other"* (Hirschheim[36], Iivari, and Klein 1998). It was estimated that more than "*1000 brand-named methodologies are in use all over the world*" (Jayaratna 1994, p. xvii).

It is very difficult for the designer to review the vast array of existing ISDM and check which methodology will accomplish the work to be done. Therefore, the most important aspect of developing a new methodology is "*to understand the existing stock and the collective methodology knowledge embedded in them*" (Hirschheim et al. 1998). A new methodology should not merely duplicate an existing one but should offer some positive improvement. Consequently, this research will develop a new participative methodology for developing websites by embedding and grafting

[36] Hirschheim: http://www.bauer.uh.edu/parks/fis/sad5.htm.

stages from various methodologies (Jayaratna 1994) such as those for developing information systems, websites and marketing plans.

Various types of methodologies will be discussed in this section from perspectives of the information systems, human computer interaction, and websites: Structured Systems Analysis and Design Methodology (SSADM); Soft Systems Methodology (SSM); User-Centered Development Methodology; and ETHICS. These methodologies have been chosen for assessment as they cover a range of perspectives, which are likely to address the four key principles identified above.

Such methodologies lay out specific stages to be undertaken and incorporate a range of principles from the lifecycle models discussed in the previous section. This will be presented in a table at the end of each methodology section to address two aspects: 1) checking the level of availability of techniques covering the four key principles in each stage of the methodology; 2) identifying the strongest stage for each methodology.

This information will help the researcher in two aspects: 1) to recognize the importance of these four key principles in particular methodologies; and 2) to select stages that will promote the structure of the new participative methodology for developing websites.

3.4.1 Structured Systems Analysis and Design Methodology (SSADM)

This methodology gives the designer "*very detailed rules and guidelines to work to*" (Avison et al. 1993, p. 191), and "*techniques, documentation and training procedures for developing information systems*" (Avison, Wood-Harper 1990, p. 181).

This methodology is classified into two major parts: three stages of systems analysis and three stages of systems design. The purpose behind this classification is to

"*make it easier to judge the proportion of time to spend on analysis"* (Avison et al. 1993, p. 192). Thus, this methodology is divided into six sequential stages, each of which needs to be completed before the next can be started. The stages are as follows:

- **Analysis of the current system:** investigate and define the problems of the current system.

- **Specification of the required system:** define the aims and services of the new system.
- **User selection of service levels, including technical options:** this stage focuses on users' participation and a feasibility study.

- **Detailed data design:** to define data and the relationships between them, to ensure that the data model meets the requirements of the individual users and the client organization.

- **Detailed procedure design:** this stage is the trial design for the system. The prototype can be paper-based. It is used by the user to check the trial design to see if it is working according to the requirements.

- **Physical design control:** develop the system from the paper prototype to an implemented system. The users can use it and test the final system.

One of the main flaws of this methodology is that it cannot adequately "*address the problem of project control and estimating costs directly through the incorporation of project management tools*" (Avison et al. 1993, p.202-203). In addition, there is limited provision for iteration between stages and maintenance is missing.

Table 1 indicates that user participation is moderate in the analysis stage. There is only a minimum rating for user participation and iteration aspects in the design stage to ensure that the data outcomes meet user requirements. Usability and real interaction aspects are rated as zero for each stage of this methodology.

The strongest stage in the SSADM methodology is the design stage. This stage will help to identity the data and the relationships between them and produce the trial design for the system. The trial design will be checked by the users to assess if it is working according to users' requirements and requests.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance
User Participation	0	2	1	2	0	0	0
Usability	0	0	0	0	0	0	0
Iteration	0	0	1	0	0	0	0
Real Interaction	0	0	0	0	0	0	0
Strongest stage in SSADM	-	-	☑	-	-	-	-

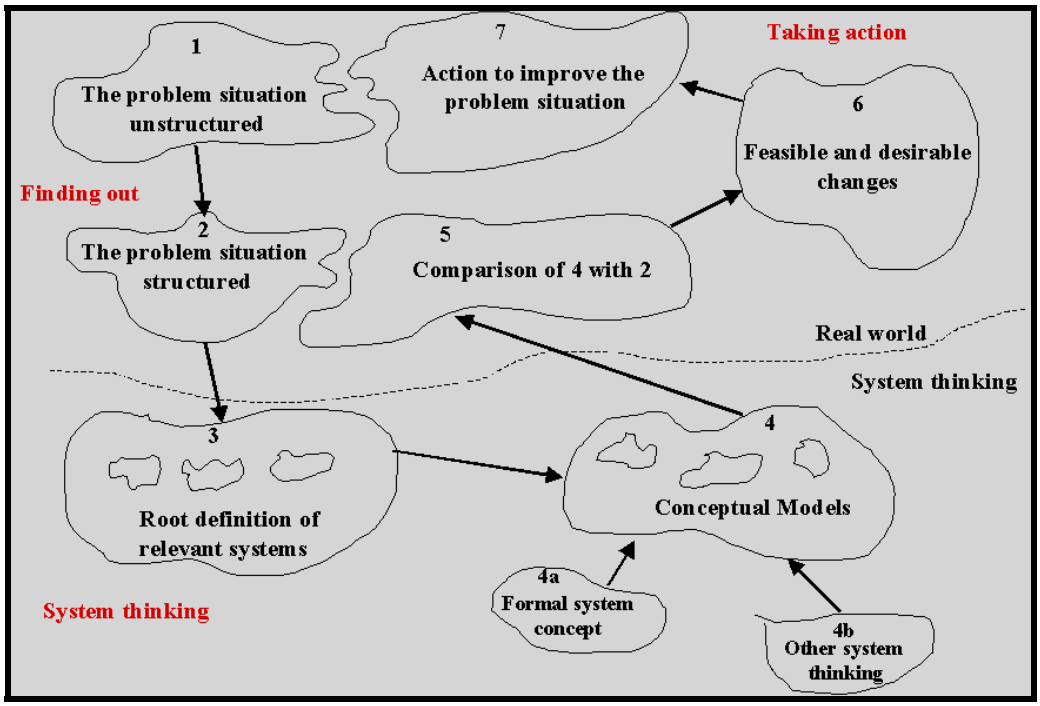
Table 1: Structured Systems Analysis and Design Methodology (SSADM)

3.4.2 Soft Systems Methodology (SSM)

Checkland proposed the Soft Systems Methodology (SSM) in 1981. SSM provides a "*way of tackling messy situations in the real world"* (Checkland and Scholes 2003, p.1). A powerful argument in favor of SSM is that it "*has been found to be transferable to people beyond those who developed it, and has been used in several hundred projects around the world*" (Rosenhead and Mingers 2002, p. 112).

According to Checkland, the SSM methodology involves three roles: client, problem solver and problem owner. The 'client' "*is the person or persons who caused the study to take place*" (Checkland and Scholes 1990, p. 47), while, the 'problem solver' "*wishes to do something about the situation in question, and the intervention had better be defined in terms of their perceptions, knowledge and readiness to make resources available*" (Checkland et al. 1990 p. 47). The 'problem solver' is responsible for turning the proposals for change "*into real-world action in doing the study*" (Checkland et al. 1990 p.48). The 'problem owner' is the person/group for whom the system has consequences.

This methodology is divided into seven sequential stages (see Figure 13), where each stage must be completed before the next stage can be started.



Source: (Checkland et al. 2003, p. 27)

Figure 13: Traditional SSM Seven Stages

The stages are as follows:

- **Problem Situation Unstructured (1):** the purpose of this stage is to define the problem and to gain more information and understanding of the problem in general; for example, the SSM practitioner is required to recognize the organization's objectives and policies. This can be achieved by meeting the members of the organization and gaining as much information as possible about the organizational structure and culture.

- **Problem Situation Structured (2):** at this stage, the analyst evaluates the problem situation from "*different angles and from the point of view of different stakeholders, in other words, looking at the situation from*

different worldviews" (Horrian[37] 2001). The stage has several steps: intervention analysis, social and cultural analysis, political analysis, rich picture and utilizes formal and informal methods.

- **Intervention Analysis:** this step will help the analyst to define the three roles through which they will learn more about problem situation in general:
  - Client: "*is the person or persons who caused the study to take place"* (Checkland et al. 2003, p. 47).
  - Problem solver: defines the problem solver, resources and the constraints
  - Problem owner: *no one is intrinsically a problem owner. The problem solver must decide who is to take [the role of] possible "problem owner"* (Checkland et al. 2003 p. 47). In addition, the problem owner is the entity "*who has a feeling of un ease about a situation, either a sense of mismatch between 'what is' and 'what might be' or a vague feeling that things could be better and who wishes something were done about it"* (Checkland 1981, p. 294).

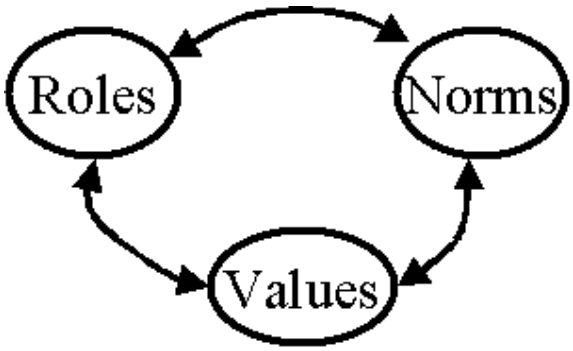
- **Social and Cultural Analysis:** this step will help the analyst to know more about the internal policies of the organization and the motivation and features of their job that effect the perspective of an individual. Under this stage, the analyst needs to think about relevant Roles, Norms and Values (see Figure 14), as these behaviors nor are fixed, they changed "*steadily through time, sometimes slowly sometimes remarkably quickly"* (Checkland 1981, p. 231) according to the situation:

[37] Horrian: http://sern.ucalgary.ca~hhorrian/seng613/CritiqueSSM.html

- **Roles:** "*a social position recognized as significant by people in the problem situation"* (Checkland et al. 2003, p. 49)

- **Norms:** is a "*specific prescriptions and proscriptions of standardized practice*" (Checkland 1981, p. 231).

- **Values:** is an "*express preferences, priorities or desirable states of affairs*" (Checkland 1981, p. 231).



Source: (Checkland et al. 2003, p. 49)

Figure 14: Social and Cultural Analysis Entities

- **Rich Picture:** is a graphical representation and communication model between the analysts and users to understand system problems and how they can be solved.

- **Formal and Informal Methods:** this step will help the analyst to collect more information about the system by using various methods, informal and formal, such as work observation, interviews and workshops and discussions.

➢ **Naming of Relevant Systems (3):** the purpose of this stage is to involve system-thinking activities. In other words, this stage will involve "*formulating of root definitions to a number of relevant systems*" (Checkland et al 2003, p. 33). This stage has several steps, such as root

definition and CATWOE analysis, which are very important steps as they focus on the human activity systems.

- **Root Definition:** Checkland et al (2003, p. 33) define root definition as a way to "*expresses the core purpose of purposeful activity system*". In other words, the core purpose is the transformation process in which some entity 'the input' changes into a new form of entity 'the output'. There are two kinds of Root Definition supported in SSM: 'Primary Task Root Definition' and 'Issue based Root Definition'. The latter is concerned with one-off occurrences (such as a management restructuring), while the former is part of regular activities in the organization.

- **CATWOE Analysis:** is a way to provide the analyst with the structure of the real world situation by answering questions such as *"who is doing what for whom, and to whom are they answerable, what assumptions are being made, and in what environment is it happening?*" (Avison et al. 1993, p.247). In other words, *"a root definition meeting CATWOE requirements would have driven us more quickly towards aspects which with hindsight we know were finally crucial; we got there in the end, but with CATWOE we should have been quicker"* (Checkland 1981, p. 226). According to Checkland et. al (2003 p. 35), CATWOE stands for:

  - C: "Customers": the victims or beneficiaries of system activities;
  - A: "Actors": people who do the activities;
  - T: "Transformation": the conversion of input to output;
  - W: "Weltanschauung": the world view which makes this definition meaningful;

- O: " Owners": those who can close the system or stop the event from happening;
- E: "Environment": elements outside the system which it takes as given.

Two of the major things, which need to be considered, are the T (Transformation) and W (Weltanschauung). The analyst needs to take care with respect to the T (Transformation) as it is "*frequently misunderstood, and the systems literature is full of inadequate representations of system inputs and outputs*" (Rosenhead et al. 2002, p. 74). Moreover, the W (Weltanschauung) might be extreme, such as a "*terrorist system" or "freedom-fighting system"* (Checkland 1988 p. 244). Therefore, it is essential to declare a "*world view when giving an account of any purposeful activity*" (Checkland 1988 p. 244).

- **Building the Conceptual Model (4):** this stage is unique and important as it is considered the core of the SSM methodology. It is now required to establish the system requirements from the information, which was gathered from the previous stages. The Conceptual model is a used as "*debating point so that the actors can relate the model to the real world situation. Usually there is a conceptual model drawn for each root definition and the drawing up of several root definitions and conceptual models becomes an iterative process of debate and modification towards an agreed root definition and conceptual model*" (Avison et al. 1993, p.247). The stage has several steps: formal system thinking and monitoring the system.

  - **Formal System Thinking:** serves as a guideline for checking the conceptual model to determine whether or not it meets the user's requirements.

  - **Monitoring the System:** this step will assist the analyst to monitor the system by defining three activities: 1) evaluating

the performance in respect to efficacy, efficiency and effectiveness; 2) monitoring the activities in relation to the problem definition; and 3) taking control action.

- **Comparison (5):** In this stage, the analyst will compare the conceptual models developed in stage four (4) with the definition of the problem situation in stage two (2). The purpose behind this comparison is to define and analyze the differences and similarities between the model and the real world in order to have a "*well-structured and coherent debate about a problematical situation in order to decide how to improve it*" (Checkland et al. 2003, p. 42).

- **Definition of Desirable and Feasible Changes (6):** this stage is important as the analyst will define those changes that are most feasible and desirable, bearing in mind such considerations as cost and benefit behind the change. It is very important to take into consideration these issues especially before the implementation stage in order to have positive outcomes, which meet the system needs.

- **Recommended Action (7):** this stage defines the changes to the system, and these recommendations should have the approval of the top level in the management before the implementation.

This methodology is a flexible process, as most of the stages can be iterated within the process if improvement is needed. The Soft Systems Methodology seeks to "*create a system of enquiry which may be used to examine problem situations and lead to action decisions at both the level of what is required, and how the requirement can be met* (Cropley and Cook 1999, p. 4).

The SSM methodology was created to support human factors activities in complex existing and new systems. SSM is useful for two reasons: 1) it "*bring clarity to confused situation and finding systems solutions in the world of human affairs"* (Checkland 2000, p. 807 and 813); 2) it helps an organization to develop their

systems to be "*less fragmented, less random, more organized, more capable of generating insights and producing commitments*" (Checkland 2000, p. 823).

This methodology is not appropriate for all situations, as it requires a large gathering of information and often it involves human factors in various stages of the methodology. This methodology is useful when the objectives for the new system need to be clearly defined and clarified and perhaps the most important issue is how the objectives can be accomplished, via a high-level approach.

However, this methodology does not provide for the development of detailed specifications or testing of the system, especially regarding technical aspects. It handles organizational human factors well but does not address detailed design or evaluation of user interfaces.

Table 2 indicates that user participation is moderately well utilized in the early stages. Iteration is available in all of the stages with minimum availability to assess if improvement within the system is needed. In contrast, there is a zero rating for usability and real interaction in this methodology. The strongest stages in SSM methodology are planning, analysis and design. The planning stage examines the nature of the requirements for change and assesses how to address them. The analysis stage will require the analyst to perform the following: 1) evaluate the problem from different angles and from the view of different stakeholders; 2) evaluate the internal policies of the organization; 3) present a graphical presentation (called "rich picture") to the current situation to understand the problem in the system and how to solved it; 4) more informal and formal tools will be used to collect information about the system through. observation, interviews; workshops and/or discussion. While in the design stage, a small number of considerations should be addressed to identify the purpose behind establishing this system such as: 1) what the system is; 2) how the system will work; and 3) the purpose behind using this system. In addition, users will be involved in the system design and participate in the decision-making.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance
User Participation	**1**	**3**	**2**	**0**	**0**	**0**	**0**
Usability	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Iteration	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Real Interaction	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Strongest Stage in SSM	☑	☑	☑	-	-	-	-

Table 2: Soft Systems Methodology (SSM)

3.4.3 User – Centered Development Methodology

Another methodology, which may be used to develop successful user interfaces for information systems, is the User-Centered Development Methodology. From the denotation, we learn that this method focuses on involving the user in the process as much as possible, with the ambition that the interface should meet the user's expectation. This can be achieved by user participation within the process activities, such as "*observing users while they work, inviting users to participate on the design team and asking users to try out the product and following up on their feedback"* (McCracken et al. 2004, p. 5).

This methodology involves numerous stages, which focus on "*gathering information, designing, building and testing of a prototype of the interface"* (McCracken et al. 2004, p. 5). It is divided into eight sequential stages, with each needing to be completed before the next stage can be started. The stages may be described as follows:

- **Needs Analysis:** defining the purpose of developing the interface (or website).

- **User and Task Analysis:** defining the users' type and the type of work users will do with the user interface or the website. User and Task analysis focuses on user's goals and their activities, which are carried out

by them to achieve their goals. For example, user analysis needs to define: age, education level and user computer knowledge. Task analysis examines user goals. McCracken et al. (2004, p. 7) states that "*many products fail because the development team didn't take the time to find out who their users are or what they want to do*".

- **Functional Analysis:** defining the functions, which will be available in the interface. Through these functions, the users will define their activities in order to achieve their goals.

- **Requirements Analysis:** defining the "*formal specifications (i.e. Data Dictionaries, Entity-Relationship Diagrams, and Object-Oriented Modeling) required to implement any system, including websites*" (McCracken et al. 2004, p. 7).

- **Setting Usability Specifications:** defining what usability means for the interface. For example "*performance measure (i.e. "number of tasks completed", "number of errors" "first impression" and "overall Satisfaction*") (McCracken et al. 2004, p. 7).

- **Design:** defining the appearance of the interface, which means, defining the content of the interface and to "*organize it according to your user's exceptions*". The design "*includes the layout of individual pages and how to use visual organization techniques to create clarity and consistency between pages*" (McCracken et al. 2004, p. 7).

- **Prototyping:** developing the initial version of the interface. Prototyping can be classified as evolutionary or throw-away. "*Evolutionary, means that the prototyping becomes part of the final project*", whilst throw-away prototyping "*serves only as a pattern for implementation, and you can throw away the prototyping once the interface is complete*" (McCracken et al. 2004, p. 8).

- **Evaluation:** testing the interface by using expert-based evaluation and/or user–based evaluation. According to McCracken "*expert- based evaluation can be achieved by using a group of usability experts to critique the prototype*" whilst user-based evaluation can be performed by asking "*users to perform representative tasks with the prototype*" (McCracken et al. 2004, p.8). Formative evaluation means "*evaluation done during design to check that the product continues to meet users' needs*" (Preece et al 2002, p. 323).

This methodology is "*highly iterative and involves as much testing and revision as possible*" (McCracken et al. 2004, p. 5). This cycle of repetition can occur in the design, prototype and evaluation steps, and will be successively run until the interface meets the usability specifications. The most important step is to take into consideration user goals and their tasks, as by missing this step, the results will be unsuccessful and unproductive. On the other hand, two basic concepts are missing in this methodology – that is, implementation and maintenance stages. It is also focused on the detail of user interface design without examining the overall relationship between social and technical aspects of the proposed system.

Table 3 demonstrates that the four key principles are available in numerous stages with ratings raging from minimum to maximum. User participation is incorporated in analysis, design, testing and evaluation stages. Testing and evaluation stages are important to ensure that the system meets user requirements. Iteration has minimum rating in design; testing; and evaluation stages. Usability aspects are well covered to ensure user satisfaction with the interface. Finally, the real interaction has zero rating in this methodology.

The strongest stages in the User-Centered Development Methodology are analysis, design, testing and evaluation. The analysis stage will help the analyst to identity the user's type, goals and the activities, which are carried out by them to achieve their goal. The design stage will define the appearance of the interface. Testing and evaluation stages are included in this methodology, as the interface will be tested by expert-based and user-based evaluation to ensure that the interface or website meets user's requirements.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance
User Participation	**0**	**1**	**1**	**1**	**0**	**2**	**0**
Usability	**0**	**0**	**3**	**3**	**0**	**3**	**0**
Iteration	**0**	**0**	**1**	**1**	**0**	**1**	**0**
Real Interaction	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Strongest stage in UCDM	-	☑	☑	☑	-	☑	-

Table 3: User-Centered Development Methodology (UCDM)

3.4.4 ETHICS Methodology

Mumford defines a specific methodology with high levels of stakeholder participation called "ETHICS", standing for "*Effective Technical and Human Implementation of Computer-based Systems*" (Mumford 1995, p. 3). Designers need to involve the user from the beginning, to keep focused on the target audience, to evaluate their activities, and to see if they "*address the needs of the contemporary consumer*" (Boyer 1999, p. 113). Users, through involvement in the development process, may be able to help to "*shape design decisions in ways that deal with their concerns or make their work easier*" (Doll et al.1989, p. 1156).

Participation is central to the ETHICS methodology as Mumford defined it as "*handing responsibility for the design of a new system to the employees who eventually will have to operate it*" (cited in Flynn 1992, p.300). Two arguments were established from this definition. The first argument is user participation, which needs to be a part of the system development process, whether it be a new or existing system, so that decisions can be made which concern the purpose of the new system. User involvement in the design task can be through groups: "*Involvement requires the creation of participative groups, and decisions on the amount and nature of their contribution to the total design process must therefore be made*" (Mumford 1995, p. 50).

The second argument is the socio-technical approach that is mainly focused on increasing the ability of the individual to "*participate in decision taking and in this*

way to enable him/her to exercise a degree of control over the immediate work environment" (Mumford 1996, p. 70). This approach was created by the members of the Tavistock Institute for two specific reasons: to create "*democratic organizations that are excellent in both human and production terms*" (Mumford 1996, p. 73) and to consider the interaction between the social and technical parts of any work system.

User involvement in the system development process, according to Mumford, "*produces productivity, quality, coordination and control; but also provides a work environment and task structure in which people can achieve personal development and satisfaction*" (cited in Flynn 1992, p. 301). Designing and implementing the social–technical approach is not an easy task, as it requires involvement from the users and management simultaneously. Furthermore, this approach requires "*training, information, good administration and skill"* (Mumford 1996, p. 77). By adopting these approaches in the new system development process, the outcomes will offer benefits in respect to users' job satisfaction and success of an enterprise.

ETHICS is "*pragmatically oriented and relies for its success on the practical abilities and the commitment of the participants to arrive at consensus decisions. It aims to build computer-based information systems which provide job satisfaction and met the efficiency needs of the organization"* (Jayaratna 1994, p. 152).

The ETHICS methodology has three objectives focusing on the management of change. These objectives concentrate on the users and their participation in the computer system. Firstly, the users play a major role in the design of the system, to enrich both job satisfaction and efficiency gains. Mumford said user groups with job satisfaction are able to cope with the required job changes and are "*better able to diagnose their own job satisfaction needs than any outside group of specialists*" (Mumford 1995, p.3). An efficiency gain concentrates on user knowledge and the experience in dealing with these interfaces. This experience can be gained by dealing with these interfaces daily, learning about the user needs and system problems. Therefore, users can make a "*useful contribution to the specification of the former and the solution of the latter*" (Mumford 1995, p. 3).

Secondly, the users are encouraged to contribute to the system design, to define and set satisfaction objectives and to supply additional information to the designer to aid in solving the problems within the system. In addition, the user can contribute his/her experience to explanations of "*usual technical and operational objectives*" (Mumford 1995, p. 3).

Thirdly, the ETHICS methodology can help ensure that the new technical system is surrounded *"by a compatible, well-functioning organizational system"* (Mumford 1995, p. 3). This objective is covered by the following concepts:

- *Design of work procedures and instructions, for individual work or within groups;*
- *Define the relationship between the departments or functional areas which the new system will affect;*
- *The creation of good boundary management techniques;*
- *Focus on internal and external customers needs.*

(Mumford 1995, p. 4)

The ETHICS methodology (see Table 4) is basically a linear model where each stage must be completed before the next stage can be started. It involves definition of a set of system characteristics including: why change is needed; systems boundaries; description of the existing system; definition of the key objects and tasks; key information needs; diagnosis of efficiency needs; diagnosis of job satisfaction needs; design of the new system; technical options; preparation of detailed design work; and, implementation and evaluation (Jayaratna 1994).

- *Identifying user needs and problems, focusing on short- and long-term efficiency, job satisfaction and quality;*
- *Setting efficiency, effectiveness, and job satisfaction and quality objectives;*
- *Developing a number of alternative design strategies which will assist the chosen efficiency, effectiveness, job satisfaction and quality objectives;*
- *Choosing the strategy which best achieves all of these objectives;*
- *Choosing hardware and software, and designing the system in detail;*
- *Implementing the new system;*
- *Evaluating its success once it is operational.*

Source: (from Mumford 1995, p. 28)

Table 4: ETHICS methodology stages

This methodology recommends many guidelines which are useful for "*the understanding and the design of human-centered systems*" (Jayaratna 1994, p. 174), and to achieve improvements in efficiency, effectiveness and job satisfaction in the work environment. ETHICS is a "*participative design strategy and so employees and users will always be involved in analyzing needs and problem and deciding on solutions"* (Mumford 1995, p. 78*).*

However, the main flaws of this methodology are its inability to handle the *"interpersonal and political conflicts that may arise from opening up human feelings and emotions"* and its lack of any means, *"of discussing or resolving many of the ethical dilemmas that could arise in system development"* (Jayaratna 1994, p. 174). Also, it is quite hard for unskilled users to do the design work appropriately when using this methodology. This methodology does not incorporate iteration between stages, for detailed technical analysis and design or for maintenance.

Table 5 reveals that user participation is dominant in this methodology, to enrich both job satisfaction and efficiency gains. However, there are zero ratings for usability, iteration and real interaction in this methodology. The strongest stage in the ETHICS methodology is the analysis stage. This stage defines the user needs and problems, which allow the analyst to develop a system which meets the users' requirements and their objectives.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance
User Participation	2	3	3	3	3	3	3
Usability	0	0	0	0	0	0	0
Iteration	0	0	0	0	0	0	0
Real interaction	0	0	0	0	0	0	0
Strongest stage in ETHICS	-	☑	-	-	-	-	-

Table 5: Ethics Methodology

3.4.5 Summary of Information Systems Development Methodologies

After investigating some key information systems development methodologies and comparing them with the four key principles for the new participative framework for developing websites, we illustrate with Table 6 that the four principles are not available in every stage of these methodologies.

For example, in the **Structured Systems Analysis and Design Methodology (SSADM)** only user participation and iteration stages are available in the design stage, while there is a zero rating for usability and real interaction. The strongest stage in SSADM methodology is the design stage, as this stage will help to define the data and the relationships between them and produce the trial design for the system.

In the **Soft Systems Methodology (SSM),** numerous techniques for user participation and iteration are available, while there is a zero rating for usability and real interaction. The strongest stages in the SSM methodology are analysis and design. The purpose behind the analysis stage is to evaluate the situation from different angles, and to collect more information to understand the system problem, so as to solve it. The main focus of the design stage is to determine the purpose of establishing this system and involving the user in system design and decision-making.

User-Centered Development Methodology is different from the above methodologies as the four key principles are available in various stages with different ratings, ranging from minimum or maximum availabilities. The most dominant key principle in this methodology is usability to ensure that the interface is easy to learn, easy to use, and with less error frequency, while the real interaction has zero rating in this methodology. The strongest stages in the User-Centered Development Methodology are analysis, design, testing and evaluation. The analysis will define the type of user(s) and their goals and activities, while the design stage will define the development of the interface. Experts and users combine testing and evaluation phases in one stage to test the interface.

Finally, with the **ETHICS Methodology,** only the user participation aspect is available, to enhance both job satisfaction and efficiency gains, while zero ratings are given for usability, iteration and real interaction. The strongest stage in the ETHICS Methodology is analysis, as via this stage, the analyst will define the users' needs so as to allow the new system to meet their requirements.

In summary, Table 6 indicates that the four key principles are represented in some methodologies with maximum, minimum, moderate, or in some methodologies, zero availability.

-

Structured Systems Analysis and Design Methodology (SSADM)							
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**
User Participation	0	2	1	2	0	0	0
Usability	0	0	0	0	0	0	0
Iteration	0	0	1	0	0	0	0
Real Interaction	0	0	0	0	0	0	0
Strongest Stage SSADM	-	-	☑	-	-	-	-
Soft Systems Methodology (SSM)							
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**
User Participation	1	3	2	0	0	0	0
Usability	0	0	0	0	0	0	0
Iteration	2	2	2	2	2	2	2
Real Interaction	0	0	0	0	0	0	0
Strongest stage SSM	☑	☑	☑	-	-	-	-
User Centered Development Methodology (UCDM)							
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**
User Participation	0	1	1	1	0	2	0
Usability	0	0	3	3	0	3	0
Iteration	0	0	1	1	0	1	0
Real Interaction	0	0	0	0	0	0	0
Strongest stage UCDM	-	☑	☑	☑	-	☑	-
Ethics Methodology							
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**
User Participation	2	3	3	3	3	3	3
Usability	0	0	0	0	0	0	0
Iteration	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	0	0
Strongest stage Ethics	-	☑	-	-	-	-	-

Table 6: Summary of Information Systems Development Methodologies

Table 7 illustrates the strongest stages from the Information Systems Development Methodologies analyzed in this chapter and lists the rating availability for the four key principles in each stage. After reviewing the information systems development methodologies and studying each stage, it was noticed that implementation and maintenance were not considered the strongest stages for any of these methodologies, since the main focuses of these methodologies are:

- Defining the system problem and clarifying users' needs for the new system;
- Evaluating the current situation and collecting more information to solve the system problem;
- Defining the relationships between the information and produce the trial designs for the system;
- Testing and evaluating the system to ensure that it meets the users' requirements.

Stage	Information Systems Development Methodologies	Principles			
		User Participation	Usability	Iteration	Real Interaction
Planning	Soft Systems Methodology	1	0	2	0
Analysis	Soft Systems Methodology (SSM)	3	0	2	0
	User Centered Development Methodology (UCDM)	1	0	0	0
	Ethics Methodology	3	0	0	0
Design	Structured Systems Analysis and Design Methodology (SSADM)	1	0	1	0
	Soft Systems Methodology (SSM)	2	0	2	0
	User Centered Development Methodology (UCDM)	1	1	3	0
Testing	User Centered Development Methodology (UCDM)	1	1	3	0
Implementation	-	-	-	-	-
Evaluation	User Centered Development Methodology (UCDM)	2	1	3	0
Maintenance	-	-	-	-	-

Table 7: Summary of Strongest Stages in Information Systems Development Methodologies

However, techniques for effective implementation and maintenance of information systems are included in other (more technical) information system development methodologies not considered above. Since the objective is to develop a

methodology for websites, it will be more effective to seek implementation and maintenance techniques targeted to websites. This is addressed in the next section.

3.5 Methodologies for Developing Web Sites

There are many similarities between methodologies for developing information systems and web sites. However, there are also differences. In this section, a range of methodologies from the websites perspective will be discussed in detail, including: Human Factor Methodology for Designing websites; Relationship Management Methodology (RMM); W3DT Design Methodology; Information Development Methodology for the web; and the Web Site Design Method (WSDM). This discussion will define the stages, which need to be carried out, by the designer and users in order to design a website, which meets the user requirements. Most stages focus on: feasibility, navigation, deployment, promotion and measurement of usability and effectiveness.

At the end of each methodology, the researcher will present a table showing: 1) the ratings for the four key principles in each stage within the methodology; 2) the strongest stage for each methodology for developing web sites; and 3) the extra stages available in each methodology. These extra stages will add effectiveness to the new participative methodology for developing websites, and partly reflect the differences between ISDM and website development methodologies.

3.5.1 Human Factors Methodology for Designing Web Sites

Vora (1998) describes a methodology which provides for the development of effective HCI for websites, with the main task being to have a clear understanding of user needs, with particular attention given to: the types of users and their characteristics; and their specific tasks and environments. Vora also focuses on other

important issues in the framework: maintenance, evaluation (expert), and iterative testing (feedback).

This methodology focuses on the human interaction perspective in designing a website. It is basically a linear model where each stage must be completed before the next stage can be started. The stages are as follows:

- **Planning:** the designer needs to answer the following question "*Why design a Web Site?*" (Vora 1998, p. 155). The stage has several steps: defining the goals; identifying content owners and authors; understanding the users and environments; and finally, the most important aspect is to understand very precisely the users' needs.

- **Analysis:** during this stage, "*decisions are made about both content and process*" (Vora 1998, p. 156). 'Content' refers to the material necessary to meet identified user tasks, addressing the information needs. The 'process' refers to how the information should be maintained and how "*interactive aspects of the websites are handled behind the scenes so that they are transparent to users*" (Vora 1998, p. 156–157).

- **Design and Development : "***information gathered in the earlier stages is translated into actual design"* (Vora 1998, p. 160)

- **Usability Testing:** the key to a successful system or (Website) is iterative testing. This testing should occur not only in the final stage, but also in every stage to ensure that the system is on the correct track.

- **Implementation:** this stage is very practical and straightforward, as the designer will transfer the system (or website) to a specific location, to be used by the real user.

- **Maintenance:** this stage is very important. The designer and content providers need to provide up-to-date information on the site to make

sure that the changes meet the user needs and to make the site more interesting and useful for the users.

However, this methodology does not specify user participation except in testing and planning. Users can also play a key role in defining content. According to Mayhew, these concepts are very important, especially from the users' perspective, as "*One of its great weaknesses, … is its lack of quality control for both the content and for presentation*" (Mayhew 1998, p. 2). Furthermore, a procedure for addressing user disabilities was missing in Vora's methodology as "d*esigners should keep in mind that the target population includes millions of potential users of Web pages who have various handicapping sensory and physical conditions*" (Laux 1998, p. 87).

Table 8 shows that usability and iteration are the main aspects available in the Human Factor Methodology for Designing Websites. Usability is a very important aspect in this methodology with moderate to maximum rating to ensure that the website meets users' requirements in respect to performance and satisfaction. Iteration is available with minimum and moderate ratings in most stages, to ensure that the system is on the correct track. With respect to user participation, it is available only in the planning, testing and evaluation stages with minimum rating, to identify user goals and understand their environments, and to test the product and make sure it meet users' desires. Finally, the real interaction is available only in the analysis and maintenance stages with moderate to maximum rating to ensure that the website has met users' requirements and - the most important aspect - to make it attractive and approachable to the users.

In the Human Factor Methodology for Designing Websites, there are five strong stages: planning, analysis, testing, evaluation and maintenance. Planning and analysis are essential stages. The former will define the users' goals and examine the environment very carefully in order to meet the users' needs. The main areas of focus of the analysis stage are content (materials to suit user tasks) and process (how information should be maintained). In this methodology, the testing stage is iterative involving "expert evaluation", which means experts will evaluate the website and suggest solutions to problems. Finally, the maintenance stage is also important in this methodology. To make the website more interesting and to attract more users to

visit it, designer and content providers need to provide up-to-date information in the site.

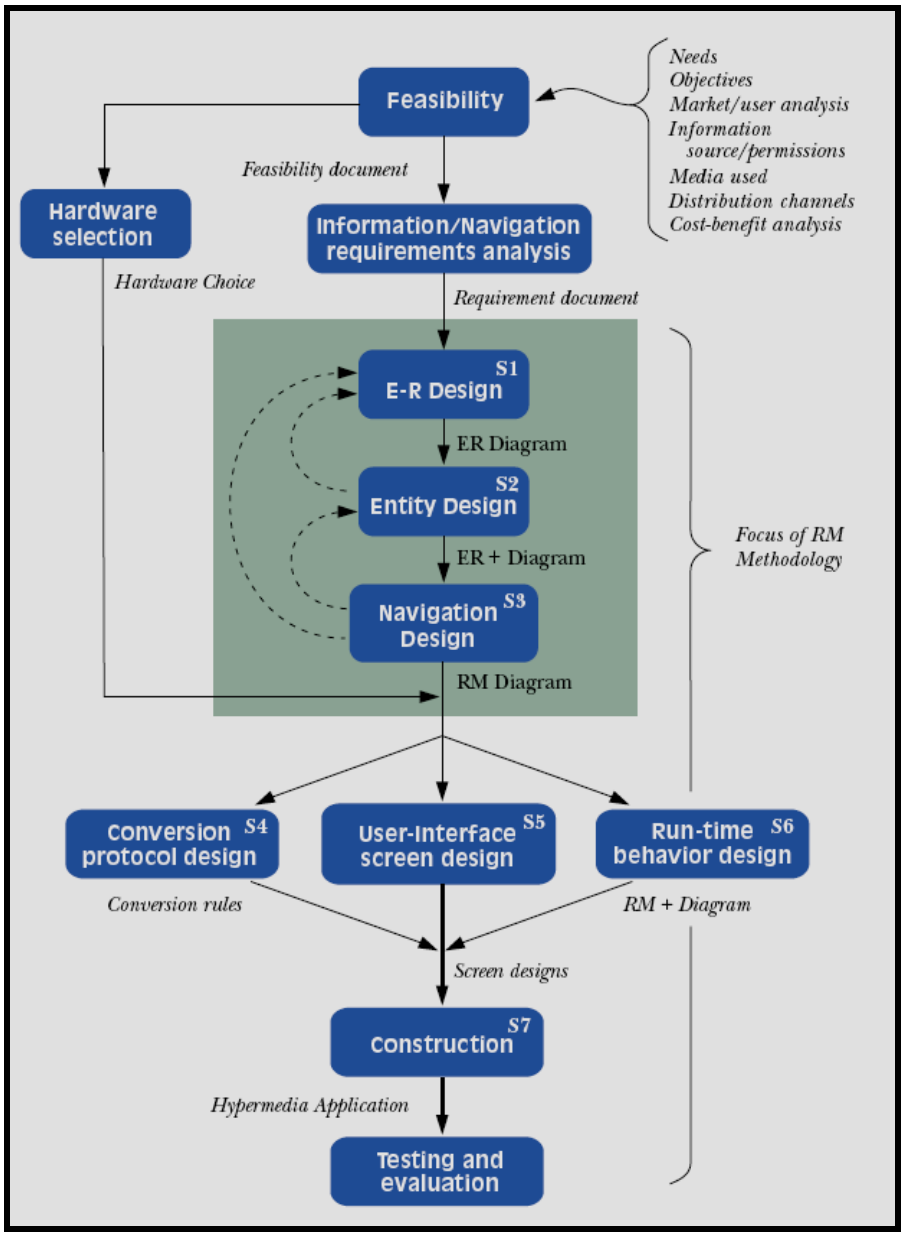
Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	1	0	0	1	0	1	0	Usability Goals Development
Usability	2	3	1	3	0	3	0	
Iteration	1	1	1	2	1	2	1	
Real Interaction	0	2	0	0	0	0	3	
Strongest stage in HFMDW	☑	☑	-	☑	-	☑	☑	

Table 8: Human Factor Methodology for Designing Websites (HFMDW)

3.5.2 Relationship Management Methodology (RMM)

Isakowitz, Stohr and Balasubramanian (1995) describe a methodology, which provides for the development of effective websites for highly structured applications such as online conference proceedings, directories, academic journals, courseware and electronic-commerce.

In other words, this methodology is "*most suited to applications that have a regular structure, especially where there is a frequent need to update the information to keep the system current*" (Isakowitz et al. 1995, p. 43). The main goal of this methodology is to reduce complexity and make the website easy to navigate and maintain, thereby saving time, money, and making it more attractive to the users. This methodology is divided into four sequential stages (see Figure 15), where each stage must be completed before the next can be started. The feedback loops between the RMM design stages are shown by dashed lines. While the remaining feedback loops, "*although present in RMM, are not shown*" (Isakowitz et al. 1995, p39).



Source: (Isakowitz et al. 1995, p. 38)

Figure 15: Relationship Management Methodology (RMM)

The stages of RMM may be described as follows:

- **Feasibility:** this stage provides the foundation for the RMM design methodology, as via this stage, the designer needs to define the objectives, user requirements, user analysis and cost-benefits analysis.

- **Hardware Selection:** this stage involves definition of the hardware requirements for the website.

- **Information/Navigation Requirements Analysis:** during this stage, the designer identifies user tasks and develops an understanding of the information needs and likely use scenarios.

- **Design Methodology:** this stage provides the foundation for designing the relationship between the entities in the web site. The stage has several steps, such as: E-R Design, Entity Design, Navigation Design, Conversion Protocol Design, User-Interface Screen Design; and Run-Time Behavior Design.

    - **E-R Design (S1):** this step of the design process "*represents a study of the relevant entities and relationships of the application domain*" (Isakowitz et al. 1995, p. 39). These entities and relationships of data are considered the basis for the hypermedia applications.

    - **Entity Design (S2):** this step is unique to the hypermedia application as, through it, the designer will determine "*how the information in the chosen entities will be presented to users and how they may access it*" (Isakowitz et al. 1995, p. 40).

    - **Navigation Design (S3):** this step defines how the navigation will be established between the entities, which are based on "*associative relationships*" (Isakowitz et al. 1995, p. 41).

    - **Conversion Protocol Design (S4):** this step (see Figure 16) sets the conversion rules to "*transform each element of the*

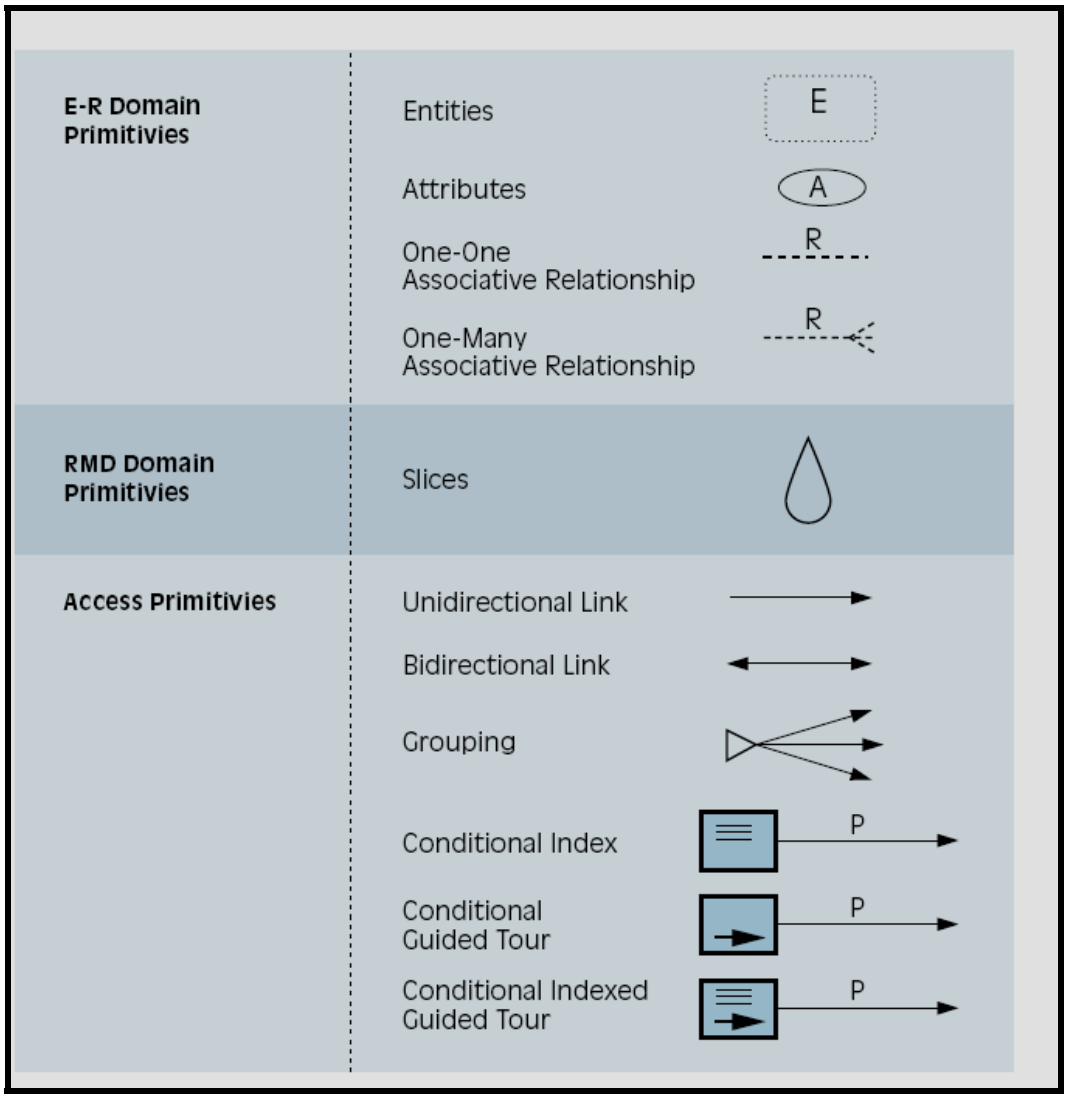
RMDM[38] *diagram into an object in the target platform"* (Isakowitz et al. 1995, p. 43).

- **User Interface Design (S5):** this step involves the design of screen layouts for each object appearing in the RMDM diagram obtained in Step 3. Via this step, the designer will design the "*button layouts, appearance of nodes and indices and location of navigational aids*" (Isakowitz et al. 1995, p. 43).

- **Run-Time Behavior Design (S6)**: this step considers the "*volatility and the size of the domain to decide whether node contents and link endpoints are to be built during application development or dynamically computed on demand at runtime"* (Isakowitz et al. 1995, p. 43).

- **Construction and Testing (Evaluation) (S7):** this stage is similar to the one in the traditional software development process. Special care must be taken in this stage to test the website to determine if it is running according to the user requirements, especially the navigational paths.

[38] RMDM: Relationship Management Data Model: "*is a set of logical objects used to provide an abstraction of a portion of the real world*" (Isakowitz et al. 1995, p. 35).



Source: (Isakowitz et al. 1995, p. 35)

Figure 16: The Relationship Management Data Model (RMDM) Primitives

This methodology is best suited to large websites focusing on product catalogs and hypermedia front-ends of databases. The main flaw of this methodology is that it is missing the maintenance stage. This concept is very valuable, particularly from the users' perception so as to attract new users to visit the website, and to encourage the current users to visit and work with it. Finally, this methodology does not distinguish "b*etween how information is abstracted and how it is presented.*

Relationships are just translated to navigational paths and no other communication among the entities is allowed" (Isakowitz[39], Stohr, Balasubramanian, 2000).

Table 9 indicates that iteration is available in the design stage with a moderate rating but in the rest of the stages with a minimum rating. The purpose of the iteration stage is to ensure that the website is running according to the user requirements, especially the navigational paths. To prevent any confusion in this methodology, the feedback loops in the design stage were shown as dashed lines, while the remaining feedback present in this methodology is not shown as in the diagram (see Figure 15). There are zero availability ratings for user participation, usability and real interaction in this methodology. This means that these aspects are not well considered in this methodology.

The strongest stages in the RMM methodology are the planning and design. The planning stage defines the objectives, user requirements and analysis, and cost benefits analysis. While the design stage is the dominant stage in this methodology as the designer will classify: 1) the relationship between the entities in the web site; 2) the navigational path between the entities; and 3) the design of screen and button layouts.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	0	0	0	0	0	0	0	Hardware Selection; Navigation Design and User Interface.
Usability	0	0	0	0	0	0	0	
Iteration	1	1	2	1	1	1	1	
Real Interaction	0	0	0	0	0	0	0	
Strongest Stage in RMM	☑	-	☑	-	-	-	-	

Table 9: Relationship Management Methodology (RMM)

[39] Isakowitz: http://www.dgp.toronto.edu/~fanis/courses/hypermedia/rmm.html

3.5.3 The W3DT Design Methodology

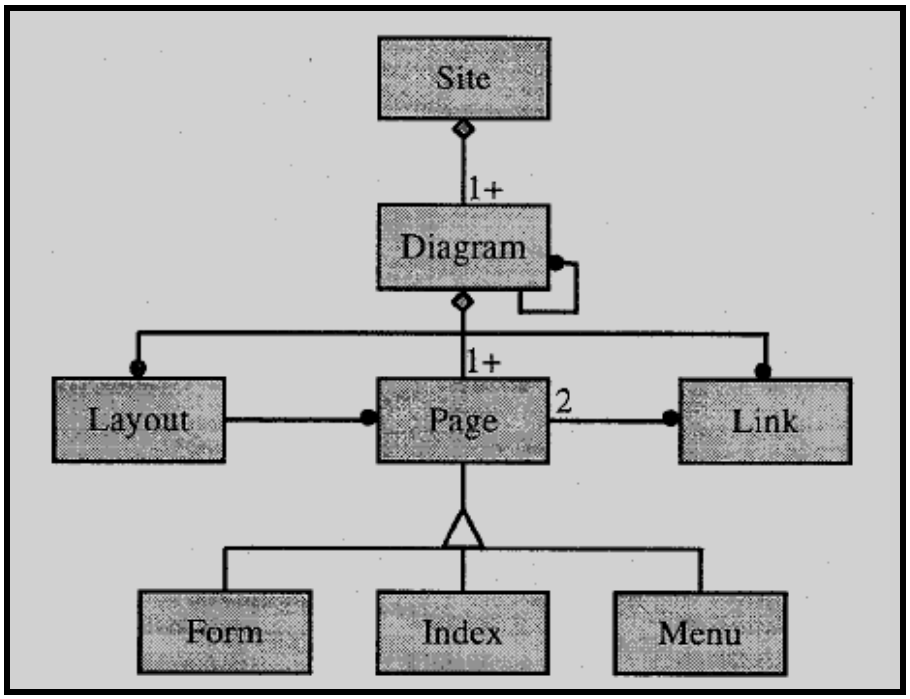
Bichler, Nusser and Wien (1996) describe the W3DT (World Wide Web Design Technique), a methodology especially for designing a large-scale Web-based hypermedia application. This methodology focuses on two main parts: modeling techniques and computer-based design. The former gives the designer the possibility to "*generate a running prototype of the system, including HTML-pages and CGI-scripts"*, while the latter allows the designer to define and draw a "*graphical representation of a web-site's structure*" (Bichler et al. 1996, p. 328). The major requirement for dealing with W3DT is to keep the models "*clear and intuitively comprehensible*" (Bichler et al. 1996, p. 328).

The essential design primitives and their interaction are best described by the W3DT Meta Model (see Figure 17), which shows "*the class hierarchy of the different elements*" (Bichler et al. 1996, p. 330).

The first essential design primitive is **Site**. One or more diagrams can be found under the site, and each diagram serves two purposes:

- *to indicate a hierarchical refinement of a model*;
- *to include sub models into a unified view*

(Bichler et al. 1996, p. 330).



Source : (Bichler et al. 1996, p. 330)

Figure 17: The W3DT Meta Model

Usually, a Diagram consists of one page with the option to have "layout" and "link" on the same page. The main purpose of Layout is to hold information about website headers, footers, and background images. On the other hand, the link can be more than just a "*hypertext reference to another document*" (Bichler et al. 1996, p. 330). Furthermore, page, form, index and menu are the basic elements for building a "*hypermedia application information domain*" (Bichler et al. 1996, p. 330).

There is no major difference between an Index and a Menu in the W3DT Meta Model, as the former is used to list a complete set of links, while the latter is a "*navigational aid with the main purpose to provide access structures*" (Bichler et al. 1996, p. 330).

It was noted that this methodology has been widely used by several groups of students at universities, colleges and website developers in organizations "*showing very promising results*" (Bichler et al. 1996, p. 333). However, this methodology is missing seven essential concepts: planning, analysis, implementation, testing, iteration, evaluation and maintenance. These stages are very important in the

development process as, via them, the designer will test and evaluate the system (or the website) to check whether users' requirements were met.

Table 10 indicates zero ratings for the four key principles in the W3DT Design Methodology. This means that none of the above four key principles were incorporated in this methodology to any significant degree.

The strongest stage in the W3DT design methodology is the design stage. This stage gives the designer the chance: 1) to generate a first trial product of the system with a hypermedia application; and 2) to draw a graphical representation of the website construction.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	0	0	0	0	0	0	0	Navigation Design and Building a Hypermedia Application
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	0	0	
Strongest stage in W3DT	-	-	☑	-	-	-	-	

Table 10: The W3DT Design Methodology

3.5.4 Information Development Methodology for the Web

John December (1996) describes a methodology which provides for the development of effective websites for technical communicators, writers, designers and software developers. The main task of this methodology is to decrease difficulty and make the website easy to navigate, maintain, and more attractive to the users. This methodology is very usable for dynamic and competitive web design. December argued that this "*methodology was based on the characteristics and qualities of the web on the experiences of web users*" (December 1996, p. 372). This methodology

is divided into six sequential stages (or elements, according to John December[40]), where each must be completed before the next stage can be started. The stages are as follows:

- **Planning for the Audience and Purpose:** this stage defines several items, which are very useful to build a web site, such as the purpose of the website and audience information. The audience information can include: concerns, background and characteristics. December stated that this planning and analysis requires asking and answering questions such as *"Who will use this web? And what will they gain from it?"* (December[41] 2003)

- **Setting Objectives and Gathering Domain Information:** after considering the purpose and audience, the designers and analysts need to concentrate on the objectives and goals that the website needs to accomplish.

- **Designing a Web:** to make the web flexible, efficient and easy to use a relationship should be established between the pages of the web. Therefore, to design a website, the designer should have a thorough grounding in "*hypertext, multimedia, Java and other programming possibilities as well as knowledge about how particular web structures affect an audience"* (December 2003).

- **Implementing a Web:** the purpose behind this stage is to create files of HTML and other software. The initial implementation might be a "*prototype which is not released publicly, but available for analysis [and use] by a set of representative users"* (December 2003).

[40] December : 1996 p.372
[41] December: http://www.december.com/web/develop/overview.html

- **Analyzing a Web:** this stage involves the designer examining the web structure and contents to determine if it meets the objectives, goals and the purpose of the web.

- **The Web's Release and Promotion and Ongoing Innovation:** involves the web being "*publicity released for general web audiences, potential users and current users*" (December 1996, p. 372). Furthermore, it involves ongoing support and work to improve the web in order to meet the user requirements.

This methodology is limited to websites for information, art, general services and entertainment. The methodology is missing two essential aspects: iteration and evaluation stages. These concepts are very important, especially from the users' perspective.

Table 11 indicated that the four key principles have zero ratings in the Information Development Methodology for the Web except for user participation and real interaction, which have a minimal rating in the implementation stage because of the role of representative users in reviewing the prototype. The real interaction is available in the maintenance stage to improve the web in order to meet the user needs. The strongest stage in Information Development Methodology for the Web is implementation. This stage releases the first sketch of the website and is checked by representative users in order to make sure it complies with the user requirements.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	0	0	0	0	1	0	0	Promotion and Prototyping (is available under the Implementation Phase"
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	0	1	
Strongest stage in IDMW	-	-	-	-	☑	-	-	

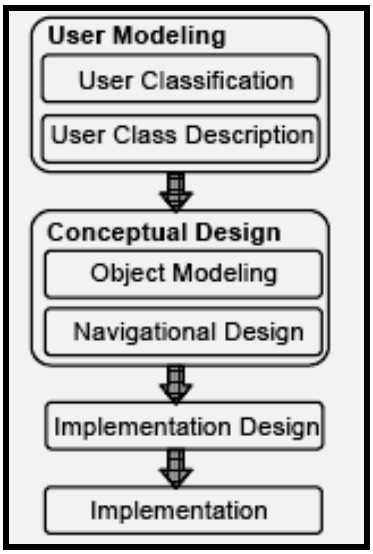
Table 11: Information Development Methodology for the Web

3.5.5 The Web Site Design Method (WSDM)

Olga De Troyer (1998) describes a methodology for web site design. The main goal for this new methodology is to develop a site which provides information '*in such a way that both the provider and the inquirer benefit from it"* (Troyer and Leune 1998, p. 88).

The main mission statement for this methodology is [to describe] the subject; purpose and the target audience for this website. Without giving good consideration to the mission statement there "*is no proper basis for decision making or for the evaluation of the effectiveness of the website*" (Troyer 1998, p. 53).

This methodology has adopted the "user-centered" approach in order to create effective communication and to define the different types of users and characteristics and their information requirements. This will lead to definition of the "perspectives". A perspective "*is a kind of user subclass"*, which means, *"all users in a user class with the same characteristics and usability requirements* (Troyer 1998, p. 54 – 55). This methodology consists of the following stages: User Modeling, Conceptual Design, Implementation Design and the actual Implementation (see Figure 18).



Source: (Troyer 1998, p. 54)

Figure 18: WSDM Phases

- **User Modeling:** this stage is divided into two steps: User Classification and User Class Description. The purpose behind this stage is to concentrate *"on the potential users of the Web site"* (Troyer et al. 1998, p. 88).

  - **User Classification:** this step will help the designers to identify the future users or visitors of the website and classify them into user classes. Therefore, the purpose of this step is to identify the target audience by "*looking at the organization or the business process which the website should support*" (Troyer 1998, p. 53).

  - **User Class Description:** this step will help the designer to analyze in more detail the user types in order to identify not only their "*information requirements but also their usability requirements and characteristics*" (Troyer 1998, p. 54). Examples of information requirements are: "*levels of experience with websites in general, language issues, education/intellectual abilities, age"*. Some of this information can be *"translated into usability requirements"* (Troyer 1998, p. 54).

- **User Conceptual Design:** this stage is divided into two steps: User Modeling and the Navigational Design. This stage utilizes different "*user classes and their perspectives"* which will allow the users to efficiently "*navigate through the Web site"* as each user class has it own "*navigation track"* (Troyer et al. 1998, p. 90).

  - **Object Modeling:** this step will help the designers to identify information requirements of different user classes and their perspective.

  - **Navigational Design:** this defines the specific navigation path through the website for each user class.

- **The Implementation Design:** this stage will help the designer to design the "look and feel" of the website, to "*create a consistent, pleasing and efficient look and feel for the conceptual design made in the previous phase*" (Troyer 1998, p. 55).

- **The Implementation:** is the "*actual realization of the website using the chosen implementation environment, e.g. HTML"* (Troyer 1998, p. 55).

The WSDM methodology is "*user centered*" rather than "*data driven*", which means the starting point for this methodology "*is the set of potential visitors of the Web site*" (Troyer et al. 1998, p. 85). The user participation is not strong in this methodology; however, the WSDM methodology seeks to learn more information about the users in0 respect to their knowledge in dealing with the website, language, education and age. This information will help the designer to translate these user characteristics into usability needs and requirements of the website. However, the WSDM methodology is missing a few stages in the development process, namely: testing, iteration, evaluation and maintenance. These stages are important as, through them, the designer will learn if the website meets users' requirements.

Table 12 indicates that user participation is covered in the planning; analysis and design stages with minimal rating, as the designer is seeking to gain more general information about the users such as language, age and education, as some of this information will be translated into usability requirements. Usability aspects are available in planning, analysis, design and implementation with a moderate rating, while the real interaction has a similar rating but in analysis and design. For iteration, the rating is zero, which means it is not considered in this methodology.

The strongest stages in the WSDM are the planning, analysis and design. The planning stage will help the designer to identify the target audience to the website and to classify them into user classes; while the analysis stage will help the designer to analyze in more detail the user types in order to identify information and usability requirements and characteristics. Finally, the design stage will help the designers to identify the information required, how it will be presented, and the navigation paths for user types.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	1	1	1	0	0	0	0	User modeling and Conceptual Design
Usability	2	2	2	0	1	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	2	2	0	0	0	0	
Strongest stage in WSDM	☑	☑	☑	-	-	-	-	

Table 12: The Web Site Design Method (WSDM)

3.5.6 Summary of Methodologies for Developing Web Sites

The preceding sub-sections examined the methodologies for developing web sites and compared them with the four key principles for the new participative framework for

developing websites. Tables 13 and 14 indicate that the four principles are not fully available in every stage of website methodologies. The availability rating ranges from 1 to 3 in some methodologies, while in other methodologies the ratings are zero for the four key principles.

For example, in the **Human Factor Methodology for Designing Websites,** the four key principles are available but in varying degrees in different stages. Usability is very dominant in analysis, testing and evaluation stages with maximum rating, while in the planning and design stages it has a moderate rating. This means that usability is a very significant aspect in this methodology to ensure that the website is running without any errors and enhancing job satisfaction. Iteration is available in some stages with minimum rating, that is in planning, analysis, design, implementation and maintenance, with a moderate rating in testing. User participation is available only in the planning, testing and evaluation stages with a minimum rating, while the real

interaction has a moderate rating in analysis, and maximum rating in the maintenance stage. In the Human Factor Methodology for Designing Websites, there are five strongest stages: planning, analysis, testing, evaluation and maintenance. Planning and analysis are essential stages for defining the users' goals, understanding the environment, and the way that information should be maintained. The testing and evaluation stages are also very important. Finally, the maintenance stage incorporates the provision of up-to-date information, in order to make the website more attractive and interesting.

In the **Relationship Management Methodology (RMM),** only iteration is available with minimum or moderate ratings in all the stages. Zero rating for user participation usability and real interaction in this methodology means that usability, user participation, and real interaction are largely ignored. The strongest stages in the RMM methodology are design and planning. Design and planning are essential as the former will help the designer to define the relationship and navigational path between the entities and to design the screen and button layouts; whilst the latter will define users' goals and an understanding of the cost benefits analysis.

The four key principles have zero ratings in **The W3DT Design Methodology** and the **Information Development Methodology for the Web** except for a minimum rating for user participation in the implementation stage and with minimum rating for real interaction in the maintenance of the latter methodology. This means that the four key principles are largely ignored in these methodologies. The strongest stage in the **W3DT Design Methodology** is the design stage. The strongest stage in the **Information Development Methodology for the Web** is implementation. This stage permits the users to check the first draft of the website to ensure it meets the users' requirements and needs.

Finally, the four key principles are addressed in the **Web Site Design Method (WSDM),** except for iteration. User participation is incorporated into various stages, such as in planning, analysis and design with minimum rating; while usability is available with minimum and moderate rating in planning, analysis, implementation and design respectively, and real interaction is available with moderate ratings in the analysis and design. The strongest stage in WSDM is the design stage. This stage

will help the designers to distinguish the future users or visitors of the website and gain more information about their characteristics.

Human Factor Methodology for Designing Websites (HFMDW)								
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	1	0	0	1	0	1	0	**Usability Goals Development**
Usability	2	3	1	3	0	3	0	
Iteration	1	1	1	2	1	2	1	
Real Interaction	0	2	2	0	0	0	0	
Strongest Stage in HFMDW	☑	☑	-	☑	-	☑	☑	

Relationship Management Methodology (RMM)								
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	0	0	0	0	0	0	0	**Hardware Selection; Navigation Design; and User Interface.**
Usability	0	0	0	0	0	0	0	
Iteration	1	1	2	1	1	1	1	
Real Interaction	0	0	0	0	0	0	0	
Strongest Stage in RMM	☑	-	☑	-	-	-	-	

The W3DT Design Methodology								
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	0	0	0	0	0	0	0	**Navigation Design and Building a Hypermedia Application**
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	0	0	
Strongest Stage in W3DT	-	-	☑	-	-	-	-	

Information Development Methodology for the Web								
Stages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	0	0	0	0	1	0	0	**Promotion and Prototyping (is available under the Implementation Phase"**
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real interaction	0	0	0	0	0	0	1	
Strongest stage in IDMW	-	-	-	-	☑	-	-	

Table 13: Summary of Methodologies for Developing Web Sites

The Web Site Design Method (WSDM)								
Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	1	1	1	0	0	0	0	User modeling and Conceptual Design
Usability	2	2	2	0	1	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	2	2	0	0	0	0	
Strongest stage in WSDM	☑	☑	☑	-	-	-	-	

Table 14: Summary of Methodologies for Developing Web Sites

After reviewing the methodologies for developing web sites, extra stages are collected from these methodologies (see Table 15). The main focuses of these extra stages are: usability, navigation, promotion, prototyping and identifying user types. These stages are very significant for developing web sites. Therefore, most of these stages will be taken into consideration by the researcher to be added to the new participative framework for developing websites.

Methodology (Developing Web Sites)	Extra Stages
Human Factor Methodology for Designing Websites	Usability Goals Development
Relationship Management Methodology (RMM)	Hardware Selection; Navigation Design and User Interface.
The W3DT Design Methodology	Navigation Design and Building a Hypermedia Application
Information Development Methodology for the Web	Promotion and Prototyping "is available under the Implementation phase"
The Web Site Design Method (WSDM)	User modeling and Conceptual Design

Table 15: Extra Stages from Methodologies for Developing Web Sites

Table 16 demonstrates the strongest stages from methodologies for developing web sites, and presents the rating availability for the four key principles in each stage. It was noticed that all the stages were covered in the methodologies for development of web sites as the main focus for these methodologies are:

- Defining the users' goals and understanding the environment very precisely in order to meet the users' needs and analyze the cost benefits;

- Defining the materials to identify user tasks and how information should be maintained;
- Defining the navigational path between the entities in the website, designing of screen and button layouts, generating a first trial product of the system, and defining user usability requirements and their characteristics;
- Releasing the first sketch of the website that will be checked by representative users in order to ensure that it complies with the user requirements;
- Making the website more interesting and attractive so that more users visit it, via content providers contributing up-to-date information to the site.

Stage	Methodologies for Developing Web Sites	Principles			
		User Participation	Usability	Iteration	Real Interaction
Planning	Human Factor Methodology for Designing Websites (HFMDW)	1	2	1	0
	Relationship Management Methodology (RMM)	0	0	1	0
	The Web Site Design Method (WSDM)	1	2	0	0
Analysis	Human Factor Methodology for Designing Websites (HFMDW)	0	3	1	2
	The Web Site Design Method (WSDM)	1	2	0	2
Design	Relationship Management Methodology (RMM)	0	0	2	0
	The W3DT Design Methodology	0	0	0	0
	The Web Site Design Method (WSDM)	1	2	0	2
Testing	Human Factor Methodology for Designing Websites (HFMDW)	1	3	2	0
Implementation	Information Development Methodology for the Web	1	0	0	0
Evaluation	Human Factor Methodology for Designing Websites (HFMDW)	0	3	2	0
Maintenance	Human Factor Methodology for Designing Websites (HFMDW)	0	0	1	3
	Information Development Methodology for the Web	0	0	0	1

Table 16: Summary of Strongest Stages from Methodologies for Developing Web Sites

3.6 Marketing Methodologies

This section will examine the actual values added by Marketing Methodologies and the benefits they will bring to the e-commerce framework, especially in developing

websites. In this section, the researcher will examine several methodologies from the marketing perspective such as e-Marketing Plan, and will also review methodologies which were created by companies which are developing websites for marketing. At the end of each methodology section, the researcher will present a table showing: 1) how the four key principles are addressed in each stage within the methodology; 2) the strongest stage for each methodology for developing web sites; and 3) the extra stages of each methodology. These extra stages will help the researcher to develop a more comprehensive structure for the new participative methodology for developing marketing websites.

3.6.1 E-Marketing Plan

The E-Marketing plan is a "*guiding, dynamic document that links the firm's e-business strategy with technology-driven marketing strategies and lays out details for plan implementation through marketing management*" (Strauss, El-Ansary, Frost 2006, p. 46). The main ideas behind an e-Marketing plan are: 1) to achieve an effective and efficient e-business objective; 2) to increase revenues and reduce costs; 3) to serve " *as a roadmap to guide the direction of the firm, allocate resources, and make tough decisions at critical junctures*" (Strauss[42], El-Ansary, Frost 2003).

Strauss et al. (2003) suggest that there are two common types of e-marketing plans: the 'napkin plan' and the 'venture capital plan'. The former approach is to just "*jot ideas on a napkin over lunch or cocktails and then run off to find financing*" (Strauss et al. 2006, p. 47). However, these plans work only sometimes. While the latter plan basically focuses on building a suitable business plan to increase the profit and reduce the cost. Therefore, the traditional marketing plan needs to be introduced to define and clarify key questions about topics such as capital, new customers, product and service, pricing and customer support required to retain the customers. Sound planning and "*thoughtful implementation are needed for long-term success in business*" (Strauss et al. 2003).

[42] Strauss: www.nd.edu/~mkt384/mark461/powerpoints3/chapter3F.ppt

The E-Marketing plan is divided into seven steps:

- **Situation Analysis:** this step will help the Marketers to define and review the firm's environment and involves SWOT (strengths, weakness, opportunities, and threats) analyses. Strengths and weakness of the company's internal situation need to be identified, new opportunities need to be defined to improve the current situation of the company, while the threats "*are areas of exposure*" (Strauss et al. 2006, p. 50). Also under this step, a review and analysis of the existing marketing plan needs to be carried out to identify appropriate strategies, objectives, and performance metrics for e-business.

- **E-Marketing Strategic Planning:** this step involves "*determining the fit between the organization's objectives, skills and resources and its changing market opportunities"* (Strauss et al. 2006, p. 51). Additionally, the Marketers will create a sustainable e-marketing strategy for the e-business goals from "*marketers design segmentation, targeting, differentiation, and positioning strategies*" (Strauss et al. 2003). This includes demographics, geographic location, psychographics and behavior of potential customers. This information will help the marketers to formulate the e-marketing objectives.

- **Objectives**: three main issues need to be defined in an e-marketing plan: task (what one is planning to achieve by building this e-business); measurable quantity (how much); and time frame (setting a time to accomplish the e-business job).

- **E-Marketing Strategies**: in this step, the marketers need to identify the 4Ps (product, pricing place and promotion) and the relationship management requirements to "*achieve plan objectives regarding the offer*" (Strauss et al. 2006, p. 53). *Product:* What is planned to be produced at the end (by building the e-business) in terms of service, information, selling products or advertising; *Pricing:* what it will cost for the e-business to be implemented; *Place:* the location of the e-business work; *Promotion:* the techniques that will need to be adopted in order to promote the e-business work. The relationship management strategies need to identify how to "*build*

relationships with a firm's partners, supply chain members, or customers" (Strauss et al. 2006, p. 57). Some companies use Customer Relationship Management (CRM) or Partner Relationship Management (PRM) approaches. PRM software is used to build and develop a complete database, which retains information about business partner capabilities and communication. While the purpose of the CRM software is "*to retain customers and increase average order values and life time value"* (Strauss et al. 2006, p. 57).

- **Implementation Plan**: the marketers select the 4Ps, relationship management strategies and other tactics to achieve the e-marketing objectives and to develop the implementation plan. To achieve the implementation plan, the firm needs to check if the following aspects are available to accomplish the firm's objectives "*staff, department structure, application service providers, and other outside firms"* (Strauss et al. 2006, p. 57). Furthermore, special tactics will be used in the website to collect information about users who are dealing with it, such as forms, feedback e-mail, and online surveys. According to Strauss[43] et al. (2003) additional tactics which can be used to collect information include: "*1) Web site log analysis software helps firms review user behavior at the site and make changes to better meet the needs of users, 2) Business intelligence uses the Internet for secondary research, assisting firms in understanding competitors and other market forces*".

- **Budget:** the key aspect of this stage is to identify the expected costs and returns from the investment. Returns are matched "*against costs to develop a cost/benefit analysis, ROI[44] calculation, or internal rate of return (IRR)"* (Strauss et al. 2003) to determine if it is worthwhile to continue with the project. Furthermore, during the implementation stage, the marketers observe whether the results (cost and revenue) are on the correct track for achieving the predicted cost/benefit ratio.

[43] Strauss: www.nd.edu/~mkt384/mark461/powerpoints3/chapter3F.ppt
[44] ROI: Return on your investment.

- **Evaluation Plan:** is used to evaluate the success of the website. The tracking system should be available before activating the website. *"E-marketers use tracking systems to measure results and evaluate the plan's success on a continuous basis"* (Strauss et al. 2006, p. 60).

This e-marketing plan is a very important tactic for the marketers to gain more information about the current situation of the business before releasing the new version of e-business. However, this plan lacks a few stages which need to be available in order to achieve user exceptions and requirements, such as design, testing, iteration and maintenance.

The strongest stages in the E-Marketing Plan are E-Marketing Strategies (under the planning stage), the implementation stage and the evaluation stage. E-Marketing Strategies will allow the designer to identify the 4Ps: product, pricing, place and promotion, and the relationship management requirements to achieve plan objectives for the website. In the implementation stage, the marketers will utilize the 4Ps, the relationship management strategies, and other tactics to achieve the e-marketing objectives. The evaluation stage involves tracking systems to measure results and evaluate the plans for the website.

Table 17 indicates that usability and iteration have zero ratings for this methodology. User participation is available in the planning and implementation stages with minimal rating, and real interaction is available in the evaluation stage with maximum rating. To formulate the e-marking objectives, the marketers will collect general information about the users such as demographics, geographic location, psychographics and behavior of potential users in the planning stage, while in the implementation stage, special tactics will be used to collect information about the users such as forms, feedback e-mail and online surveys.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	1	0	0	0	1	0	0	E-Marketing Strategies Objectives and Budget
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	3	0	
Strongest Stage in E-Marketing Plan	☑	-	-	-	☑	☑	-	

Table 17: E-Marketing Plan

3.6.2 The Advertures Company Methodology

The Advertures Company released a process methodology to enhance the development of websites from a marketing perspective in 2004. This methodology has five stages, each of which should be completed before moving to the next stage.

- **Orientate**: this stage will help the designers to know why they are developing this website. In this stage, the designer will define the following concepts: the goals, product details, and competition. These concepts will also help to determine the cost and time for establishing this website.

- **Blue Print:** this stage will produce the first sketch for the website, where the "*marketing, technology and creativity collide; banging heads and eventually coming upon the best way to mix all three aspects and create the optimum product*" (Advertures[45] 2004).

- **Model:** this stage will combine the technology possibilities and the creativity from the sketch to produce the working model.

[45] Advertures: http://www.advertures.cz/alt/index_en.php?cat=company&sub=methodology

- **Build:** during this stage, the designers will build up the new system and make sure that the proposed website is tested repeatedly until it meets users' requirements.

- **Maintain:** through this stage, the website will be maintained in order to "*continue functioning at optimum levels*" (Advertures 2004).

From the Advertures company point of view, this methodology will meet the users' requirements when building a website from the marketing perspective; however, not all the possible stages are available in this methodology. When compared with other system development processes, it lacks detailed design.

Table 18 shows that user participation; usability and real interaction have zero rating; while iteration is available in the testing stage with moderate rating to ensure that the website is tested repeatedly until it meets users' requirements. The strongest stage in this methodology is testing, which allows the designer to test the project repeatedly until it meets users' requests and desires.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	0	0	0	0	0	0	0	Blue Print and Model
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	2	0	0	0	
Real Interaction	0	0	0	0	0	0	0	
Strongest stage in The Advertures Company Methodology	-	-	-	☑	-	-	-	

Table 18: The Advertures Company Methodology

3.6.3 The Market-Vantage (Internet Performance Marketing) Methodology

The Market-Vantage Company introduced a new methodology process for developing websites to enhance the strategy of the websites in order to "*reduce cost, increase customer loyalty and market analysis*" (Market-Vantage[46] 2003). This methodology has four stages, each of which should be completed before moving to the next stage (see Figure 19).

- **Internet marketing goals, target markets and strategy:** this stage helps the designers to ask the following questions in the planning process: what are you selling? who are the buyers? who are your competitors? and, how can potential customers find the product? (Market-Vantage 2003). Answers to these questions will give the designer a full picture of the purpose behind building this website.

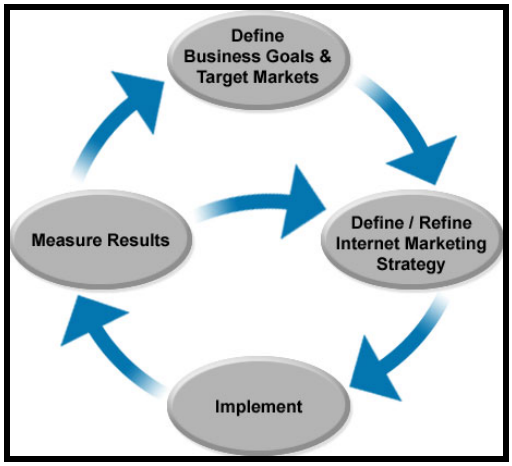
- **Define/Refine Internet Marketing Strategy:** this stage helps the designers in two aspects: learning about users [the purpose behind the visit and tracking their visit]; and how the business will be enhanced by using the Internet for introducing the new products.

- **Implementation:** this stage establishes the website so that the users can start using the new product and check if it meets their requirements.

- **Measurement:** is part of ongoing maintenance of the website and checking if the results of using the website are meeting its goals, using software to track current and new users. Continuing support and recommendations are available from the designer to the website manager.

[46] Market-Vantage: http://www.market-vantage.com/about/methodology.htm

From figure 19, we notice that this methodology includes iteration, so as to ensure that the website is meeting the user requirements and providing appropriate company outcomes. However, this methodology is missing a few stages such as detailed analysis and design. These stages are imperative in developing a website so that the website achieves the goals of e-business and as well as meeting users' requirements.



Source: (Market-Vantage[47] 2003)

Figure 19: Market-Vantage (Internet Performance Marketing) Methodology

Table 19 identifies that user participation and usability have zero rating (except in the maintenance stage), while iteration is available in the implementation stage with moderate rating to ensure that the website meets users' requirements. Real interaction is available in the maintenance stage with moderate rating to check if the website meets users' requirements and needs after the changes have been made. The strongest stages in the Market-Vantage (Internet Performance Marketing) Methodology are the planning, implementation and the maintenance stage, which is under the measurement stage. The planning stage will help the designers to identify the purpose behind building the website, namely, the products/service being sold, the firms' competitors and buyers, and how to find the product via the web. The implementation stage is important in Market-Vantage to allow users to use the new product and to check if it meets their requirements. User information is used in the maintenance stage to review on-going performance of the website.

[47] Market-Vantage: http://www.market-vantage.com/about/methodology.htm

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	1	0	0	0	0	0	2	Define/Refine Internet Marketing Strategy; and Measurement
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	2	0	0	
Real Interaction	0	0	0	0	0	0	2	
Strongest Stage in The Market-Vantage Methodology	☑	-	-	-	☑	-	☑	

Table 19: The Market-Vantage (Internet Performance Marketing) Methodology

3.6.4 EnSky's Unique Methodology

EnSky Company initiated a new methodology for developing websites from the marketing perspective. This methodology has into nine stages, each of which should be completed before moving to the next stage.

- **Evaluation Overview:** this methodology divides the evaluation aspect into two types: pre-and post evaluation. The former is a phase to define the user needs and requirements for success and to determine the approach to be used in the latter stages, namely to define "*the methods to track the results in post-evaluation*" (EnSky 1997)[48]. The initial pre-evaluation stage establishes the goals of the project and identifies the existing branding, "*marketing strategies, middle market demographics, competitors and developing an understanding of the business and sales models*" (EnSky 1997). According to EnSky's methodology, the post-evaluation process is very useful to measure the effectiveness of the site against the goals, which were set in the pre-evaluation.

[48] EnSky: http://www.ensky.com/company/process/methodology.php

- **Design:** during this stage, the designer will define the specifications and requirements and document the design of the look of the "*end product that extends from the branding and marketing strategies already employed*" (EnSky 1997).

- **Develop:** this stage will carry out the outcomes from the design phase to build the website by using various tools such as templates and graphical files, which were created in the design stage.

- **Testing:** during this stage, the prototype website will be tested to determine if it meets the requirements of the users. According to the EnSky methodology, once the "*testing requirements have been met and approved by the client the project is ready for deployment*" (EnSky 1997).

- **Deployment:** during this stage, the designer will transfer all the files of the website to the in-house web server. After this stage, the designer will follow the methodology by using the promotion and maintenance stages so as to begin "*the process of both updating the content on the site to keep it relevant, and marketing the site to create awareness and drive traffic to it ensuring ultimate ROI*[49] *"* (EnSky 1997).

- **Promote:** this stage will help to promote the website to the public, by using various tools such as press releases, link building, banner ad campaigns, and paid search engine or directory listing campaigns. These processes will be repeated from time to time in order to make sure that the promoting phase is effective.

- **Maintain:** via this stage, the designer will make sure that the website is updated and maintained regularly and facilitates "*the adoption of global technological advances*" (EnSky 1997).

[49] ROI: Return on your investment.

- **ROI[50]:** this stage reviews the cost and investment of developing the website and compares it with likely returns.

- **Measurement:** is part of the ongoing maintenance of the website, and is integral in determining the ROI. According to EnSky, various types of tools are used for these measurements such as, "*search engine ranking and website visitor statistics, tracking sales, new customers etc.*" (EnSky 1997).

This methodology contains most of the stages, which are needed for the designer to develop a website which meets the e-business objectives, and to evaluate the returns against the costs. However, two stages are missing - detailed analysis and iteration.

Table 20 indicates zero rating for the four key principles except for minimal user participation in the testing and maintenance stages and a minimal rating for real interaction in the maintenance stage. This means that the four key principles are mainly ignored in this methodology. The strongest stage is maintenance (under the measurement stage). This stage is important to the designer and users simultaneously, as it will attract more users to visit the site. In addition, this stage includes changes and correction of errors in hardware and software to meet user requirements.

Stages / Principles	Planning	Analysis	Design	Testing	Implementation	Evaluation	Maintenance	Extra Stages
User Participation	0	0	0	1	0	0	1	Develop; ROI; Measurement; and Promotion
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	0	1	
Strongest Stage in EnSky's Unique Methodology	-	-	-	-	-	-	☑	

Table 20: EnSky's Unique Methodology

[50] ROI: Return on your investment.

3.6.5 Review of Marketing Methodologies

The analysis above indicates that most stages in the marketing methodologies are similar to those in lifecycles, methodologies and models, with extra stages focusing on the marketing perspective, such as measurement, promotion and cost/benefit analysis. These extra stages will help the firm to achieve "*its desired results as measured by performance metrics according to the specifications of the e-business model and e-business strategy"* (Strauss et al. 2006, p. 60).

3.6.6 Summary of Marketing Methodologies

After examining the marketing methodologies and comparing them with the four key principles for the new participative framework for developing websites, Tables 21 and 22 indicate that the four principles are not fully adopted in any stage, as the ratings at best range from minimal to moderate.

E-Marketing Plan usability and iteration have zero rating while user participation is available in planning and implementation with minimal rating to collect general information about the users. Real interaction is available in the evaluation stage with maximum rating as the e-marketers use tracking systems to measure the results and ensure that the website meets users' requirements. The strongest stages in E-Marketing Plan are E-Marketing Strategies, implementation and evaluation. E-Marketing Strategies will allow the designer to identify the 4Ps: product, pricing, place and promotion, and the relationship management requirements to achieve plan objectives for the website. To achieve the implementation stage, the firm needs to check if all the objectives are available to accomplish the firm's needs. The evaluation stage is for tracking the users' behaviors to establish whether the website meets their requirements.

In **the Advertures Company Methodology,** user participation, usability and real interaction have zero rating, while iteration is available in the testing stage with

moderate rating. Testing is the strongest stage in this methodology as this allows the designer to test the project frequently until it meets users' requests and desires.

The **Market-Vantage (Internet Performance Marketing) Methodology** is similar to the Advertures Company Methodology, as user participation and usability have zero rating (except for a moderate rating for participation in the maintenance stage). Iteration can be found in the implementation stage to ensure that the website meets users' requirements. Real interaction is available in the maintenance stage. The strongest stages are planning, implementation and maintenance. The planning stage will allow the designers to gain more information about the rationale behind building the website; i.e. what is being sold; the firm's competitors and buyers; and how to find the product via the web. The implementation stage will allow the users to use the new product and check if it meets their needs. User satisfaction is tested during the maintenance stage.

The **EnSky's Unique Methodology** has zero ratings for the four key principles, except for a minimal rating for participation in the testing stage and real interaction in the maintenance stage. The strongest stage in EnSky's Unique Methodology is maintenance. This stage involves ongoing changes and correction of errors in hardware and software, in order to continue to meet user requirements.

E-Marketing Plan								
Stages / Principles	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	1	0	0	0	1	0	0	**E-Marketing Strategies Objectives and Budget**
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	3	0	
Strongest stage in E-Marketing Plan	☑	-	-	-	☑	☑	-	
The Advertures Company Methodology								
Stages / Principles	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	0	0	0	0	0	0	0	**Blue Print and Model**
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	2	0	0	0	
Real Interaction	0	0	0	0	0	0	0	
Strongest Stage in The Advertures Company Methodology	-	-	-	☑	-	-	-	
The Market-Vantage (Internet Performance Marketing) Methodology								
Stages / Principles	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	1	0	0	0	0	0	2	**Define/Refine Internet Marketing Strategy; and Measurement**
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	2	0	0	
Real Interaction	0	0	0	0	0	0	2	
The Strongest Stage in the Market-Vantage Methodology	☑	-	-	-	☑	-	☑	

Table 21: Summary of Marketing Methodologies

EnSky's Unique Methodology								
Sages / **Principles**	**Planning**	**Analysis**	**Design**	**Testing**	**Implementation**	**Evaluation**	**Maintenance**	**Extra Stages**
User Participation	0	0	0	1	0	0	1	**Develop; ROI; Measurement; and Promotion**
Usability	0	0	0	0	0	0	0	
Iteration	0	0	0	0	0	0	0	
Real Interaction	0	0	0	0	0	0	1	
Strongest Stage in EnSky's Unique Methodology	-	-	-	-	-	-	☑	

Table 22: Summary of Marketing Methodologies

After reviewing the marketing methodologies, extra stages were identified (see Table 23), focusing mainly on: promotion, prototyping, budget, ROI (return on investment) and measurement. These stages are important for developing websites from the marketing perspective. Therefore, the researcher will take into consideration these stages for the new participative framework for developing websites. The key techniques involved are:

- Identify the 4Ps for the E-Marketing plan: product, pricing, place and promotion;
- Identify the time frame to accomplish the job;
- Identify the expected returns from investment;
- Produce the first sketch for the website, evaluate it, then move on to produce the working model;
- Learn about the users by tracking their visit and the purpose behind the visit.

Methodology (Marketing)	Extra Stages
E-Marketing Plan	**E-Marketing Strategies, Objectives and Budget**
The Advertures Company Methodology	**Blue Print and Model**
The Market-Vantage (Internet Performance Marketing) Methodology	**Define/Refine Internet Marketing Strategy and Measurement**
EnSky's Unique Methodology	**Develop, ROI, Measurement and Promotion**

Table 23: Extra Stages of Marketing Methodologies

Table 24 demonstrates the strongest stages for Marketing Methodologies and presents the rating for the four key principles in each stage. The main focuses of these methodologies are:

1) Identify the product, pricing, place, promotion, and the relationship management requirements to achieve plan objectives for the website;
2) Planning the purpose behind building the website; i.e. what are you selling; your competitors and buyers; and how to find the product via the web;
3) Testing the website repeatedly until it meets users' requests and desires;
4) Maintaining the website to attract more users (new as well as old) to visit it.

Stage	Marketing Methodologies	Principles			
		User Participation	Usability	Iteration	Real Interaction
Planning	E-Marketing Plan	1	0	0	0
	The Market-Vantage(Internet Performance Marketing) Methodology	1	0	0	0
Analysis	-	-	-	-	-
Design	-	-	-	-	-
Testing	The Advertures Company Methodology	0	0	2	0
Implementation	E-Marketing Plan	1	0	0	0
	The Market-Vantage(Internet Performance Marketing) Methodology	0	0	2	0
Evaluation	E-Marketing Plan	-	-	-	3
Maintenance	The Market-Vantage Methodology	2	0	0	2
	EnSky's Unique Methodology	1	0	0	1

Table 24: Summary of Marketing Methodologies

3.7 Additional Detailed Techniques

To develop a methodology, which will help to make the websites very successful, the researcher needs to incorporate additional detailed techniques. These will address specific deficiencies identified in the methodologies reviewed in the preceding sections. They relate to:

- Detailed task analysis (to facilitate a comprehensive set of links between the front end and back end of an e-commerce websites); and
- Detailed procedures for website design and implementation.

3.7.1 Task Analysis

It is very important to know one's users when an information system or a website is being developed. At the same time, the designer is required to gain more information about what users will actually do. To answer this question, the designer needs to adopt a specific technique which is termed 'Task Analysis'. Task analysis is the "*process of building a complete description of the [users'] (their) duties*" (McCracken et al. 2004, p. 44). This technique involves seeking the following information about the users:

- *What tasks they perform*
- *Why they perform them*
- *How they perform them*

(McCracken et al. 2004, p. 44).

The information will assist designers to determine the basis and foundation for making decisions that will produce successful designs.

3.7.1.1 Goals, Tasks, and Actions

Participation by users is the basis for developing and creating a simple, easy-to-use user interface or website. Task analysis will help the designer to learn more about the goals and tasks of the users, and in turn to produce an interface that operates effectively and productively.

According to McCracken, goals, tasks and actions should be defined at the beginning of the project. **Goals** are work-related objectives, such as searching for information, sending e-cards, registering a hotel guest, sending e-mail, or doing Internet

marketing or non-work related goals such as playing games, chatting or making a plan. Therefore, goals "*are technology independent, and they remain the same even when the technology changes*" (McCracken et al. 2004, p. 44).

On the other hand, **tasks** may or may not be consistent between users. Therefore, tasks need to be changed according to the users' requirements and needs, and these tasks are used to accomplish the goals (e.g. buying a book (about HCI) from Amazon.com).

Finally, the last step is action. **Actions** are *"subcomponents of tasks"* (McCracken et al. 2004, p. 44). In other words, actions are a series of steps, which need to be followed in sequence in order to complete the tasks and hence achieve the users' goals. In addition, these steps may involve one or more sub-steps.

3.7.1.2 Techniques for Identifying Types and Granularity of Tasks

Six techniques will be introduced in this section, which can be used to collect more information about the tasks, which are needed to achieve the users' goals. Sometimes, analysts may need to use more than one technique to collect information with respect to the tasks that are needed in order to accomplish the goals.

A key issue is 'Granularity'. This refers to "*the level of detail in a description*" (McCracken et al. 2004, p. 45). For example, users need to look at their tasks from a short distance to understand its detail as well as from a long distance, to know the purpose behind it. Therefore, in task analysis the granularity that is chosen will depend on "*the nature and scope of your website development effort*" (McCracken et al. 2004, p. 45).

- **Workflow Analysis** The purpose behind this technique is to illustrate how the work will be done if more than one user is involved in the task. This means that this technique focuses "*on work as it passes from person to person*" (McCracken et al. 2004, p. 46). As a result, this information

may be vast and very helpful for the designer and user simultaneously as it provides a full picture of the project.

- **Job Analysis** This technique is the opposite of the former, as the designer needs to "*focus on what a single person does in a day, a week, or a month*" (McCracken et al. 2004, p. 46). The designer can collect this information from the users by using the interview method or observing them in their work environment.

- **Task List** This technique takes "*the granularity of job analysis to a more detailed level*" (McCracken et al. 2004, p. 46). In other words, the designer needs to think very carefully about how many tasks are to be studied in detail before these are broken down into more tasks. In addition, the designer should define and describe the components of a user's job, as some users are responsible for more than one job.

- **Task Sequences** This technique will establish "*the order in which the tasks take place*" (McCracken et al. 2004, p. 47). The designer can learn the order of these tasks by observing the users at work. However, the important issue which needs to be taken into consideration, is to try not to change the users' way of doing the tasks unless there is an important reason for doing so. It is better to give users full control to finalize their job in whatever sequence they like. However, "*if you discover that a majority of users do things in a certain sequence, it makes sense to set up the interface to simplify things for the majority*" (McCracken et al. 2004, p. 47).

- **Task Hierarchies** The purpose behind this technique is to document the components of a task, which are called sub-tasks. The level of detail depends on the type and the purpose of the website.

- **Procedural Analysis** This last technique "*contains the most detail of any of the techniques*" (McCracken et al 2004, p. 48). This step will give the

designer information about how many steps need to be taken by the user to achieve his/her tasks.

Table 25 shows that involving the users in this aspect of the system development process is essential to provide the detailed information and to make the users familiar with the new system structure. However, the designer needs to take into consideration the level of user participation in the system development process, which means involving the users in one or more tasks during the development process. The user participation level needs to be discussed by the designer and users so that an agreed process can be identified.

Task Analysis
Goals are work-related objectives
Tasks may or may not be consistent between users
Actions are a series of steps which need to be followed in sequence in order to complete the tasks and hence achieve the users' goals
Granularity refers to the level of detail in a description

Table 25: Task Analysis

3.7.2 Detailed Website Design and Implementation

The previous sections highlighted the need for a detailed approach to website design. This can lead to an effective website implementation, including organizational aspects. Two types of approaches will be discussed from the web-based hypermedia application perspectives in this section: The Object-Oriented Hypermedia Design Model and the Implementation Model.

3.7.2.1 The Object-Oriented Hypermedia Design Model (OOHDM)

Schwabe and Rossi (1995) describe an (Object-Oriented Hypermedia Design Model) OOHDM, a new model especially for designing a complex Web-based hypermedia application. The main aims of this approach are to: reduce complexity, make the

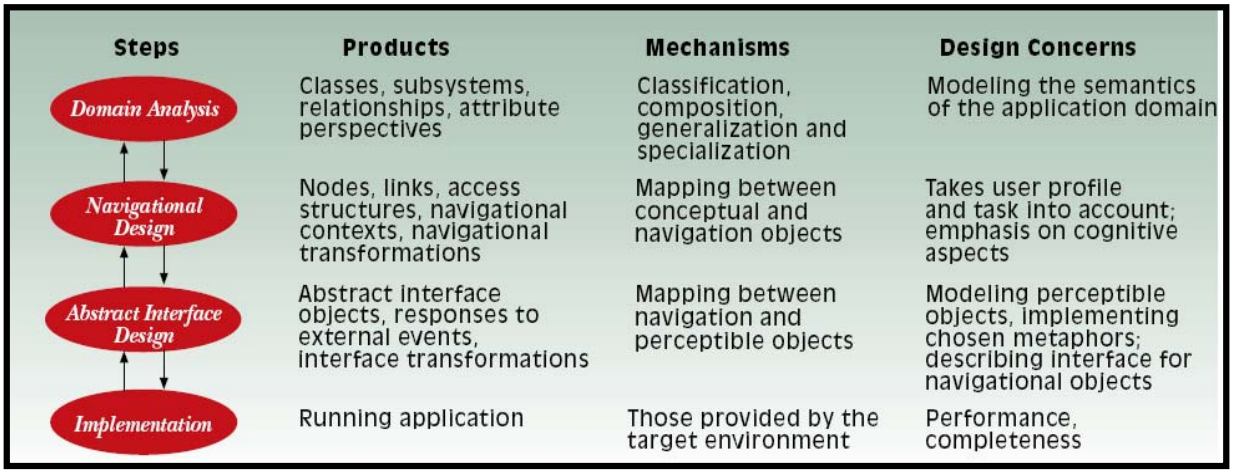
website easy to navigate and maintain, thereby saving time and money, and make it more attractive to the users. This approach clearly separates the "*navigational from conceptual design by defining different modeling primitives in each step*" (Schwabe et al. 1995, p. 46). This approach is divided into four sequential stages (see Figure 20), where each must be completed before the next stage can be started, although iteration can be used. Each stage *"focuses on a particular design concern, and an object-oriented model is built"* (Schwabe et al. 1995, p. 45). The stages are as follows:

- **Domain Analysis**: in this, stage the "*conceptual model of the application domain is built using well-known object-oriented modeling principles*" (Schwabe et al. 1995, p. 45).

- **Navigational Design**: in this stage the navigational structure for the hypermedia application will be defined in "*terms of navigational contexts (focusing on the users and their tasks), which are induced from navigation classes such as nodes, links, indices, and guided tours"* (Schwabe et al. 1995, p. 46).

- **Abstract Interface Design**: this stage provides the "*perceptible objects*" (i.e. picture, a city map…etc) in "*terms of interface classes*" (i.e. text fields and buttons) (Schwabe et al. 1995, p. 46). Furthermore, this step will establish the communication between the interface and navigation in the hypermedia application.

- **Implementation**: In this stage, the hypermedia application will be implemented according to the user requirements and needs.



Source: (Schwabe et al. 1995, p. 45)

Figure 20: The OOHDM Methodology

Table 26 illustrates that the design stage is very important for development of two key aspects of the website: navigational design and abstract interface design.

The OOHDM Methodology – Extra Stage
Design: two aspects will be defined in this stage: 1) navigational design; and 2) abstract interface design. The latter will define the navigational structure for the hypermedia application, while the former will establish the communication between the interface and navigation in the hypermedia application. **Construction (Implementation):** involves the technical implementation of the design

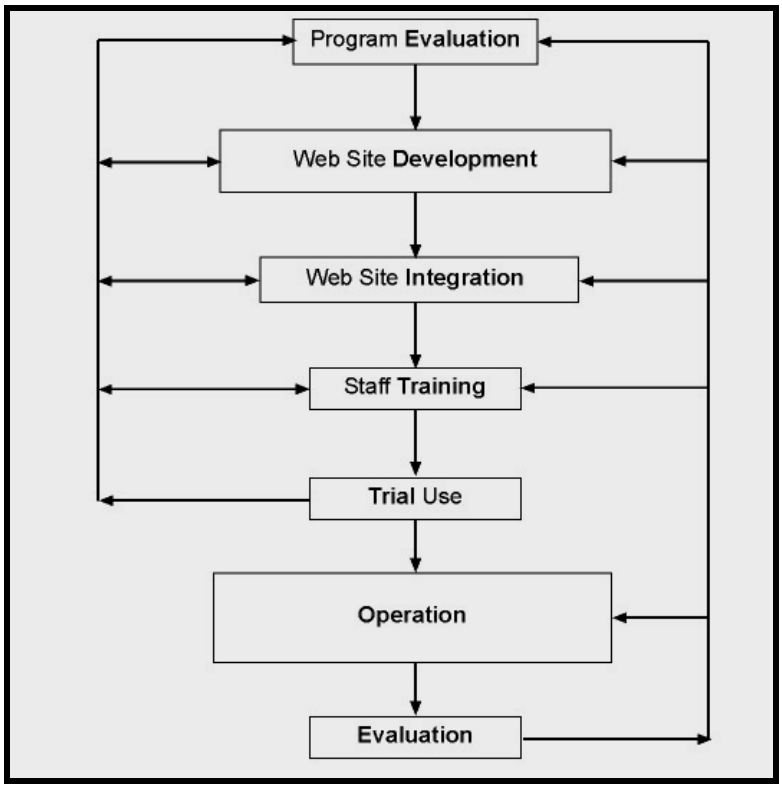
Table 26: The OOHDM Methodology - Extra Stage

3.7.2.2 Implementation Methodology

Sampson[51], Carr, Panke, Arkin, Minvielle, and Vernick, (2001) describe a methodology which provides for the development of effective websites for counseling and career services. This methodology is very useful as it "*can be used to*

[51] Sampson http://www.career.fsu.edu/documents/implementation/Implementing%20Web%20Sites.ppt.

consider opportunities for enhancing the design and use of the site" (Sampson et al. 2001) and it also incorporates organizational aspects of implementation.



Source: (Sampson et al. 2001)

Figure 21: The Seven Steps Implementation Model

This model is divided into seven sequential stages (see Figure 21), each of which must be completed before the next stage can be started. The stages are as follows:

- **Program evaluation:** this stage provides the foundation for the implementation process, helping to "*ensures that the website is used for the right reasons with the right clients*" (Sampson[52] et al. 2001). The step has several sub steps: evaluate the current resources and services; establish a committee; prepare an implementation plan; and seek stakeholder support.

[52] Sampson http://www.career.fsu.edu/documents/implementation/Implementing%20Web%20Sites.ppt.

- **Web site development:** this stage helps the designer to make sure that the "*web site developed has the potential to effectively meet client and organization needs*" (Sampson et al. 2001). The stage has several steps: develop and evaluate website contents and features, and develop site documentation. In addition, this stage focuses on the development of website contents. Three questions need to be asked: "*Whom does the website serve? What are the needs of users and what resources exist that would meet each of the identified needs?"* (Sampson et al. 2001).

- **Web site integration:** this stage involves the users to make sure that the website outcomes will meet their requirements. It begins with the "*staff reviewing current needs and current resources and services*" (Sampson et al. 2001), and then determining how the website will be used in delivering services and how it will operate according to user requirements.

- **Staff training:** necessary training is given to the staff to incorporate the web site with existing service delivery.

- **Trial use:** this stage requires the users to try out the website to see if it meets their needs. Moreover, continuing training is available in this stage, and observation and interview methods are used in order to determine if the website training is effective.

- **Operation:** this stage allows the user to operate and use the website.

- **Evaluation:** evaluation and comments are collected from the users to ensure that the website services are running according to the user requirements. Therefore, the *"results of the evaluation are used to indicate needed improvements in web site design and use"* (Sampson et al. 2001).

Finally, feedback loops (see Figure 21) are indicated by the arrows "*indicating the direction of the feedback*" (Sampson et al. 2001). The staff responds to feedback as the implementation process continues. It was noted that this model is most suited to

the development of websites for counseling and career services. However, it also has a wider application.

This method includes a stage which is essential to the system development process, which is Training Staff (see Table 27).

Implementation Methodology – Extra Stage
Training Staff: from Implementation Model. This phase provides necessary training to the staff about the new system.

Table 27: Implementation Methodology - Extra Stage

3.8 Summary of Information Systems Development Methodologies, Methodologies for Developing Web Sites, and Marketing Methodologies

New challenges have been imposed since the growth of use of the Internet as a global means of delivering information, selling goods, and entertainment. These new challenges suggest the need to develop a new methodology for developing websites which meet users' requirements and needs in order to avoid potential client frustration, make the website enjoyable, effective and efficient, and most importantly, to improve performance.

In this section, the researcher will summarize the results from the earlier analysis of Information Systems Development Methodologies, Methodologies for Developing Web Sites, and Marketing Methodologies. The purpose behind the analysis is to:

- Identify the strongest stages of each methodology;
- Identify how well the four key principles are addressed in each methodology;
- Identify the extra stages from website and marketing methodologies.

Identifying the strongest stage for each methodology will help the researcher to define the framework for the new participative methodology for developing websites.

The researcher identified several stages from the development life cycle, which are: 1) planning, 2) analysis, 3) design, 4) testing, 5) implementation, 6) evaluation, and 7) maintenance. These stages are considered the basic and essential requirements for the system development process, as via these stages the designer will develop a system (interface or website) which meets the users' requirements.

Additionally, under the tables summarizing stages in the methodologies the researcher added four extra rows: "user participation", "usability", "iteration" and "real interaction". These key principles were either not fully considered in some methodologies, or were totally ignored. These principles are identified as being fundamental to the proposed system development process of a website for marketing purposes, producing an effective interface or website. Simultaneously, through these principles, the designer and user will develop the new system (interface or website) to meet the user requirements and needs in order to make the design system flexible and adjustable, and to limit user frustration when working with it. These principles are the main foundation for this research.

The first row is "**user participation**". It was noticed that user participation is a very practical approach in the development process. With it, the users will perform some activities and tasks and "*these activities may pertain either to the management of the ISD project or to the analysis, design, and implementation of the system itself*" (Hartwick et al. 2001 p. 21).

Furthermore, according to Hartwick and Barki, four dimensions of user participation can be identified: RESPONSIBILITY; USER-IS RELATIONSHIP HANDS-ON ACTIVITY, and the most important aspect, which is COMMUNICATION ACTIVITY. These dimensions can deliver the following information to the designer.

- **Responsibility**: "*the performance of activities and assignment reflecting overall leadership or accountability for the project*".

- **User-IS Relationship**: "*the performance of development activities reflecting users' formal review, evaluation and approval of work done by the IS staff*".
- **Hand-On Activity**: "*the performance of specific physical design and implementation tasks*".
- **Communication Activity**: "*activities involving formal and informal exchange of facts, needs, opinions, visions, and concerns regarding the project among the users and between user and other project stakeholders*" (Hartwick et al. 2001 p. 22).

Therefore, the designer needs to work very closely with these dimensions in order to gain the basic information from the user about the system requirements and to identify the problems of the system. Furthermore, "*user objectives, assumptions, strategies, actions, errors, problems, attitudes, etc., should surface so they can be explicitly considered in the system design and implementation processes*" (Hartwick et al. 2001 p. 22).

In addition, communication between the designers and users is an important aspect which helps to identify the problems and to develop various solutions for the system by using different negotiation approaches and placing more emphasis on listening to users' needs and desires. For example, Joint Application Development (JAD) workshops are "*facilitated by a session leader trained in group dynamic techniques, where users and developers work together to plan and design a new system*" (Hartwick et al. 2001 p. 22).

The second row is "**usability**". This term is very important in the system development process as usability involves "*an assortment of support for needs such as ease of use, ease of learning, error protection, graceful error recovery, and efficiency of performance*" (Carroll 2002 p. 193). Usability will be emphasized in this research as it is considered very important especially in a methodology for developing websites.

The third row is "**iteration**". This term is very important in the system development process, as it can occur in each stage to ensure that the web site is meeting the user

requirements and company outcomes. This will enable the designers to build up the new website and make sure that the project will be tested repeatedly until it meets user requirements.

The fourth row is "**real interaction**". This term is very important in developing a website as it occurs in the maintenance and evaluation stages to ensure that user requirements are being met, by tracking use of the website by real users to achieve their specific objectives.

Finally, for the new participative framework for developing websites, a column will be added called "**participation rating**" which will help the researcher to identify the level of need for user participation in each stage. The participation rating will be from 0 to 3, indicating zero participation to maximum participation. The 1 and 2 ratings are minimum and moderate participation respectively

The researcher earlier reviewed the Mumford (1995) classification of user participation approaches in the system development process. In this research, the researcher will be using only the first two approaches: the Consultative Approach and the Representative Approach. Both of these approaches are very appropriate in all the stages in order to secure the agreement between users and designers at the beginning and to identify the key aspects, such as system objectives, problems, and the creating of various solutions to the system. The Consensus Approach will not be adopted in this research as it "*does not always emerge easily and conflicts which result from different interests within a department may have to be resolved first*" (Mumford 1995, p. 18-19).

Extra stages were added from various methodologies for developing web sites, mainly focusing on: identifying user types, navigation, promotion, and prototyping. In addition, the researcher included more stages from marketing methodologies mainly focusing on: promotion, prototyping, budget, ROI (return on investment) and measurement.

The requirements of a new participative methodology for developing websites include:

- Participation at all stages (different participation rate);
- Provision of detailed contents acquisition and maintenance requirements;
- Provision for detailed design of presentation;
- Provision of usability evaluation (at various stages);
- Provision of regular maintenance.

Table 28 summaries the key aspects of the methodologies discussed in earlier sections of this chapter. More discussion in respect to Table 28 will be provided in Chapter 4 where the researcher will explain:

1- How these stages will work together to provide a coherent design and evaluation methodology for developing websites;
2- How these stages will help the users and designer simultaneously to design a simple and friendly website, which will meet the users' needs and desires.

Stage	Participation rating	Methodologies	Principles			
			User Participation	Usability	Iteration	Real Interaction
Planning	3	Soft System Methodology	1	0	2	0
		Human Factor Methodology for Designing Websites (HFMDW)	1	2	1	0
		Relationship Management Methodology (RMM)	0	0	1	0
		The Web Site Design Method (WSDM)	1	2	0	0
		E-Marketing Plan	1	0	0	0
		The Market-Vantage (Internet Performance Marketing) Methodology	0	0	0	0
Analysis	2	Soft Systems Methodology (SSM)	3	0	2	0
		User Centered Development Methodology (UCDM)	1	0	0	0
		Ethics Methodology	3	0	0	0
		Human Factor Methodology for Designing Websites (HFMDW)	0	3	1	2
		The Web Site Design Method (WSDM)	1	2	0	2
		Task Analysis				
Design	3	Structured Systems Analysis and Design Methodology (SSADM)	1	0	1	0
		Soft Systems Methodology (SSM)	2	0	2	0
		User Centered Development Methodology (UCDM)	1	3	1	0
		Relationship Management Methodology (RMM)	0	0	2	0
		The W3DT Design Methodology	0	0	0	0
		The Web Site Design Method (WSDM)	1	2	0	2
		Navigation				
		Prototyping				
Testing	3	User Centered Development Methodology (UCDM)	1	3	1	0
		Human Factor Methodology for Designing Websites (HFMDW)	1	3	2	0
		The Advertures Company Methodology	0	0	2	0
Implementation	2	Information Development Methodology for the Web	1	0	0	0
		E-Marketing Plan	1	0	0	0
		The Market-Vantage (Internet Performance Marketing) Methodology	0	0	2	0
		Construction				
		Promotion				
		Staff Training				
Evaluation	3	User Centered Development Methodology (UCDM)	2	3	1	0
		Human Factor Methodology for Designing Websites (HFMDW)	0	3	2	0
		E-Marketing Plan	0	0	0	3
		Measurement				
Maintenance	2	Human Factor Methodology for Designing Websites (HFMDW)	0	0	1	3
		The Market-Vantage Methodology	2	0	0	2
		EnSky's Unique Methodology	1	0	0	1

Table 28: New participative framework for developing websites

Participation rate is from 0 to 3. Zero represents no participation while 3 indicates maximum participation. Ratings of 1 and 2 are minimum and moderate participation respectively. The ratings are based on the Consultative and Representative approaches according to Mumford (1995).

3.9 Conclusion

This chapter has outlined the basic concepts behind Methodologies including: lifecycle models, IS development methodologies, methodologies with explicit human factors aspects, websites methodologies, marketing methodologies, and additional detailed techniques such as task analysis and detailed website design and implementation. The main focus has been on defining users' requirements and needs, planning, analysis, design, testing, implementation, evaluation and maintenance. These stages are very useful in any methodology as, via them, the designer will make sure that the system is running according to the needs of users and the client organizations. In addition, four key principles (user participation, usability, iteration, real interaction) were identified as fundamental aspects to develop systems in an effective manner. The four key principles are the main foundation for this research.

The choice of the most appropriate methodology is a very important issue in the development process, and one which needs to be considered by the designer and management simultaneously to achieve successful and profitable systems in the end, since "*each methodology produces various components at various stages and the terminology used varies considerably from one methodology to another" (*Olle et al. 1998, p. 70).

Having reviewed the stages from a wide range of methodologies, the chapter concludes with a draft framework combining the most effective aspects of the methodologies.

The next chapter investigates the integration of methodologies to provide for an effective system development process, followed by a discussion of how various academic fields of study have shaped integration approaches. In addition, a literature review of methodologies integration will be discussed to identify the weakness and strengths of adopting embedding and grafting approaches. Furthermore, in the next chapter the researcher will examine how these stages from the framework will work together to produce an effective design and evaluation methodology for developing

websites; that is, how these stages from the framework will be a part of a new participative methodology for developing websites.

CHAPTER FOUR

INTEGRATION OF METHODOLOGIES

In Chapter Three, an extensive review was presented of various Lifecycle Models, IS development methodologies, methodologies with explicit human factors aspects, websites methodologies, marketing methodologies, and additional detailed techniques. This serves to provide the fundamentals for developing the framework for the new participative methodology. This was developed by identifying the strongest stage of each methodology to allow both designers and the users (end users and client-customer users) to work collaboratively for developing websites, which meet the users' requirements. In this chapter, the researcher will examine issues relating to the integration of relevant methodology components and construct a new participative methodology for developing websites.

4.1 Introduction

After reviewing various Lifecycle Models; and Methodologies from the Information Systems, Web Design and Human Computer Interaction, and Marketing perspectives, and developing the framework for the new participative methodology, the researcher examined previous studies dealing with the integration of methodologies. The chapter will discuss how combining and integrating methodologies will help the designer and users to work collaboratively in the system development process.

This chapter begins with a general introduction regarding integration of methodologies in the system development process. This is followed by a discussion

of how various academic fields of study have shaped integration approaches. A literature review of methodology integration will be discussed to identify some of the weaknesses, strengths, and criticisms associated with adopting or not adopting methodologies integration in the system development process. In addition, a summary will be provided to identify the philosophical problems involved in combining methodologies.

This review will then be used to inform the process of integration of methodology elements proposed in Chapter Three, leading to a new draft of an integrated methodology for website development.

4.2 What is an Integration Methodology?

The objective here of methodology integration is to produce an effective approach that will achieve high usability by adopting a participative approach to website development. The resulting methodology must produce a technically sound and efficient website, while maximizing its human factors aspects.

In a general sense, such integration of methodologies involves combining soft systems thinking and the hard systems approaches. The main purpose behind this is the "*transformation of a soft systems conceptual model into a construct familiar to IS practitioners such as a data flow diagram*" (Miles 1992, p. 62). This links user requirements to particular technical developments.

The Hard Systems Approaches, also known as "Functionalist Systems Methodologies", are successful applications in problematic situations where the problem is clearly defined, is well structured and the relationships between the variables are tractable, e.g. where "*the problem is of a technical nature, largely devoid of human aspects; and the decision maker can enforce implementation of the solution*" (Daellenbach[53] n.d.). Hard Systems Approaches are technical and most of

[53] Hans G Daellenbach, Department of Management, University of Canterbury, Christchurch, NZ: http://www.esc.auckland.ac.nz/Organisations/ORSNZ/conf36/papers/Daellenbach.pdf

the results may involve the use of quantitative approaches such as computer simulations, statistical analysis or potentially large mathematical models and optimization techniques. The negative aspects of using these approaches for less well-defined situations include the "*lack of participation among the stakeholders and the problem solving focus is inappropriate"* (Wood-Harper[54] 2000).

Conversely, Soft Systems Approaches, also known as "Interpretive Systems Methodologies", may inadequately address the details of problem situations. The focus is on structuring of the problem situation components and relationships rather than on technical problem solving. Soft Systems Approaches are suitable "*where different stakeholders with different world views have different, possibly conflicting perceptions about the problem situation and its major issues; where there may be no agreement about the appropriate objectives, or even the set of possible actions; and where it may be meaningless to talk about optimization, since a resolution usually involves a compr[om]ise, but where there are sufficiently shared values and interests to cooperate"* (Daellenbach[55] n.d.).

These "soft approaches" were developed through action research and practice and they start out by seeking information about the current situation (the issue(s)) within its wider context. The initial analysis is prepared via various elicitation techniques, for instance "*by uncovering uncertainties about values, choices, and the environment, and identifying clusters of highly connected aspects*". The main purpose behind this stage is to gain a "*shared understanding and mutual appreciation of the issues, including personal world views and objectives"* (Daellenbach n.d.). The criticisms of Soft Systems Approaches include their "*neglect of using technologies and lack of material impact*" (Wood-Harper 2000). Finally, this approach can cope well with human aspects but has difficulty in handling the technical aspects.

The objective of combining Hard and Soft systems Approaches is to exchange views and stages between them in order to produce an integrated methodology so as to

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[54] Wood-Harper: http://www-users.cs.york.ac.uk/~kimble/nukais/twh.pdf
[55] Hans G Daellenbach, Department of Management, University of Canterbury, Christchurch, NZ: http://www.esc.auckland.ac.nz/Organisations/ORSNZ/conf36/papers/Daellenbach.pdf

meet all the requirements for developing the new system. As was indicated above, each of these approaches disregards some aspects in the system development process, which leads to an inadequate system development. The problem, though, is how to combine the competing approaches in an efficient and effective manner.

4.3 Theoretic Issues re Combining Methodologies

Various theories have been suggested as the basis for choosing between, or integrating, methodologies to produce the appropriate methodology in a given situation. Flood and Jackson (1991) introduced an approach called "Total Systems Intervention (TSI)".

"*Total Systems Intervention (TSI) represents a new approach to planning, designing, "problem solving" and evaluation. The process employs a range of systems metaphors to encourage creative thinking about organizations and the difficult issues that managers have to confront. These metaphors are linked through a framework, the "system of systems methodologies", to various systems approaches, so that once informed agreement is reached about which metaphors most thoroughly expose an organization's concerns, an appropriate systems-based intervention methodology (or set of methodologies) can be employed. Choice of an appropriate systems methodology will guide "problem solving" in a way that ensures that it addresses what are found to be the main concerns of the particular organization involved*" (Flood et al. 1991, p. 45).

TSI was invented to encourage "*highly creative thinking about the nature of any problem situation before a decision is taken about the character of the main difficulties to be addressed*" (Flood et al. 1991, p.xiii). TSI involves choosing which type of system methodology will be appropriate for the specific needs. The nature of TSI is to address the problem by combining various types of methodologies, where one of them is "dominant", while the others are "supportive", "*although these relationships may change as the study progresses"* (Flood et al. 1991, p. xiv). As a

result, TSI acts as a meta-methodology within a Critical Systems Thinking framework, in an "*interactive manner which is deemed to be particularly powerful and fruitful*" (Flood et al. 1991, p. 46).

The philosophy of TSI is based on Critical Systems Thinking, a new development in the systems movement. According to Flood and Jackson, Critical Systems Thinking can be viewed from three aspects: "Complementarism", "Sociological Awareness" and "Human well-being and emancipation".

- **Complementarism**: involves a comparison between "pragmatist" and "isolationist" approaches to systems methodologies.

    - *Pragmatist*: focuses on building a "tool-kit" of techniques which have been used in practice, and neglects the "theoretical issues" to solve the problem. Most consultants adopt this method in order to please the client; however, better results for the problem solution can be obtained if the theoretical issues are considered from the beginning. Pragmatism "*abandons the hope of developing management science as an intellectual discipline, the main tenets of which can be passed on to "apprentices""* (Flood et al. 1991, p. 47).

    - *Isolationist:* the analyst works with only one method or methodology to solve any particular problem. However, more extreme isolationists engage in a kind of "imperialism", suggesting that one approach is superior to all others. They advocate adapting "*methods and methodologies for use under the tutelage of the preferred theoretical position*" (Flood et al. 1991, p. 47). This will lead to misuse of methodologies, rather than using an approach that suits the situation – i.e. use of

soft, hard or cybernetic[56] approaches to tackle the problems in the system without regard to the nature of those problems.

- **Sociological Awareness:** focuses on which particular system methodologies have become popular for guiding interventions at particular times, the reasons for their possible lack of applicability, and potential consequences for the client organization. For example, "soft" Systems Methodologies, which are *dependent upon open and free debate for the justification of their results, might have deleterious social consequences if the conditions for such debate were absent"* (Flood et al. 1991, p. 48).

- **Human well-being and emancipation:** Flood et al. (1991, p. 49) state that "*critical systems thinking and the thrust of TSI is emancipatory*", as it seeks to achieve for "*all individuals, working through organizations and in society, the maximum development of their potential*." According to Jürgen Habermas (cited in Flood et al. (1991)), there are two essential foundations in human life: Work and Interaction. The latter is known as "practical interest", which is concerned with securing and expanding the possibilities for "*mutual understanding among all those involved in social systems*" (Flood et al. 1991, p. 49). While the former enables human beings to achieve goals and to bring new materials to the work environment so as to increase the technical capabilities of human beings for the prediction and control of natural and social affairs.

The philosophy of TSI comes through integration of guidelines, and practice, which needs to be appreciated by all who are planning to use this approach. Flood et al. (1991, p. 49) state that ""*hard" and cybernetic systems approaches can support the technical interest,* while the soft methodologies "*the practical interests and critical systems heuristics can aid the emancipatory interest*".

Total Systems Intervention consists of three phases: creativity, choice and implementation.

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[56] Cybernetic: *Approaches based on laws of organizations (Flood et al. 1991, p. 47).*

- **Creativity:** "*identifies the dominant dependent issues using various systems metaphors*" (Daellenbach[57] n.d.). Three aspects are involved in this stage: task, tools and outcomes.

    - *Task:* uses systems metaphors as organization structures to help managers think creatively about their enterprises.
    - *Tools:* TSI introduced various types of tools to assist in the discussion and debate.
    - *Outcome:* is to highlight the main interests and concerns and to provide "*the basis for a choice of an appropriate intervention methodology*" (Flood et al. 1991, p. 51).

- **Choice:** "*identifies a main system based methodology of the dominant issue*" (Daellenbach n.d.). In addition, three aspects are involved in this phase: task, tools and outcomes.
    - *Task:* choosing the appropriate systems intervention methodology (or methodologies) to meet the requirements of the organization, which were exposed in the creative phase.
    - *Tools:* guidelines from the "*system of systems methodologies*" (Flood et al. 1991, p.51) aid in the choice of an appropriate methodology.
    - *Outcome:* the outcome from this phase is to choose the "dominant" methodology, to "*be tempered in use by the imperatives highlighted by "dependent" methodologies*". (Flood et al. 1991, p. 51).

- **Implementation:** this phase focuses on adopting a specific methodology to bring about the desired change. Task, tools and outcomes are also involved in this phase.

[57] Hans G Daellenbach, Department of Management, University of Canterbury, Christchurch, NZ: http://www.esc.auckland.ac.nz/Organisations/ORSNZ/conf36/papers/Daellenbach.pdf

- *Task:* employing a particular "*systems methodology (or methodologies) to translate the dominant vision of the organization, its structure, and the general orientation adopted to concerns and problems, into specific proposals for change*" (Flood et al. 1991, p. 52).
- *Tools:* TSI provides "*specific systems methodologies tools used according to the logic of TSI*" (Flood et al. 1991, p. 52).
- *Outcome:* the outcome from the implementation stage is "*co-ordinated change brought about in those aspects of the organization currently most vital for its effective and efficient functioning* (Flood et al. 1991, p. 53).

To conclude, TSI is a very important meta-methodology. It can *support and enrich organizational planning, decision-making and "problem-solving" capabilities* (Flood et al. 1991, p. 59). The uses of TSI can help with two issues: 1) defining the "problem situation" and 2) delivering the appropriate "problem solution" methodology (or methodologies).

The TSI phases can be iterative to confirm that the demands of an organization are being met, and the methodology (or methodologies) which was (or were) chosen will give effective and efficient performance to the organization.

However, philosophical problems are still applicable in combination and integration methodologies as much depends on the circumstances of the problems and the users who are dealing with this meta-methodology. Therefore, these problems need to be addressed in the future, especially with the combination of methodologies for building up a new system (interface or website). Can methodologies based on vastly different philosophical approaches be effectively combined, or even used in parallel?

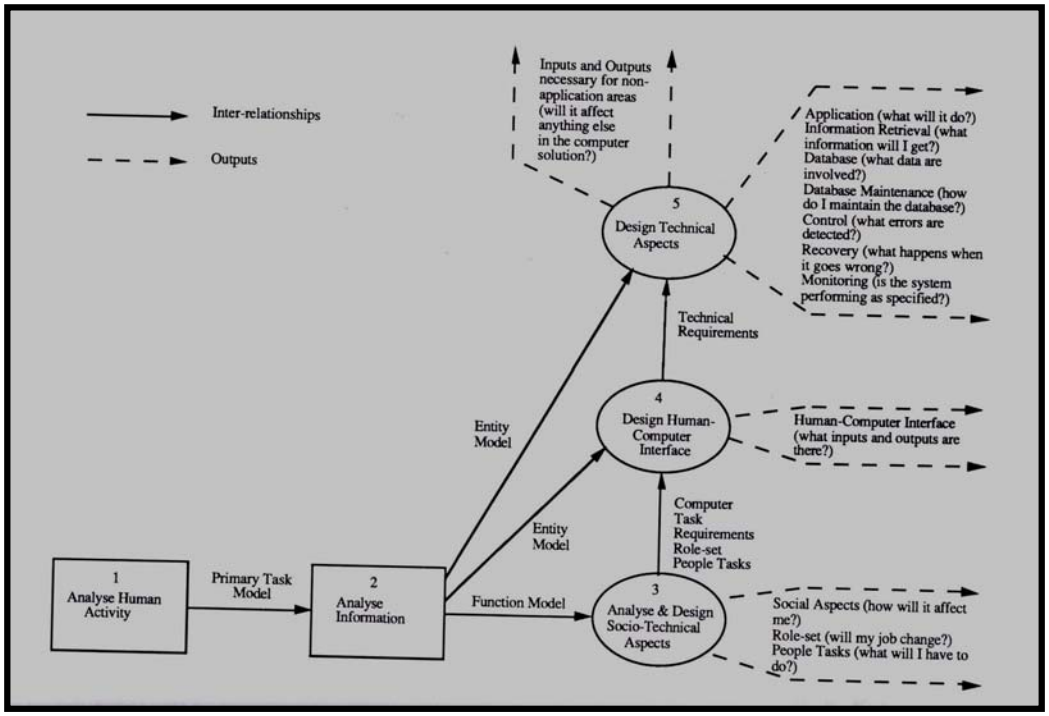
4.4 Integration of Methodologies

This section will discuss an attempt at integration of methodologies for the system development process. The idea behind this is to take the best aspects of several existing methodologies and combine them to create new frameworks, which consider the human and technical aspects of the system development process. These aspects have been influenced by both "soft" and "hard" systems approaches.

An example of such integration of methodologies is the Multiview methodology. The Multiview methodology *"is a blended methodology drawing from a number of major methodologies already in use or proposed"* (Avison and Wood-Harper 1990, p. 13). This methodology focuses on two major aspects of information systems development: human and technical. Both of these aspects can be critical and Multiview *"has been designed for such complex problem situations"* (Avison et al. 1997, p. 77).

Avison and Taylor (1997, p. 77) stated that "*Multiview is a flexible framework where the techniques and tools are chosen according to the particular problem situation and the stage in the development of the information system"*. That is, the methodology is to some extent 'contingent', meaning that it can be adapted (by emphasizing different aspects) to suit any particular problem situation.

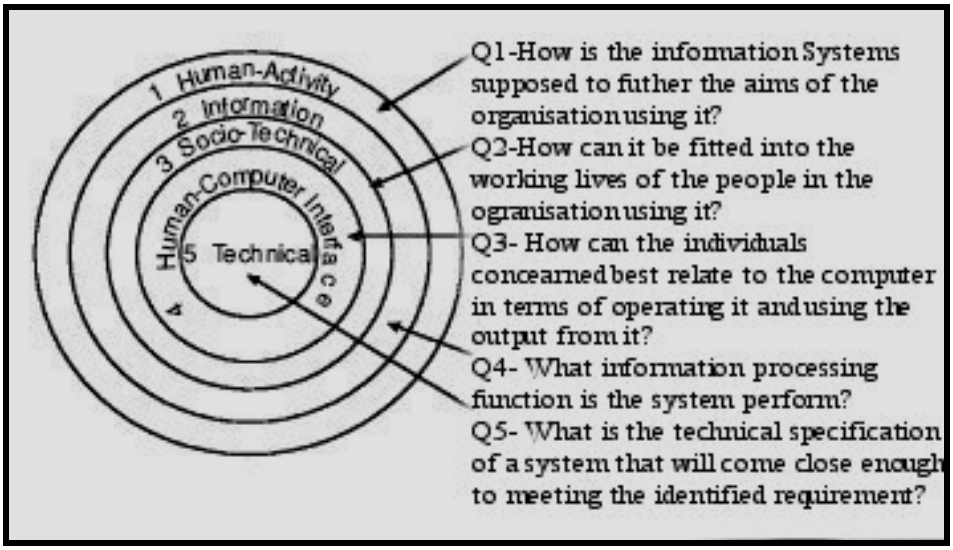
There are five stages in the Multiview Methodology, focusing on systems analysis and design. Each stage provides a different perspective of the problem and has different tools to tackle the aspects of the problem relevant at that stage of the system development process. The outputs of the methodology are revealed as dotted arrows in Figure 22.



Source: (Avison et al. 1990, p. 22)

Figure 22: The Multiview Framework

Figure 23 provides an overview of this methodology. The following five stages are used to address the questions raised in Figure 23: (1) analysis of the human activity system; (2) analysis of the information (entities and functions); (3) analysis and design of the socio-technical system; (4) design of the human-computer interface; and (5) design of the technical aspects. Note that the stages are represented as moving from more general to more specific aspects of solving the problem(s).



Source: (Avison et al. 1997, p. 77)

Figure 23: The Multiview1 framework

The Multiview methodology focuses on two aspects of the problem and its solution: issue-related and task-related. The issue-related question is *"What do we hope to achieve for the company as a result of installing a computer?"* while the task-related question is: *"What jobs is the computer going to have to do?"* (Avison et al. 1990, p. 23).

The stages to Multiview may be summarized as follows:

- **Analysis of Human Activity:** the stage begins by trying to understand the worldview or "Weltanschauung" of the people involved. This stage is based on the Soft Systems Methodology (SSM). Rich picture and root definition techniques are used in this stage to retrieve the conceptual model. The conceptual model will define what the system will do, while the output will answer the question "*How is the information system supposed to further the aims of the organization using it?*" (Avison et al. 1990, p. 25). This stage uses different types of tools such as questionnaires, interviews, workshops and observation in order to gain more information about the existing system and the problem situation.

- **Analysis of information (sometimes called information modeling):** the purpose of this stage is to analyze the entities and functions, which were identified in the first stage by the conceptual model. Two phases are involved in this stage:

    - *Development of a functional Model:* to identify the main functions required for resolution of the problem. A series of data flow diagrams will be drawn in this stage in order to show the sequence of events which need to be carried forward to the third stage.
    - *Development of an entity model:* an "*entity is anything that you want to keep records about*" (Avison et al. 1990, p. 29). The purpose behind this stage is to define the entities and the relationships between them – i.e. data modeling.

- **Analysis and design of socio-technical aspects:** this stage will define the human needs for the new system, identify alternative socio-technical solutions to the problem, and pick the solution that best meets both the technical and human objectives. The outputs of this stage "*are the computer task requirements, the role-set, the people task and the social aspects*" (Avison et al. 1990, p. 32).

- **Design of the human-computer interface:** this stage is concerned with the technical design of the computer interface. The inputs are the entity model and information model (derived from stage two of the methodology) and the computer task requirements, the role-set, the people task and the social aspects (from stage three). This information is used to create and produce an appropriate interface, which meets user requirements, by using the prototyping approach. This approach generates an enormous amount of feedback from the user, and this feedback will enhance and improve the system interface.

- **Design of technical aspects:** this stage is concerned with the final major outputs of the methodology "*such as application, database, control, recovery*

and monitoring aspects" (Avison et al. 1990, p. 33-34). The inputs are the entity model from stage two and the technical requirements from stage four.

The Multiview methodology was developed through a series of consultancy projects and there has been considerable interest in how effective it is for integrating "hard" and "soft" approaches. To achieve a valid evaluation of the methodology, it must be based on a coherent framework, which permits comparison of approaches. Frances Bell (1996) has used the framework called NIMSAD[58] to evaluate the Multiview Methodology. NIMSAD was chosen for specific reasons:

- *The author's familiarity with the framework;*
- *The shared roots of Multiview and NIMSAD* (Jayaratna 1994);
- *The opportunity to build on existing evaluations using NIMSAD.*

(Bell 1996, p. 167)

Before discussing the evaluation of Multiview Methodology, it is useful to review the four essential elements of the NIMSAD framework:

- ***The 'problem situation' (the methodology context):*** the reasons for "*which information processing systems are designed, implemented and have to perform";* (Jayaratna 1994, p. 73).

- ***Intended problem-solver (the methodology user):*** the framework "*stressed the importance of understanding the context of information systems"* (Jayaratna 1994, p. 63), and the need to clearly define the role of the intended problem-solver.

- ***The problem-solving process (The Methodology):*** this aspect "*is focused on problem formulation; solution design; and design implementation* (Jayaratna 1994, p.74).

[58] NIMSAD: Normative Information Model-based Systems Analysis and Design (Jayaratna 1994, p.44)

- ***The evaluation of the above three:*** *"to measure the effectiveness of the problem-solving and the problem solver in the 'problem situation'"* (Jayaratna 1994, p. 108).

The evaluation of Multiview is now carried out in terms of these four elements.

Problem Situation: Bell (1996) stated that the techniques used in the Multiview methodology for surfacing and clarifying the problem situation are based on the Soft Systems Methodology.

- **The first stage** analyses both the human and information related aspects of the current system. It *"includes recognition of the stakeholders' worldview or (Weltanschauungen)*" (Bell 1996, p. 168). This interaction and observation between the users will create a clear picture about the existing system and the new system that is required, taking into account the (perhaps divergent) views of the various stakeholders.

- **The second stage** provides *"analysis of information in respect to modeling of functions, events and entities"* (Bell 1996, p. 169). This will assist the analyst to create models and diagrams of the new system. Bell (1996, p. 169) stated that the "*functional model is focused on the future information systems rather than the problem situation and the quality of the treatment of the problem situation may depend much more on the skills and approach of the analyst than the actual techniques and notations offered by Multiview"*.

- **The third stage** aims to design information systems which serve the needs of organizations, especially the staff who will use these systems. This stage is focused on user participation and human needs which leads to "*better understanding of the problem situation, as well as improving the chances of subsequent user acceptance of the system"* (Bell 1996, p. 169).

- **The fourth stage** aims to design the computer interface, in a way that addresses the requirements identified in the earlier stages.

- **The fifth stage** deals with the technical specification aspects and its interaction with the problems situation. (Bell 1996).

The Problem Solver: Bell (1996) confirmed that user participation is an essential aspect of the Multiview methodology as it is considered at each stage to confirm that smooth transition from the old system to the new is occurred. Therefore, the analyst needs to listen to the users and to their social objectives in order to "m*ake those objectives explicit*" (Bell 1996, p. 170). However, this methodology is unable to offer guidance regarding "how" to manage and resolve the conflicts between the parties (i.e. the various user groups and the analysts). The outcomes of user participation may leave the analyst unable "*to accommodate the conflict of ethics and values"* (Bell 1996, p. 170). Multiview Methodology is not ideal when the system problem is not clear and hence the users' needs are uncertain.

The Problem Solving Process: this aspect is focused on problem formulation, solution design and design implementation. Stage one has problem formulations as its main concern, as the techniques in this stage "*offer support for the logical stream of analysis, although cultural aspects are often highlighted as important e.g. in the case studies"* (Bell 1996, p. 171). Since SSM was adopted in the Multiview Methodology, the authors of this methodology claim that "*each stage of Multiview provides its own view, thus giving multiple perspectives"* (Bell 1996, p. 171). However, Bell stated that when Multiview problem formulations were compared with NIMSAD's stages, it was noticed that there was a "*lack of focus on 'problems' and the implicit nature of the prognosis outline*" (Bell 1996, p. 171).

With respect to system design, the conceptual models from stage one can be compared with the functional model from stage two as the information "*needs are conceptually modeled and designed"* (Bell 1996, p. 171). In the Multiview methodology, only one data model is created and confirmed by the users, whereas "*current ideas in data modeling stress the creative aspects of data modeling, and the consideration of several possibilities"* (Bell 1996, p. 171). Stage four focuses on the technical requirements for the dialogue between the computer and human, while stage five involves the prototype of the human computer interface being tested and evaluated by the users.

To define the basic scope of the system, the Multiview Methodology uses various functions, as these functions are considered the basic aspects in this methodology, such as human objectives, views, experience, and the activities they perform in the current system. The methodology uses various techniques to define and understand the problems, such as rich pictures and Unified Modeling Language (UML). Multiview identifies the preferred situation by identifying alternative solutions to the problem, and choosing the one that most completely satisfies the social and technical objectives of the system.

However, Multiview methodology does not assess the legitimacy of the problems owners' definition of the problem or the motivation behind the change, as it involves studying many views of the problem in order to choose the main solution for the system. Bell (1996, p. 172) stated that there is "*no explicit support for the translation from a logical to a physical design*" in the Multiview Methodology. Questions still remain to be answered in order to carry out the methodology, such as *"How do end-user developers use the system models and knowledge gained so far? How do the prototypes keep in touch with the vision of the future emerging from Stage one?*" Bell (1996, p. 172). Finally, by comparing Multiview Methodology with the four NIMSAD aspects, it is clear that the implementation stage is not adequately supported by specific techniques.

Evaluation: is performed before, during and after intervention.

- **The evaluation of the problem situation:** evaluation aspect is supported during the early part of stage one where the problem is explored. However, during the intervention, the evaluation is "*evident but not explicitly supported*" (Bell 1996, p. 172).

- **The evaluation of the intended problem-solver**: the evaluation of the methodology before the intervention "*can help to choose appropriate users for a given methodology and to define the role of the "reflective practitioner"*" (Bell 1996, p. 172).

- **The evaluation of the problem-solving process**: the prototyping technique plays a good role in the final stages to define the state of the system and to compare it with models of the existing system.

The criticisms of the Multiview Methodology are various with respect to design processes and outcomes. Bell (1996) identifies the following difficulties in working with this methodology:

- *"It is not clear where the customization is intended to include adaptation of the high-level process model of the Multiview Methodology;*
- *It is not clear what would be acceptable sequences, selections, iterations and parallelisms of the stages themselves"* (Bell 1996, p. 166);
- Multiview users need guidance;
- *"Although it is clear that the Multiview user is encouraged to adapt the methodology within each stage, it is not clear what would be acceptable sequences, selections, iterations and parallelisms of the stages themselves"* (Bell 1996, p. 166);
- The scope of Multiview1 was also problematic in "*that it made a strong distinction between one-off development and maintenance and suggested that the different aspects of the development process could be separated in a meaningful way*" (Avison, Wood-Harper, Vidgen and Wood 1998, p. 124);
- Implementation and testing stages are not supported in this methodology.

To summarize, the Multiview methodology is a hybrid methodology (based on Soft Systems Methodology (SSM), Mumford's (ETHICS), information modeling and other "hard" techniques). The "*Multiview user is encouraged to adapt the methodology within each stage*" (Bell 1996, p. 166). The outputs of the methodology are the "*social systems, the role-set and people tasks, the human-computer interface and the technical specification, and the necessary input and outputs to support the non-application system"* (Avison et al. 1990, p. 34). Finally, Multiview is good as "*it takes on different perspectives or views: organizational, technical human-orientated, economic, and so on*" (Avison et al. 1993, p. 252). However, the Multiview methodology provides inadequate support for the analyst in

adapting and integrating its various stages. In response to these criticisms, a new version of Multiview (called Multiview2) was developed to address the identified difficulties for the analysts and users.

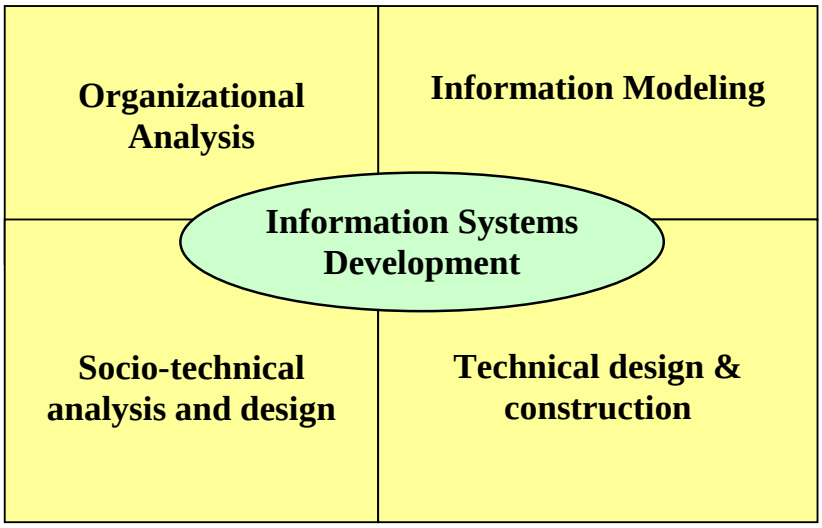
Multiview2 stages have been reduced from a five- to a four-box structure of: organizational analysis, information analysis and modeling, socio-technical analysis and design, and technical design and construction. This new framework for Multiview is given in Figure 24 and it shows the four stages of the methodology "*mediated through the actual process of information systems development*" (Avison et al. 1997, p. 79). The stages of Multiview2 are briefly described as follows:

- **Organizational Analysis:** this stage examines and understands organizational needs and behavior for an information system.

- **Information Modeling**: acts as a bridge between the other three stages, "*communicating and enacting the outcomes in terms of each other*" (Avison et al. 1997, p. 79).

- **Socio-technical analysis and design:** this stage examines how the system is working and seeks to understand user participation in the system development process.

- **Technical design and construction:** "*examines technical artefacts*" (Avison et al. 1997, p. 79).



Source: (Avison et al. 1997, p. 78)

Figure 24: The Multiview2 framework

According to Avison (et al 1997, p. 79) Multiview2 is an improvement as:

- *Stakeholder analysis strengthens the conceptual analysis of SSM and ethical analysis in organizational analysis;*
- *There is a migration from structured methods to object-oriented analysis information analysis and modeling;*
- *Ethnographic approaches supplement the tenets of ETHICS in socio-technical systems analysis and design; and*
- *Prototyping, CASE, evolutionary and rapid development approaches are more strongly suggested in technical design and construction.*

Finally, in general, Multiview "*includes tools and techniques blended into a common approach, each used on a contingency basis, that is, as appropriate for each problem situation"* (Avison, Lau, Myers and Nielsen 1999, p. 95). Multiview2 offers a rich implementation of Information Systems Development, since this methodology consists of three elements: 1) organization behaviors, 2) work systems and technical artefacts, and 3) the situation to prevent any difficulties from arising between the parties. This methodology can be used in "*complex unstructured information system development projects involving many users"* (Avison et al 1997, p. 79) as, in such

cases, the investigation needs soft analysis and hard structured techniques, such as process and data modeling.

Additionally, the purpose of this methodology is to achieve a better end product and to enhance process development and product success (Avison and Fitzgerald 2003). However, the Multiview methodology still has a few problems, such as the fact that the implementation and testing stages are missing. This deficiency will cause problems, as there are no defined techniques for checking whether the system meets the user requirements. In addition, it is very hard to see the linkage between the stages of Multiview since each stage takes a unique perspective of the system and this will lead to confusion for the analysts and users. The problem of the component techniques coming from different philosophical approaches has not been adequately addressed.

Avison et al. confirmed that (1999, p. 95) "*Multiview's authors still view it as a framework not a step-by-step methodology, and its use as an 'exploration of information systems development' not a prescriptive approach*". Hence, it still requires that the analyst (user of the methodology) have considerable skills in applying the methodological framework.

Furthermore, the Multiview framework was used in web-based information systems, by including methods and techniques that match the requirements for developing a website; this contingency framework was called Multiview/WISDM (Web IS Development Methodology). This framework "*has a collection of formalized methods and techniques organized according to five different aspects of ISD: Organizational Analysis (Value creation); Information Analysis (Requirements specification); Work Design (User satisfaction); Technical Design (Software model) and HCI (User interface)*" (Madsen, Kautz and Vidgen 2006, p. 228). Each of these aspects has been annotated to "*highlight the different emphases that IS development projects are subject to as the developers move around the matrix*" (Vidgen 2002, p.258). However, a successful web-based IS project is likely to need a mix of all the above aspects, "*but the mix will vary from project to project, reflecting the contingent nature of the emergent methodology*" (Vidgen 2002, p.258).

The lessons from the development (and critique) of the Multiview methodology need to be applied to the development of an integrated methodology for this research project.

4.5 Embedding and Grafting

Any endeavor to link and integrate Hard Systems and Soft Systems approaches must take into consideration the fact that they rely on two fundamentally different philosophical underpinnings. Miles (1992) accepts that linking the two methodological approaches is not a straightforward matter as it may cause difficulties in matching inputs and outputs from the stages. A way of potentially overcoming these difficulties is the use of "Embedding" and "Grafting".

The Embedding approach "*is to seek improvements to formalized information provisioning, computer based or otherwise, using a soft systems approach*" (Miles 1992, p. 62), i.e. embedding technical aspects within a broadly soft (social) methodology. To ensure that this approach is successful in the system development process, the methodology designer must "*incorporate into the methodological framework a means of modeling the data structure of an information system"* (Miles 1992, p. 62). Appropriate modeling techniques need to be embedded in the various stages so that the technical details can be explained to participants and matched to social/HCI needs.

For example, various focus questions will be addressed to extend SSM's predication path beyond the root definition and conceptual modeling stages to encompass a data modeling stage. "*What is the system? What does the system have to do in order to be what it is? What are the information flows that will enable the system to do what it has to do? What are the entity types that will support the information flows and how do they relate"* (Miles 1992, p. 63).

As a result, the purpose behind the embedding approach is to combine soft systems thinking and the hard systems approaches but without doing epistemological damage

to either of them. Each stage is strengthened in order to achieve better definition and implementation of the required system. The output from the embedding approach can extend from an "*application portfolio to a minor revision of an existing information system"* (Miles 1992, p. 64).

The Grafting approach combines two or more soft systems thinking and hard systems approaches by choosing the best aspects of these approaches in order to carry them out within the system development process. Here, elements of soft systems are added to a broadly technical methodology – i.e. grafting on specific human-based techniques to inform the basically technical approach. Miles (1992, p. 65) states, "*grafting it is an Information System that is drawing upon soft systems concepts, while in embedding, it is the reverse"*. Therefore, most of the current studies indicate that moving from grafting to embedding is an attempt to escape from the current bounds of "*information system orthodoxy so that information systems are modeled as soft systems constructs"* (Miles 1992, p. 65). The important aspect of grafting is that a practitioner "*should address not only the technical and economic aspects of the proposal but also the human factors which impinge on the project*" (Miles 1988, p. 56).

In summary, according to Miles (1988), the grafting approach is shifting more to 'soft' systems thinking, while in the embedding approach the "*'hard' becomes a special case of 'soft'* (Miles 1998, p. 56). This means that the embedding approach is more advantageous compared with the grafting for the following reasons:

- *It enables the investigative thrust of a 'soft' systems approach to be operated whenever and for as long as its users deem it profitable to do so;*
- *It engenders a sustained collaborative relationship between information users and specialists;*
- *It enables changes to the problem situation other than those of a computer-based procedural nature to be also addressed;*
- *It affords a methodological coherence for the management information system development through established vehicles such as steering committees* (Miles 1988, p. 59).

In this research, both the grafting and embedding approaches will be adopted to develop the new participative methodology for developing websites. In some stages, the researcher will use the embedding approach and in other stages, grafting will be used. The stages will be constructed from various methodologies with a view to combining approaches with minimal epistemological damage to their philosophical foundations. The strongest stages were selected from each methodology (i.e. from methodologies for developing information systems, Web Sites, and marketing methodologies) to develop the new participative framework for developing websites (see Table 31).

An integrated methodology needs to be "contingent" with the analyst and client choosing the techniques which best suit the problem situation. Embedding and grafting techniques are used to develop a new methodology to address the requirements of users' needs in a new situation (see Table 29). With the integration, designers and users are choosing the stages and steps which will be able to address the *"unique features of the new situation"* (Iivari el al. 2001, p. 204). Therefore, the purpose behind the integration is to combine different paradigms in effective and realistic ways to provide a compatible and valuable incorporation for the new methodology.

Stage	Type	Description
Planning	**Embedding**	The inclusion of the Market-Vantage (Internet Performance Marketing) Methodology in the planning stage is an embedding example. This stage will help the designers to identify the purpose behind building the website, i.e. what is being sold; the firm's competitors and buyers; and the way to find the product via the web. The outcomes from this embedded stage are quantitative, as the main goal is to provide facts and estimates that can be used by decision makers to make accurate predictions about relationships between competitors, buyers and how to find the product on the web, and to understand the relationships and differences and to verify or validate the existing relationships.
Analysis	**Grafting**	A grafting example from the analysis stage is the use of the Ethics Methodology. This stage defines the user needs and problems, which allows the analyst to develop a system which meets the user requirements and their objectives. The main goal of this grafting stage is to identify the human aspects in the analysis stage and expand their finding into adequate detail to illustrate exactly what will and will not be built into the website design, and to add, improve, and correct the initial website requirements if they are not meeting the users' desires.
Design	**Grafting**	The design stage from the SSM is an example of grafting. This stage will address questions to identify the purpose behind establishing this system such as what the system is; how the system will work; and the purpose behind using this system. In addition, the users will be involved in the system design and participate in the decision making.
Testing	**Grafting**	The testing stage from the Human Factor Methodology for Designing Websites is an example of grafting. This stage is iterative involving "expert evaluation" which means the experts will evaluate the website and identify the problems, so that they can be solved.
Implementation	**Grafting**	The staff training (available from the additional details techniques from the Implementation Model) is an example of grafting. This step will provide for necessary training to the staff about the new website.
Evaluation	**Embedding**	The measurement step available in the Market-Vantage (Internet Performance Marketing) and EnSky's Unique Methodologies is an example of embedding. This step is part of ongoing maintenance to the website to check if the results of using the website are meeting its goals and is integral in determining the ROI[59]. This embedding step uses quantitative methods concerned with issues of design, measurement and sampling, "*because their deductive approach emphasizes detailed planning prior to data collection and analysis*" (Neuman 2000, p.122).
Maintenance	**Grafting**	The Maintenance stage available from the Market-Vantage (Internet Performance Marketing) methodology is an example of grafting. This stage uses the user information to review on-going performance of the website.

Table 29: Examples from New participative framework for developing websites using Grafting and Embedding

[59] ROI: Return on your investment.

4.6 ISD as Knowledge Work

Information systems development is considered as "knowledge work" as it requires different sorts of knowledge and approaches to expand a system development process i.e. producing a website or an information system. Iivari and Linger (1999, p. 2) state that knowledge is a "*set of organized statements of facts or ideas, presenting a reasoned judgment or an experimental result, which is transmitted to others through some communication medium or in some systematic form*". Knowledge work is very abstract, as the users need to identify and understand the relationship between "*the objects of work and their symbolic representations*" (Iivari, Hirschheim, and Klein 2001, p. 1027). Knowledge work requires the integration of several aspects, (objects) such as: facts, rules, techniques, plans, strategies, approaches, theories and metaphors.

To achieve this work, a relationship should be established between these objects to achieve the task which is required by an organization (to solve the problem). This leads to the conclusion that knowledge work is similar to collaborative work as it considers a *"web of coordinated actions, performed by the participants to achieve a joint outcome"* (Iivari et al 1999, p. 3). This means that the user is required to participate in multiple work activities to achieve a shared common object of work. Therefore, an organization needs to understand the relationship between different forms of knowledge: *"general knowledge (theories) and concrete knowledge (facts), or it may be an outcome of scientific progress (more general theories)"* (Iivari et al. 2001, p. 1028).

Knowledge work involves producing knowledge since there is a relationship between producing and applying knowledge. Iivari (et al. 2001, p. 1027) stated, "*Knowledge work does not exclude knowledge-producing work because typically knowledge-producing work (such as research and development) is also knowledge-applying work*".

As previously mentioned, knowledge work is similar to information systems development as designers and analysts need to understand the relationship between

these categories: technology knowledge, systems development process knowledge, and organizational knowledge in order to solve the system problems and to establish a system which meets user requirements. This is achieved by using various methodologies, or one methodology, depending on the situation. Iivari (et al. 2001) indicated another category besides the above, which is application knowledge. This category defines the "*structure, functionality, behavior and use, in a given application domain, and knowledge of possibilities to support the application domain using IT*" (Iivari et al. 2001, p. 1029).

Vitalari (cited in Iivari et al. 2001, p. 1029) discussed the similarity between information systems development and knowledge work. The comparison between the similarities noted by Iivari et al. and Vitalari are summarized in the following table.

Iivari et al. – Similarity between Knowledge work and information system development	**Vitalari - Similarity between Knowledge work and information system development**
Application Domain Knowledge	Functional Domain Knowledge
Application Knowledge	Application Domain Knowledge
Organizational Knowledge	Organizational Specific Knowledge
ISD Process Knowledge	Knowledge of Methods and Techniques

Table 30: Similarity between information systems development and knowledge work

Table 30 demonstrates that analysts use their expertise in the ISD process knowledge to identify users' needs and requirements for the new system, by using various techniques and methods. The ISD process knowledge must also ensure that the users' input is achieved. In this research, methodologies for development of information systems, websites and marketing, are examined to select the strongest stage from each methodology, which will help the researcher to define the new methodology stages to develop a website from the marketing perspective. We note that knowledge work is similar to information systems development, which is similar to website development. Hence, the requirements for effective knowledge work also apply to the new methodology. It is also necessary to understand the relationship

between users and the designer and how the numerous activities should be allocated to achieve a common object of work. A clearly articulated and coherent methodology (understood by both the users and designer) is fundamental to the achievement of such 'common work' and to a coherent shared approach to the development and use of knowledge.

4.7 Summary of the Research Process So Far

In Chapter Three, the researcher selected the strongest stage from each methodology and identified the rating availability for the four key principles (user participation, usability, iteration, real interaction) in each stage, as these four key principles are considered the main foundation for this research and an effective basis for achieving successful 'common knowledge work' (see Table 31).

After reviewing the Information Systems Development Methodologies, the researcher selected five strong stages, which are Planning, Analysis, Design, Testing, and Evaluation. The main focuses of these stages are to:

- Identify the problem and users' needs for the new system;
- Evaluate the current situation and collect more information to solve the problem;
- Define the relationships between the information to produce the first trial of the system;
- Test and evaluate the new system to ensure if it meets user requirements.

After reviewing the Information Systems Development Methodologies and Methodologies for Developing Web Sites, the researcher identified the strongest stages (and the extra stages) in the Marketing Methodologies. The four strongest stages were: Planning, Testing, Implementation and Maintenance. The extra stages identified were: Promotion, Prototyping, Budget, ROI (return on investment) and Measurement. The main purposes of these extra stages are to: 1) identify the 4Ps (product, pricing, place and promotion) for the E-Marketing; 2) identify the time

frame to accomplish the job; 3) define the expected returns from investment; 4) produce the first trial of the system; and 5) learn about the audience by tracking their visit and the purpose behind the visit. The main objectives of these methodologies are to: 1) achieve website objectives, identify the 4Ps from the E-Marketing and the relationship management requirements; 2) plan the purpose behind building the website; 3) test the website to ensure that it meets users' needs; and 4) maintain the website to attract more users.

In order to develop a methodology which will help make the website successful, the researcher studied the additional detailed techniques to understand the website, structure – that is, the connection between the front and back ends of the website. The additional stages, which will help to develop the new participative framework for developing websites, are: Task Analysis, Navigation Design, Staff Training, Prototyping, Promotion, and Measurement of outcomes. These extra stages were combined in the framework in the analysis, design, implementation and evaluation stages, which will be taken into consideration by the researcher when developing the new methodology. Table 31 provides a summary of the various methodologies that can contribute to the website development stages.

Stage	Participation rating	Methodologies	Principles			
			User Participation	Usability	Iteration	Real Interaction
Planning	3	Soft System Methodology	1	0	2	0
		Human Factor Methodology for Designing Websites (HFMDW)	1	2	1	0
		Relationship Management Methodology (RMM)	0	0	1	0
		The Web Site Design Method (WSDM)	1	2	0	0
		E-Marketing Plan	1	0	0	0
		The Market-Vantage(Internet Performance Marketing) Methodology	0	0	0	0
Analysis	2	Soft Systems Methodology (SSM)	3	0	2	0
		User Centered Development Methodology (UCDM)	1	0	0	0
		Ethics Methodology	3	0	0	0
		Human Factor Methodology for Designing Websites (HFMDW)	0	3	1	2
		The Web Site Design Method (WSDM)	1	2	0	2
		Task Analysis				
Design	3	Structured Systems Analysis and Design Methodology (SSADM)	1	0	1	0
		Soft Systems Methodology (SSM)	2	0	2	0
		User Centered Development Methodology (UCDM)	1	3	1	0
		Relationship Management Methodology (RMM)	0	0	2	0
		The W3DT Design Methodology	0	0	0	0
		The Web Site Design Method (WSDM)	1	2	0	2
		Navigation				
		Prototyping				
Testing	3	User Centered Development Methodology (UCDM)	1	3	1	0
		Human Factor Methodology for Designing Websites (HFMDW)	1	3	2	0
		The Advertures Company Methodology	0	0	2	0
Implementation	2	Information Development Methodology for the Web	1	0	0	0
		E-Marketing Plan	1	0	0	0
		The Market-Vantage(Internet Performance Marketing) Methodology	0	0	2	0
		Construction				
		Promotion				
		Staff Training				
Evaluation	3	User Centered Development Methodology (UCDM)	2	3	1	0
		Human Factor Methodology for Designing Websites (HFMDW)	0	3	2	0
		E-Marketing Plan	0	0	0	3
		Measurement				
Maintenance	2	Human Factor Methodology for Designing Websites (HFMDW)	0	0	1	3
		The Market-Vantage Methodology	2	0	0	2
		EnSky's Unique Methodology	1	0	0	1

Table 31: New participative framework for developing websites

Participation rate is from 0 to 3. Zero represents no participation while 3 indicates maximum participation. Ratings of 1 and 2 are minimum and moderate participation respectively. The ratings are based on the Consultative and Representative approaches according to Mumford (1995).

4.8 Combined New Methodology

Chapter Three provided an overview of various lifecycles, methodologies and models from the perspectives of Information Systems, Web Design, Human Computer Interaction, and Marketing. After producing an understanding of a mixture of methodologies, the researcher developed a framework (see Table 31) for the new participative methodology by integrating a selection of stages from various, methodologies. The researcher selected the strongest stages from each methodology, which will be needed to develop the new participative methodology for developing websites. At the same time, extra stages were added in order to construct a new methodology that is practical, feasible and useful.

To distinguish between the stages and steps in the new participative methodology for developing websites, the researcher uses "SA" for stage while "SE" for step. This allows designers and users to differentiate between them and, most importantly, to make it easier for them to recall the role of each part of the methodology.

This methodology has a sequence of numbers for each stage and step, which means that designers and users should complete each stage and step in this sequence before moving to another stage. The most important aspect of this new methodology is that, before moving to the next stage, each completed stage must be evaluated and tested to ensure that the users' requirements are being met.

Figure 25 illustrates the stages and steps for the new participative methodology for developing websites. The figure was adapted from the Star Lifecycle model (Hix et al. 1993), as the evaluation stage is at the centre of the methodology. This will allow the designers and users to evaluate each stage before moving to another stage. Prior to moving to the next stage, one needs to evaluate the previous stage to assess whether users' requirements are met if they are met moving to the next stage. If they are not met, you can move to the next stage, if not, you need to return to the previous stage. This process continues until the last stage in the new methodology.

In this new methodology, there are issues, tools and techniques for each stage and step (see Table 32), which need to be carried out by the designer in order to achieve a user-friendly website to avoid the user frustration when s/he deals with this interface

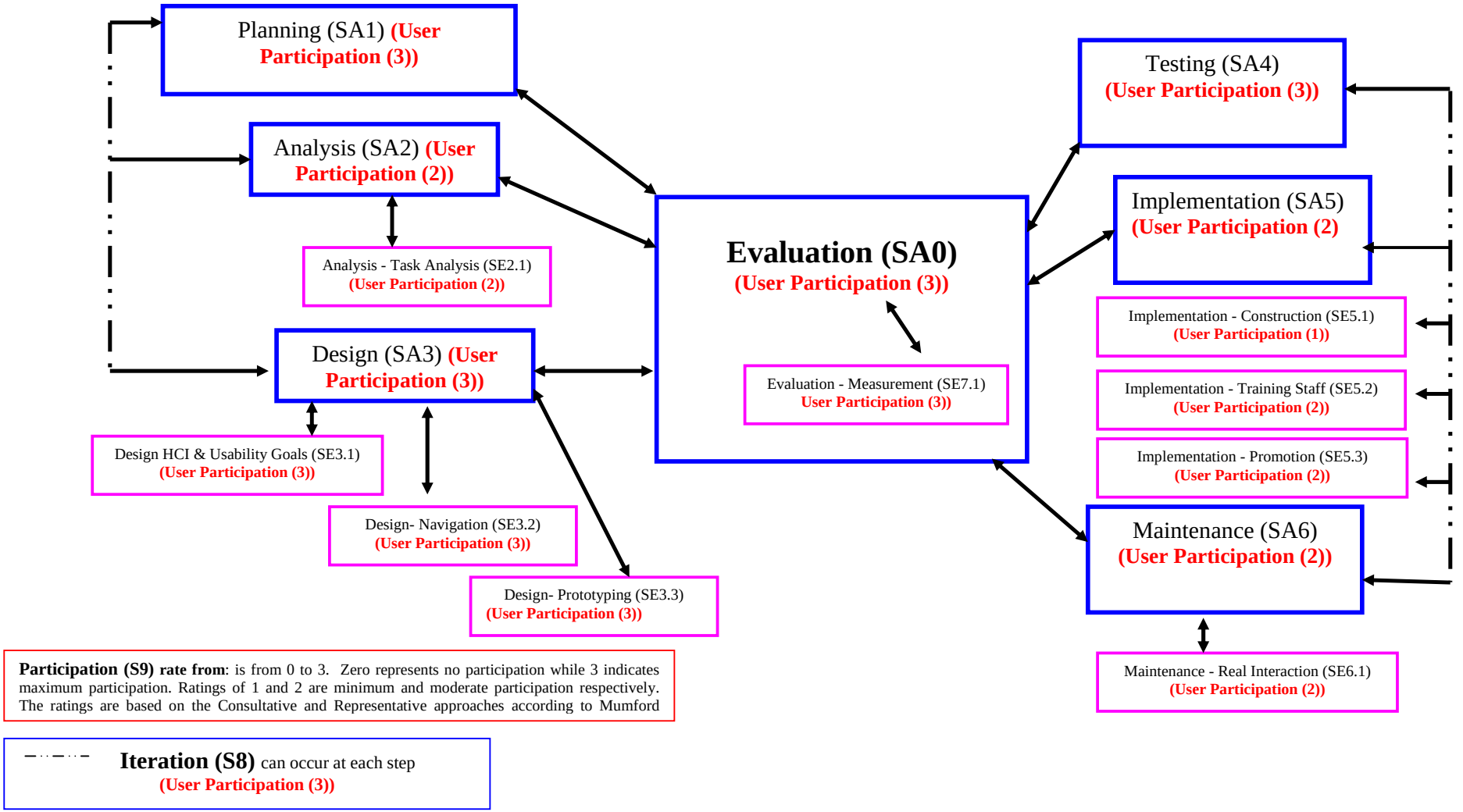


Figure 25: New Participative Methodology for Developing Websites

Stage (*& Step*)	Issues, Tools and Techniques
Usability Evaluation	➢ Formative usability evaluation by expert- and user-based
Measurement	o *On going evaluation*
Planning	➢ Define the objectives ➢ User requirements ➢ User analysis ➢ Cost-benefits analysis ➢ Alternatives and constraints ➢ What is your product ➢ Who are the buyers ➢ Who are your competitors ➢ Where should be located ➢ How to promote your website.
Analysis	➢ To add, improve and correct the initial website requirements
Task Analysis	o *Define users' type, their work, goals and activities*
Design	To define: ➢ What the website is ➢ How the website will work to achieve the purpose behind using this website ➢ User involvement in decision making ➢ Future users
HCI and Usability goals	➢ *User usability – Web design should be* o *Efficient* o *Effective* o *Safe* o *Utility* o *Easy to learn* o *Easy to remember* o *Easy to evaluate* o *Usable* o *Practical* o *Visible* o *Job satisfaction* o *Extra techniques, text style, fonts, layout, graphics and color*
Navigation	o *Site, Layout, Link, Navigational Structure for the hypermedia Application*
**Prototyping*	o *High-Fidelity* o *Low –Fidelity*
Functionality Testing	➢ Functionality testing by expert- and user-based
Implementation	➢ Implementing the website using software
Construction	o *Technical Application (i.e. HTML, Dreamweaver; Cold Fusion and ASP)*
Training Staff	o *Necessary Training*
Promotion	o *Press Releases* o *Link building and banner-ad campaigns* o *Paid search engine* o *Directory listing campaigns to promote the website* o *Traditional Marketing (i.e. Newspaper; Radio and TV)*
Maintenance	➢ Update changes and the corrector of errors in the website
Real Interaction	o *Log file*

Table 32 **Issues, Tools and techniques for the New Participative Methodology**

:

The major stages of the methodology may be described as follows:

The Evaluation stage (see Table 33) was selected from three methodologies: one from information systems, one from website and marketing methodologies, and one extra stage from the marketing methodologies.

Stage	Methodologies
Evaluation	**User Centered Development Methodology (UCDM)** The evaluation stage is available within the testing stage. The testing and evaluation stages are included in this methodology, as expert-based (to test the interface) and user-based evaluation (to ensure that the system or interface meets users' requirements).
	Human Factor Methodology for Designing Websites (HFMDW) The evaluation stage is available within the testing stage. It is iterative, involving "expert evaluation", which means experts will evaluate the website and suggest solutions to problems.
	E-Marketing Plan The evaluation stage will allow the marketers to use tracking systems to measure results and evaluate the plans for the web.
	Measurement is available in the Market-Vantage (Internet Performance Marketing) and EnSky's Unique Methodologies. This step is part of ongoing maintenance of the website to check if the results of using the website are meeting its goals and is integral in determining the ROI[60].

Table 33: Evaluation Stage

0. **Evaluation (SA0):** This stage should be located at the center of the new methodology, as before moving to another stage, it is necessary to evaluate the results from the previous stage, which is known as "formative evaluation". Under this stage, expert-based and user based evaluation will assess the usability of the website. An additional evaluation stage is included:

    0.1 Evaluation – Measurement (SE0.1): this step is ongoing evaluation following maintenance to the website, to check if the results of using the website are meeting its goals, which is integral in achieving the expected profit.

[60] ROI: Return on your investment.

The Planning stages (see Table 34) were selected from six methodologies: one from information systems, three from website methodologies, and two from marketing methodologies.

Stage	Methodologies
Planning	**Soft System Methodology** The planning stage examines the nature of the requirements for change and assesses how to address them.
	Human Factor Methodology for Designing Websites (HFMDW) The planning stage defines the users' goals and examines the environment very carefully in order to meet the users' needs.
	Relationship Management Methodology (RMM) The planning stage defines the objectives; user requirements and analysis; and cost benefits analysis.
	The Web Site Design Method (WSDM) The planning stage will help the designer to identify the target audience to the website and to classify them into user classes.
	E-Marketing Plan The planning stage available in E-Marketing Strategies is to allow the designer to identify the 4Ps: product, pricing, place and promotion, and their relationship with management requirements to plan objectives for the website.
	The Market-Vantage(Internet Performance Marketing) Methodology The planning stage will help the designers to identify the purpose behind building the website; i.e.: what is being sold; the competitors and buyers; and how to find the product via the web.

Table 34: Planning Stage

1. **Planning (SA1):** the planning stage begins with a discussion between users (end-user and client-customer) analysts, and designers (internal and external), in order to identify the plan and requirements which need to be available for developing a website. These requirements are: 1) to identify the objectives; 2) user requirements; 3) user analysis; 3) cost-benefit analysis; 4) alternatives; and 5) constraints. In addition, throughout this stage the designer and users need to identify and address various questions such as: what is your product? who are the buyers? who are your competitors? where should the site be located? and how to promote your website?

The Analysis stage (see Table 35) was selected from five methodologies: three from information systems, two from website methodologies, and task analysis from additional details techniques.

Stage	Methodologies
Analysis	**Soft Systems Methodology (SSM)** The analysis stage will require the analyst to perform the following: 1) evaluate the problem from different angles and from the view of different stakeholders; 2) evaluate the internal policies of the organization; 3) present a graphical presentation (called "rich picture") of the current situation to help understand the problem in the system and how to solve it; 4) more informal and formal tools will be used to collect information about the system i.e. observation, interviews; workshops and discussion.
	User Centered Development Methodology (UCDM) The analysis stage will help the analyst to identify user types and the goals and activities which are carried out by them to achieve their goals.
	Ethics Methodology This stage defines the user needs and problems, which allows the analyst to develop a system that meets the user requirements and their objectives.
	Human Factor Methodology for Designing Websites (HFMDW) The analysis stage focuses on content (materials to suit user tasks) and process (re. how information should be maintained).
	The Web Site Design Method (WSDM) The analysis stage will help the designer to analyze in more detail the user types to identify information and usability requirements and characteristics.
	Task Analysis From Task Analysis the designer is able to identify the following: **Goals** are work-related objectives; **Tasks** can be consistent between users or not; **Actions** are a series of steps which need to be followed in sequence in order to complete tasks and hence achieve the users' goals; **Granularity** refers to the level of detail in a description.

Table 35: Analysis Stage

2. **Analysis (SA2):** the analysis stage begins with the business models developed during the planning stage. In this stage, the users, analysts and designers are expanding their findings into adequate detail to illustrate exactly what will and will not be built into the website design; and to add, improve, and correct the initial website requirements if they are not meeting the users' desires. There is an additional detailed step:

   2.1 Analysis - Task Analysis (SE2.1): this step will ascertain: the purpose of developing the website; user types; the type of work users will do with the website; and users' goals and their activities, which are carried out by them to achieve their goals.

From this stage, the information will be documented in the requirements specification, which will establish the foundation of the design and development of the website.

The Design stage (see Table 36) was selected from six methodologies: three from information systems, three from website methodologies, and two extra stages (navigation and prototyping) from the website and marketing methodologies.

Stage	Methodologies
Design	**Structured Systems Analysis and Design Methodology (SSADM)** The design stage will help to identify the data and the relationships between them and produce the trial design for the system. The trial design will be checked by the users to assess if it is working according to users' requirements and requests.
	Soft Systems Methodology (SSM) In the design stage, a number of questions should be addressed to identify the purpose behind establishing this system such as: 1) what the system is; 2) how the system will work; and 3) the purpose behind using this system. In addition, users will be involved in the system design and participate in the decision-making.
	User Centered Development Methodology (UCDM) The design stage will define the appearance of the interface.
	Relationship Management Methodology (RMM) The design stage is the main stage in this methodology, as the designer will classify: 1) the relationship between the entities in the web site; 2) the navigational path between the entities; and 3) the design of screen and button layouts.
	The W3DT Design Methodology The design stage gives the designer the chance: 1) to generate a first trial product of the system with a hypermedia application; and 2) to draw a graphical representation of the website construction.
	The Web Site Design Method (WSDM) The design stage will help the designers to identify: 1) the future users or visitors of the website; and 2) user usability requirements and their characteristics.
	Navigation : is available in the following methodologies: W3DT, RMM, WSDM and OOHDM ❑ In the **W3DT,** it is available under the Menu stage to provide access structures to the web. ❑ In the **RMM,** it is available under the Navigation Design, to define how the navigation will be established between the entities which are based on associative relationships. ❑ In the **WSDM,** it is available in the User Conceptual Design stage (under the Navigational design step) to define the specific navigation path through the website for each user class. ❑ In the **OOHDM,** it is available in the Navigational Design stage to define the navigational structure for the hypermedia application in *"terms of navigational contexts (focusing on the users and their tasks), which are induced from navigation classes such as nodes, links, indices, and guided tours"* (Schwabe et al. 1995, p. 46).
	***Prototyping*:** is available in Information Development Methodology for the Web, and the Advertures Company Methodology. The main purpose of this stage is to produce the first sketch for the website to check that it meets user requirements and needs. In addition, this stage is also available in the User-Centered Development Methodology, which is one of the Information System Methodologies to allow the designer to develop the initial version of the interface or website.

Table 36: Design Stage

3. **Design (SA3):** the design stage will utilize the requirement specification from the previous stage to define: 1) what the website is; 2) how the website will work; 3)

user involvement in decision-making; 4) future users; 5) user usability requirements and their characteristics.

3.1 Design - HCI and Usability Goals (SE3.1): this step will allow users (end-user and client-customer), analysts, and designers (internal and external) to confirm that the website design is: efficient, effective, safe, has utility, easy to learn, easy to remember and evaluate, practical, visible, and provides job satisfaction. It will define performance measures that meet the users' requirements and requests. These principles are very important for good design. There are many specific issues that need to be taken into consideration when designing website pages, such as text style, fonts, layout, graphics and color.

3.2 Design – Navigation (SE3.2): this step is important when developing a website. The main purpose of this step is to define the specific navigation paths through the website between the entities and to establish the communication between the interface and navigation in the hypermedia application. Navigation paths are "*very important issues to address in website design, for the user has to be able to find what they are looking for as quickly as possible*" (Darlington 2005, p. 75). The essential design techniques are: site, layout, link, and navigational structure for the hypermedia application.

3.3 Design – Prototyping (SE3.3): this step is essential in the website design process to allow users and management to interact with a prototype of the new website and to gain some experience of using it. This step allows the management to reduce cost and increase quality through early testing. For this step, two types of prototyping will be used: low-fidelity and high-fidelity prototyping. The latter will be similar to the final product of the website by using software such as Visual Basic; Smalltalk and Macromedia and it is recommended that more than one solution be produced (i.e. three solutions) in order to give the client more options about the 'look' of the website. The features of high-fidelity prototyping are:

- It is very useful for detailed evaluation of the main design elements;
- It is useful for "*selling ideas to people and for testing out technical issues*"; (Preece et al. 2002, p. 246).
- It often constitutes a crucial stage in client acceptance – "*as a kind of final design document which the client must agree to before the final implementation*" (Benyon et al. 2005, p. 254).

The Testing stage (see Table 37) was selected from three methodologies: one from information systems and one each from website and marketing methodologies.

Stage	Methodologies
Testing	**User Centered Development Methodology (UCDM)** The testing stage is available within the combined testing and evaluation stages included in this methodology. The interface will be tested by expert-based and user-based evaluation to ensure that the system meets users' requirements.
	Human Factor Methodology for Designing Websites (HFMDW) The testing stage is iterative involving "expert evaluation", which means experts will evaluate the website and suggest solutions to problems.
	The Advertures Company Methodology The testing stage allows the designer to test the project repeatedly until it meets users' requests and desires.

Table: 37 Testing Stage

4. **Testing (SA4):** The Testing stage should occur before implementation to ensure that the website is operating correctly. Testing of the website will be both expert-based and user-based to ensure that the website functions effectively in a technical sense.

The Implementation stage (see Table 38) was selected from three methodologies: one from website methodologies, two from marketing methodologies, and two extra stages (staff training and promotion).

Stage	Methodologies
Implementation	**Information Development Methodology for the Web** The purpose of the implementation stage is to create the website using HTML and other software.
	E-Marketing Plan The implementation stage is important in the E-Marketing Plan, as the marketers will utilize the 4Ps, the relationship management strategies, and other tactics to achieve the e-marketing objectives.
	The Market-Vantage(Internet Performance Marketing) Methodology The implementation stage is important in Market-Vantage to allow users to use the new product and to check if meets their requirements. User information is used in the maintenance stage to review on-going performance of the website.
	Construction is available from the OOHDM. This step involves the technical implementation of the design.
	Staff Training is available from the Additional Details Techniques from the Implementation Model. This step will give necessary training to the staff concerning the new system.
	Promotion is available in Information Development Methodology for the Web, E-Marketing, and EnSky's Unique Methodology. This step involves the website being publicity released for the web audience, potential users and current users.

Table 38: Implementation Stage

5. **Implementation (SA5):** the website will be prepared then released for the web audience, potential users and current users. This stage will allow users to use the new product and to check if it meets their requirements.

   5.1 Implementation - Construction (SE5.1): this step involves the technical implementation of the design.

   5.2 Implementation - Training Staff (SE5.2): this step will give necessary training to the staff about the new website.

   ***5.3 Implementation – Promotion (SE5.3)*:** this step will use various tools such as press releases; link building and banner-ad campaigns; paid search engine; directory listing campaigns; and traditional marketing (i.e. Newspaper; Radio and TV) to promote the website. These tools will be re-visited from time to time in order to make sure the promotion requirements are being met.

The Maintenance stage (see Table 39) was selected from three methodologies: one from information systems, and two from marketing methodologies.

Stage	Methodologies
Maintenance	**Human Factor Methodology for Designing Websites (HFMDW)** The maintenance stage is also important in this methodology. To make the website more interesting and to attract more users to visit it, designer and content providers need to provide up-to-date information in the site.
	The Market-Vantage(Internet Performance Marketing) Methodology User information is used in the maintenance stage to review on-going performance of the website.
	EnSky's Unique Methodology This stage is important to the designer and users simultaneously, so as to attract more users to visit the site. In addition, this stage includes changes and correction of errors in hardware and software to meet user requirements.

Table 39: Maintenance Stage

6. **Maintenance (SA6)**: this stage is the ongoing maintenance of the website including update changes and the correction of errors in the website.

   6.1 Maintenance - Real Interaction (SE6.1): in the maintenance stage, real interaction needs to be tracked by using the server log file[61]. This information is very useful to the designers to improve and enhance the structure of the website to encourage more users (both old and new) to visit it. This set of guidelines "*focuses on marketing or technical issues rather than rhetorical issues like audience analysis*" (Ramey 2000, p.397). Tracking is considered an important aspect in web design as, through it, the designer can study real user behavior, "*Tracking tells marketers where visitors cluster; more than anything else, these behavioral patterns demonstrate what attracts and engages visitors*" (Robinson and Peroff 1999, p. 62).

7. **User Participation (SA7):** this aspect is a very important concept in the methodology, as the main purpose is to allow user participation in the website development process to gain more information about the problems and alterative solutions from the users and to familiarize them with the system before it is

[61] Server Log File: the record of activity on a site (Ramey 2000, p. 398)

released. For each stage there is a rating, which indicates the user participation in the development process, i.e. the participation rating will be from 0 to 3. The former represents zero participation while the latter is maximum participation. Ratings of 1 and 2 are minimum and moderate participation respectively. The user participation approaches from Mumford (1995) were adopted in the website development process: the Consultative Approach and the Representative Approach. Both of these approaches are very appropriate in all the stages to secure the agreement between the user and designers at the beginning and to identify the key aspects, such as system objectives, problems, and the creation of various solutions to the system. The Consensus Approach will not be adopted in this research as it "*does not always emerge easily and conflicts which result from different interest within a department may have to be resolve first*" (Mumford 1995, p. 19).

8. **Iteration (SA8):** this aspect can occur at each point in the New Participative Methodology for Developing Websites to ensure that the website is meeting the user (end-user and client-customer) requirements and company objectives. The iteration procedure needs to be considered in order to allow for effectiveness and self-correction. This stage will help the designers to build up the new website and ensure that the project will be tested repeatedly until it meets users' requirements.

4.9 Conclusion

In this chapter most of the discussion focuses on integration of methodologies and reviews of the system development process. It includes a discussion of how various academic fields of study have shaped integration approaches. In addition, this chapter focuses on the new draft, integrated methodology for website development.

The review also highlighted some issues re combining methodologies by discussing various theories such as "Total Systems Intervention" (TSI) which is a new approach to planning, designing, problem solving and evaluation. The nature of TSI will

involve choosing which type of system methodology will be apposite for the specific needs. In addition, TSI will address the problem by combining various types of methodologies where one of them will be "dominant", while others act as "supportive".

The literature review of integration approaches was conducted with a horizontal approach, surveying as many types of integration as possible and providing one example (the Multiview framework). This framework used the integration between soft and hard systems approaches in order to ensure that this framework will meet the user requirements with respect to the technical and human aspects. In addition, embedding and grafting approaches need to be considered.

Integration is not an easy aspect in the system development process, since soft systems thinking and hard systems approaches need to be combined without doing epistemological damage to either of them, and the most important issue should be to meet the users' needs. The integrated methodology needs to be "contingent" with both the analyst and client choosing the particular techniques which suit the problem situation.

In addition, this chapter reviews ISD as knowledge work, as it requires different sorts of knowledge and approaches in order to expand a system development process, such as producing a website or a user interface.
Finally, the chapter presents us with a review of the new participative methodology for developing websites, defines each stage and step in this methodology, and discusses the tools and techniques which need to be used in order to produce an effective user-friendly website.

Chapter Five will discuss various issues including the Significance of the Research, Research Goals/Questions and Research Method and Design. Under the Significance of Research section, the researcher will discuss the potential contributions that the new methodology may bring to the future of web design in terms of usability, real interaction, user participation and iteration. In addition, this section addresses the 'why' of the research. Furthermore, under the Research Goals/Questions section, the researcher will present a detailed overview of the research and explain the goals that

this research aims to achieve. This section addresses the 'what' of the research. Additionally, under the Research Method and Design section, the researcher will discuss 'how' the research will be conducted. It examines the various research methodologies and a design used by most researchers in the field and explains the reasons for the choice of the methodologies adopted in this research.

Moreover, Chapter Five will discuss how the researcher conducted interviews with some companies who are dealing with website design in Western Australia. This was done in order to learn more about the website methodologies, tools and techniques used to create a website, which meet the users' needs. In addition, the researcher will compare their work with her new participative methodology for developing websites via focus questions about their methodologies. All of these issues will be further explored, discussed and analyzed in the remaining chapters of this thesis.

CHAPTER FIVE

RESEARCH METHODOLOGY

5.1 Introduction

In Chapter Four, the researcher examined issues relating to the integration of methodologies, following on from reviews of the system development process. In addition, the chapter discussed "Total Systems Intervention" (TSI), an approach to planning, designing, problem solving and evaluation. The researcher evaluated the Multiview framework, which uses the integration of soft and hard systems approaches to meet user requirements with respect to the technical and human aspects of systems development. Furthermore, ISD as knowledge work was appraised as it requires different sorts of knowledge and approaches to expand a system development process such as producing a website. The chapter concluded with a review of the new participative methodology for developing websites, and it's stages, steps, tools and techniques were defined.

This chapter will discuss various issues: Significance of the Research, Research Goals/Questions and Research Method and Design. Under the Significance of the Research section, the researcher justifies 'why' this research was conducted, and the importance of adopting the new methodology in developing a website design, especially in terms of usability, real interaction, user participation and iteration. This section will identify two issues: 1) the problem/inefficiency that currently exists in the web design industry, and present some solutions and suggestions regarding how this research can aid in explaining the reasons for this problem's occurrence; and 2) how the proposed research intends to fill the gap in the current methodologies used for web site design.

In the Research Goals/Questions section, a series of objectives will be identified for investigation and examined by the researcher in order to achieve the aims of the research; also, it will be shown how each minor objective will be used to address the major question. This section addresses the "what" of the research.

In the Research Method and Design section, the researcher discusses the various available types of research methods and designs, especially from the Information Systems research perspective, and justifies the reasons behind adopting particular methodologies in this research. In addition, this section covers research design, as it explains the instruments which need to be used to gather appropriate data and justifies the adoption of these particular instruments in this research. This section addresses the "how" of the research.

5.2 Significance

This section will address the 'why' and will justify the reasons for conducting this research. After studying various informal methodologies for website development, the researcher found that most web users are still frustrated when they are working with websites. Hence, improved design and development methodologies are required.

This research will enable the designers and users to develop websites which meet their requirements and needs simultaneously, by adopting the New Participative Methodology for Developing Websites. The outcomes of this research will benefit both the designers and website users in the following ways. The designers will be assisted to better understand the purpose behind creating a website and to identify criteria that will enable users to benefit from visiting the website and gaining new information to meet their goals. In addition, they will be able to use techniques to acquire knowledge about the needs of specific market places, consumers and suppliers, and to identify the opinions and suggestions that contribute to the construction of an effective website. On the other hand, the website users (end-users and client-customers) will gain knowledge about the factors that enable them to

continue to be involved in the development process, and to find out how to effectively utilize their background knowledge when using the website.

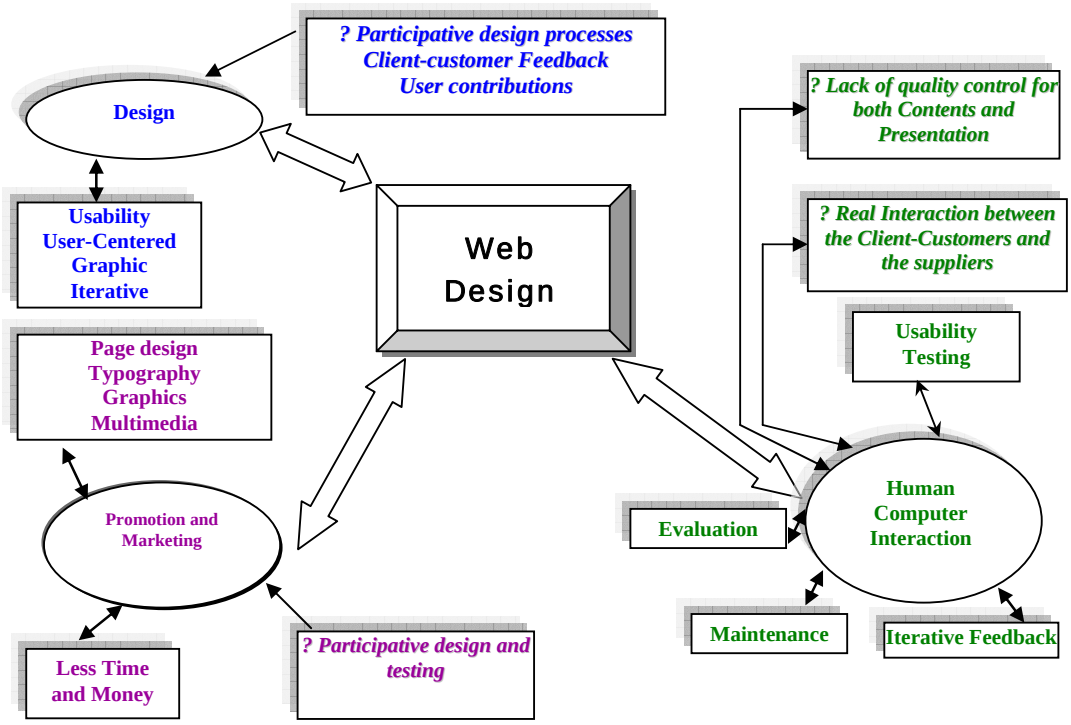


Figure 26: Current Methodologies

The informal and formal website development methodologies currently utilized include the following stages: establish the need, gather information, developed and evaluate, implement, maintain and usability testing (Abels, White, Hahn 1998, Cunliffe 2000, IBM n.d., Vora 1998). However, it is noted that formal methodologies are either not used in industry practice or are inadequate, since the client-customer is still frequently frustrated and confused when using websites. The problems experienced relate especially to navigation, interactivity and downloading.

These current methodologies (see Figure 26) do not adequately support participative design processes, contents and presentation, real interaction, client-customer feedback - and user contributions may be ad-hoc (*in Figure 26, items in italic are the missing stages in these methodologies*). Hence, a new integrated methodology should be created to prevent these problems in website design. Such a methodology will

address various issues: to examine how the user can work with a website without any frustration and aggravation, as poor usability, navigation and graphic art will produce negative effects. "*Users are frustrated because of an inability to find the information sought, disorganized pages and confusing information, pages under construction and disconnected links, the lack of navigation support and other problems*" (Borges, Morales, and Rodrigues 1998, p. 137). Usability is very important aspect in the website development process since it "*is related to consumer ability to know where s/he is at any time and what can be done*" (Flavian, Guinaliu and Gurrea 2006, p. 3).

Harvey and Novicevic (2000 p. 80) stated that since the "*global environment for business becomes more volatile and the need to institute frame breaking changes in the conventional wisdom of management increases, global organizational ignorance about the usability of its existing knowledge becomes a critical issue*". Therefore, it is increasingly important to measure the level of user satisfaction with the website content and interface. Thus, usability needs to play a major role in the development process. Hassan and Li (2005) suggest that a sophisticated website development methodology is required since usability "*has an indirect relationship with the need of content quality of a particular system*" (p. 49).

Furthermore, website redesign from e-commerce and e-marketing perspective should consider the usability aspect to "*include new features to facilitate navigation and access to information or to change the appearance of the site in favor of a more pleasant and efficient layout"* (Benbunan-Fich and Fich 2005, p. 36). Thus, any methodology should be flexible enough to accommodate new types of website functionality. In addition to the use of usability design techniques, designers need to involve the user from the beginning and to keep focused on the target audience, "*to evaluate your [their] activities and see if they address the needs of the contemporary consumer*" (Boyer 1999, p. 113).

According to Kambil and Eselius (2000, p. 36) "*When companies get their customers involved in the creation of their products, it can play out in two ways: as a collective*

contribution from many customers, or as a self-directed effort from a focused individual". Mumford stresses that participation is very important in the ETHICS[62] methodology, which enables a "*shared learning process to take place in which each of the interest groups can contribute to the problem-solving process. The various interest groups are likely to have different values, needs and objectives, and these can be brought into the open, discussed and attempts made to reconcile them as part of the participative process*" (Mumford 1995, p. 15-16). Participation in general will play an unambiguous role in the development process since the users will contribute significantly to the decision-making about the new system and will be able to test and evaluate the new system before implemented it. This situation will produce an effective and successful system which meets the user requirements and needs.

In order to solve the problems of current methodologies, this research will focus on investigating and developing a new methodology for designing simple and friendly websites. Different types of methodologies have been investigated and a new, consolidated methodology produced. The practicality of this approach will be assessed through interviews and questionnaires with representatives of website development companies in Western Australia.

5.3 Research Questions

After investigations of academic and commercial methodologies for development of websites, the researcher deduced that most of these methodologies have similar approaches regarding aspects of navigation, usability, implementation and iteration. However, it was also noted that most of these methodologies are either not used by industry or are inadequate, hence most users are still frustrated and confused when working with websites.

In order to solve this problem, the researcher examined various methodologies including: lifecycle models, IS development methodologies, methodologies with

[62] ETHICS: Effective Technical and Human Implementation of Computer Systems

explicit human factors aspects, websites methodologies, marketing methodologies, and additional detailed techniques (i.e. task analysis and detailed website design and implementation) in order to develop a new integrated methodology, which meets the users' and designer's requirements. Therefore, in order to clearly identify the purpose of the investigation and to establish a preliminary boundary to the opportunity of the research, the research was defined via the following major research question:

> *Can an integrated design methodology help designers and users to create effective websites, which meet the requirements of end-users, client-customers, and designers?*

The major research question clearly demonstrates the objectives of this research. In particular, we endeavour to determine whether the integration of stages and steps from various methodologies will meet the requirements of the designers and users. Additionally, four minor research questions were formulated to support the major research question:

1. *Will the website development process benefit from participation by both end-users and client-customers?*

2. *What are the requirements which need to be considered before creating a websites, such as usability, Human Computer Interaction (HCI), iteration, and real interaction, and how can such criteria be addressed within a design methodology?*

3. *Will this new methodology satisfy the needs of the website industry in Western Australia?*

4. *Can the integrated new methodology be "contingent" in an effective way, with designers and users choosing the particular techniques and tools, which suit the specific problem situation?*

The first question aims to determine whether it is possible to achieve effective user participation in the website design process. The partnership between designers and users is very important and it should involve the users from the beginning to the end of the process. This will lead to less time being needed for the implementation, training, evaluation and testing stages. This question will focus the evaluation on the "participation" aspects, which need to be addressed within the new methodology.

The second question aims to consider various requirements before developing a website, these requirements (i.e. reliability, usability, navigation and real interaction) need to be addressed within a design methodology. This question will focus the evaluation on the "key principles" and "requirements", which need to be addressed within the new methodology, and test whether the proposed methodology meets these objectives.

The third question aims to evaluate whether the new methodology will satisfy the needs for website industry in Western Australia. It will examine the stages and steps in this methodology to evaluate if these are necessary and sufficient in order to develop a website which meets the users' and designer's requirements. This question will focus the evaluation on the "benefits" of adopting this new methodology in the website industry in Western Australia.

The fourth question aims to emphasise that this new methodology needs to be "contingent" which means that it is not necessary to adopt all the stages and steps in the design of any particular website. The users and designers can choose which techniques and tools need to be used to address the problem situation. Most projects are limited by time, budget, and the availability of users to test the website. This question will focus the evaluation on the "practicality" of adopting this new methodology in the website industry in Western Australia.

As mentioned previously, the main objective of this research is to investigate and examine whether an integrated design methodology can help designers and users to create effective websites. The researcher will evaluate the minor research questions to support the major research question, and the results from these questions are considered as a part of the research objectives. Eventually, the results from this

research may benefit the website industry in Western Australia to reduce the frustration and disappointment often experienced by website users.

5.4 Research Methodology

The research approach for this study will predominantly use an Interpretive (Qualitative) approach. This "*involves the use of qualitative data such as interviews, documents and participant observation, to understand and explain social phenomena* (Myers 1997, p. 241). A Qualitative approach will be used in this research i.e. interviews and questionnaires, as this will allow the researcher to collect a wide range of information from the industry in order to provide a more complete picture of the major and minor questions being addressed in this thesis.

This research will be carried out by using different types of methods and techniques. Throughout this study, an Induction (Social Science) approach will be used as the main research method. This approach will "*begin with [a] detailed observation of the world and move toward more abstract generalizations and ideas*" (Neuman 2000, p. 49). The researcher will observe and refine the concepts then "*develop empirical generalizations and identify preliminary relationships", to "build the theory from the ground up*" (Neuman 2000, p. 49).

The first step in this study is to define the purpose, and this can be achieved by using an explanatory method, seeking to discover "*Why things are the way they are*." (Neuman 2000, p. 22). This approach is aimed at focusing on, and looking for, causes and reasons, as indicated in Figure 27.

The explanatory step was examined in the research by exploring various methodologies for website design to identify the reasons why many users are frustrated and confused when working with websites. The researcher outlined the basic concepts behind Methodologies including: lifecycle models, IS development methodologies, methodologies with explicit human factors aspects, websites methodologies, marketing methodologies, and additional detailed techniques such as task analysis and detailed website design and implementation. From this information,

a New Participative Methodology for Developing Websites was developed. This methodology will help the designers and users to fill the gaps in the current methodologies and to avoid the frustration currently experienced by website users.

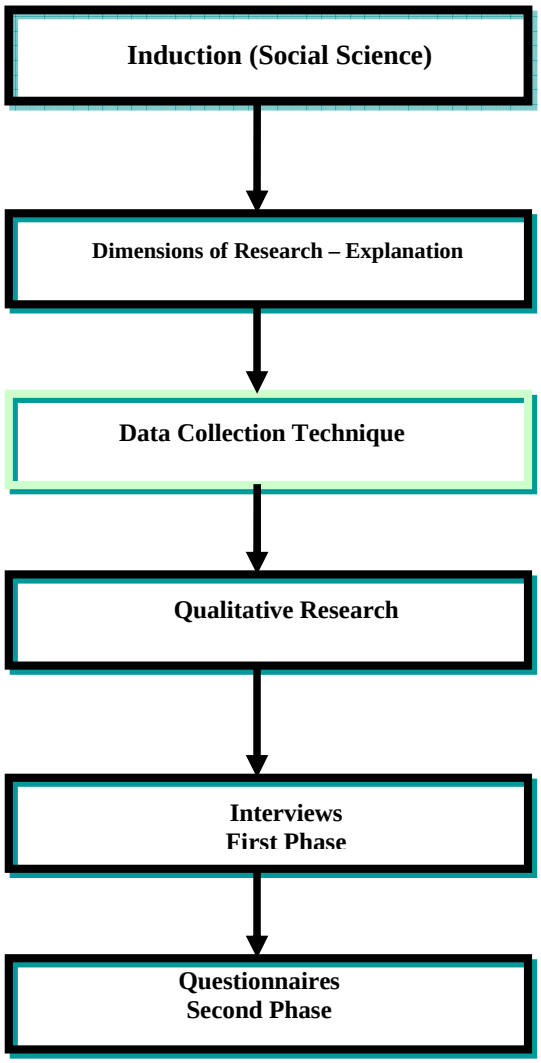


Figure 27: Research Methodology

The qualitative method is centered mainly on an ethnographic approach (Myers & Avison 2002) through which data is collected mainly from interviews and observation. This method is designed to "*provide the researcher with the perspective of target audience members through immersion in a culture or situation and direct*

interaction with the people under study" (Weinreich[63] 1996) and to "*understand people and the social and cultural contexts within which they live*" (Myers et al. 2002, p. 4). Use of website development methodologies was studied in the context of the website development industry in Western Australia.

Qualitative data sources include "*observation and participant observation (Fieldwork), interview and questionnaires, documents and text, and the researcher's impressions and reactions*" (Myers[64] 2003). The advantage of using qualitative methods is that they generate "*rich detailed data that leave the participants' perspectives intact and provide a context for health behavior*" (Weinreich[65] 1996).

In addition, according to Marcus and Robey (cited in Kaplan and Duchon 1988, p. 573), qualitative methods can "*yield data from which process theories and richer explanations of how and why processes and outcomes occur can be developed*". However, a key weakness of this method is that it is time consuming.

As was mentioned above, this research is mainly focused on interviews leading to the use of a questionnaire. Both stages are necessary in order to gather a wide range of data needed to support the research objectives and to minimize the shortcomings of each approach. It is useful to examine the weakness and strengths of these qualitative methods.

An interview is "*obviously and exclusively an interaction between the interviewer and interview subject in which both participants create and construct narrative versions of the social world*" (Miller and Glassner 2006, p. 125). In addition, Mahoney[66] (1997) states that "*the use of interviews as a data collection method begins with the assumption that the participants' perspectives are meaningful, knowable, and able to be made explicit, and that their perspectives affect the success of the proje*ct". An interview provides "*access to the meanings people attribute to their experiences and social works*" (Miller et al 2006, p. 126).

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[63] Weinreich: http://www.social-marketing.com/research.html
[64] Myers: http://www.qual.auckland.ac.nz
[65] Weinreich: http://www.social-marketing.com/research.html
[66] Mahoney: http://www.ehr.nsf.gov/EHR/REC/pubs/NSF97-153/START.HTM#TOC

Interviews are utilized in this research to explore the type of methodology, tools and techniques that are adopted by the website development industry in Western Australia and to learn more about their technical experiences and knowledge of how to develop a website. The interviews also identify existing problems and provide an indication of the likely usefulness of the principles behind the proposed new methodology.

The purpose of the interview in this research is: 1) to identify the type of methodology(s) that is carried out by the industry in Western Australia to develop a website; 2) "*to inquire about possible measures and focus of the study*" (Kaplan et al 1988, p. 577); and 3) to generate the questionnaire for the second phase of this research.

The strengths of this approach include:

- *Useful when participants cannot be observed directly;*
- *Participants can provide historical information;*
- *Allows researcher "control" over the line of questioning*; (Creswell 2003, p. 186)
- *Afford ability to experience the affective as well as cognitive aspects of responses*;
- *Allow[s] interviewer to explain or help clarify questions, increasing the likelihood of useful responses*

(Mahoney[67] 1997).

The weaknesses of this approach include:

- *Expensive and time-consuming;*
- *Interviewee may distort information through recall error, selective perceptions, desire to please interviewer;*
- *Flexibility can result in inconsistencies across interviews;*
- *Volume of information [may be] too large; may be difficult to transcribe and reduce data* (Mahoney 1997).

[67] Mahoney: http://www.ehr.nsf.gov/EHR/REC/pubs/NSF97-153/START.HTM#TOC

It is ideal to use this approach in this research, as participants will provide rich and historical information to the researcher to learn more about their methodology(s) to develop a website. Therefore, this research approach has been selected as the fundamental research method to be utilized in this research.

The second approach used in this research was a questionnaire, which was generated and developed from the qualitative research after "*analyzing the interviews and observations to derive categories for questions that focused on the primary expectations expressed by interviewees*" (Kaplan et al 1988, p. 578). A questionnaire is a "p*reformulated written set of questions to which respondents record their answers, usually within rather closely defined alternatives"*. In addition "*questionnaires are an efficient data collection mechanism when the researcher knows exactly what is required and how to measure the variables of interest*" (Sekaran 2003, p. 236).

The purpose of using this approach in this research is: 1) to evaluate the "practicality" and "benefits" of adopting the proposed new methodology in the website industry in Western Australia; 2) to consider the various requirements for developing a website; and; 3) to evaluate whether it is possible to achieve effective user participation in website design.

The strengths of this approach include:

- *Questionnaire offers greater anonymity;*
- *Questionnaire is less expensive;*
- *Respondent can take more time to respond at[their] convenience;*
- *Questionnaire can be administered electronically, if desired.*

(Cavana, Delahaye, and Sekaran 2001, p. 245)

The weaknesses of this approach include:

- *Response rate is almost always low; 30 per cent rate is quite acceptable;*
- *Follow-up procedures for non-responses are necessary.*

(Cavana et al 2001, p. 245)

This approach will provide data to assess the minor research questions to support the major research question.

5.5 Summary of Research Methodology

This section will provide a detailed description of the research methodology, which was adopted by the researcher to assess the research questions. The research is based on Qualitative approaches of Interview and Questionnaire. These approaches were adopted in the research to enhance the utility and consistency of the research results and to reduce errors.

After studying various methodologies from different perspectives and preparing the literature review, the interview questions were formulated (see Figure 28). The main objectives of the interviews were to learn more about methodologies used in the industry and the tools and techniques that are utilized to develop a website. In addition, the interviews addressed the four key principles for this research in order to assess the extent to which these principles were reflected in the industry methodologies.

The research procedures, the interview questions and questionnaire design were reviewed by, and received the approval of, the Ethics committee at the University before any information was sent to the Industry participants and IS Professionals. All participants provided written informed consent to participating in the research procedures.

After preparing the interviews questions, the researcher identified some companies in Western Australia which are developing websites. It was a very challenging exercise for the researcher to identify those website companies which were prepared to take part in this research. This was accomplished by emailing a letter detailing the purpose of the research, and two consent forms (one for the organization and one for participants). Finally, the researcher managed to interview personnel from nine top website companies in Western Australia from a possible list of twenty-nine. The rest

of the companies refused to be involved in this research, as some were too busy and others were not prepared to release any information about their methodologies.

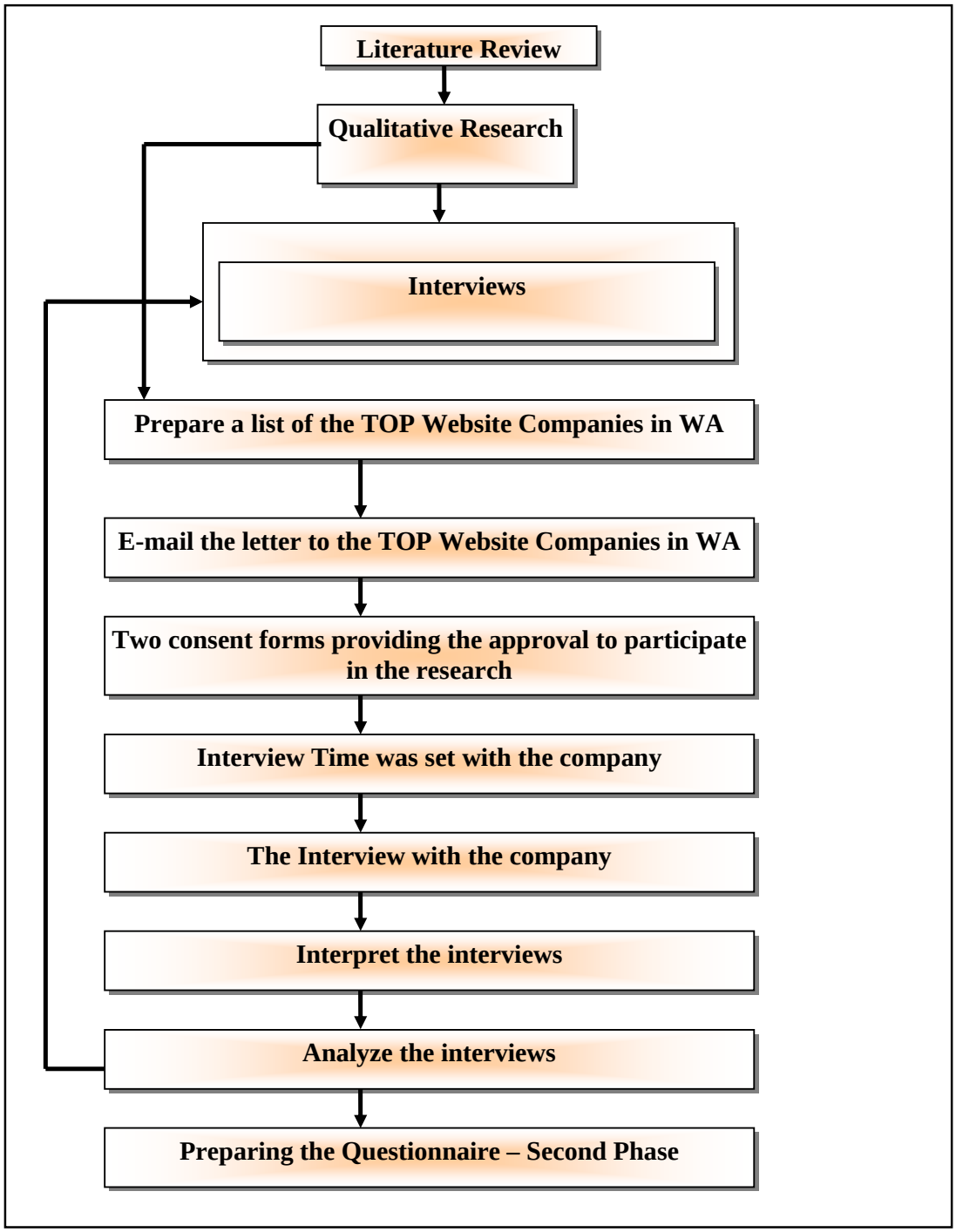


Figure 28: Summary of Research Methodology

The interviews were carried out from the end of May 2006 until mid-August 2006. All the interviews were audio recorded (after receiving permission from the interviewee) using a digital voice recorder. This facility allowed the researcher to download all the interviews on to the computer and listen to them more than once to understand the main concepts derived from each interview. This data took more than two months to interpret. This provided new information from the industry to be considered by the researcher and then added to the new methodology in order to make it more practical. After reviewing all the information gained from the interviews, the researcher then developed the questionnaire, which is the second and final phase of this research.

The questionnaire was administered from November to December 2006 via the Online Survey Tool from Curtin Business School. Details regarding the questionnaire were emailed to the nine website companies following the interviews which had been conducted from May until mid-August 2006. Seven of the nine companies responded to the questionnaire with two participants from company C responding, which gave a total of eight participants. In addition, the questionnaires was emailed to ten IS professionals and eight responded to the questionnaire which yielded a total of sixteen participants. The questionnaire was divided into seven parts, each of which related to one key principle of this research. After reviewing and analyzing the questionnaire outcomes, the researcher summarized conclusions and modified the new methodology accordingly.

5.6 Conclusion

This chapter provided a detailed description of the Significance of Research, Research Goals/Questions and Research Method and Design. The researcher justified the usefulness of this research. In addition, this chapter introduced the major and minor questions for this research that need to be investigated and examined so that an integrated design methodology can be developed that will assist designers and users to create effective websites.

The chapter also provided a detailed description of the research methodology and the research design and styles used in performing this research study; justified the two techniques used (from the qualitative approach); and discussed the strengths and weaknesses of each. Lastly, the actual research process was detailed.

Chapter Six will discuss the interview process carried out by the researcher with website design companies in Western Australia in order to learn more about their methodologies and tools. The outcomes of the interviews directed the researcher in developing the questionnaire which is the second phase of this research.

CHAPTER SIX

INTERVIEWS WITH THE INDUSTRY

6.1 Introduction

Chapter Five outlined the methodology for this research study. It described the Significance of Research, Research Goals/Questions and Research Method and Design for this research. Evidence was presented to support why this research is significant for the web industry. Additionally, research major and minor questions were presented and justified. The researcher discussed the two qualitative approaches and the strengths and weaknesses of each.

In this chapter, the author will discuss how the qualitative approach was applied. A summary of the interviews will be presented to illustrate the new concepts and information gleaned from the interviews, and to discuss positive and negative feedback regarding the new participative methodology for developing websites. The data from these interviews will be analyzed here and also discussed in the remaining chapters of this thesis.

6.2 Web Industry in Western Australia

To implement the qualitative approaches for this research, the researcher collected information about the web industry in Western Australia so as to address the main research objectives. This research was divided into two phases; the first phase was the interview) and the second phase was the questionnaire. To carry out the first phase, the researcher prepared a letter (see Appendix A), which contained the following:

- Introduction to the researcher;
- Information about the research in general;
- Information about the two phases in this research in order to give the company an idea about how the research would be carried out;
- A guarantee that privacy would be maintained regarding any of the information acquired from the interview and the questionnaire;
- Encouragement for the company to participate in this research as this will provide a valuable insight into design website methodologies;
- A statement stating the researcher's willingness to provide feedback regarding the results of the interviews and questionnaire if the company asks for it;
- A request that the company complete the Organization Consent and Participant Consent Forms to signify willingness to participate in this research project.

In phase one, the letter and the forms were posted to a sample of 29 of the top web industry companies in Western Australia. This sample was collected from Australian Web Industry Association website[68], Port80.asn.au website, the Western Australia Government website and from various web search engine such as Google, Yahoo, and MSN. Under the Australian Web Industry Association website, there were 35 web industry companies listed. The researcher sent the letter and forms to 29[69] of these 35 companies, that is, 82% of the website industry companies in Western Australia. Companies were given one week to respond, after which a reminder letter (see Appendix B) was sent out to the non-responding companies to encourage them to participate in this research. Nine companies agreed to meet the researcher and participate in the interviews and questionnaire. This represented 31% of the 82% (of total number of companies in Western Australia) who agreed to work with the researcher. This is an excellent outcome, since this industry sector is new and relatively minor in Western Australia. The sample of companies that responded was divided into four rounds of possible interviews, as indicated by Table 40.

[68] Australian Web Industry Association Website http://www.webindustry.com.au/view/members/query/layout/full
[69] The researcher only approached the 29 companies in Western Australia, as the rest of companies were located in the Eastern states..

This was a very challenging exercise for the researcher as it took her more than one month to identify the 29 companies from Western Australia. Table 40 indicates that most of the companies chose not to participate in this research, since some of them were too busy to participate, while other companies refused to release any information regarding their work, especially their methodology. These companies did not respond to the two letters until the researcher telephoned asking if they were willing to participate in this research, and receiving a negative response.

Round	No. of Companies	First Letter	Second Letter	Respond
One	Ten	4 May 2006	17 May 2006	*Three Companies are willing to participate* *Two Companies cannot release any information* *Five Companies are very busy*
Two	Eight	22 May 2006	31 May 2006	*Three Companies are very busy* *Five Companies cannot release any information*
Three	Eight	22 June 2006	5 July 2006	*Four Companies are willing to participate*
Four	Three	19 July 2006	31 July 2006	*Two Companies are willing to participate* *One Company is very busy*

Table 40: Four Rounds Sample – Web Industry Companies in Western Australia

From the four rounds, the researcher managed to interview representatives from nine companies (see Table 41). The main objective of the questions used in the interview was to learn about the methodology, tools and techniques that were used to develop a website. The researcher also discussed the four key principles behind this research, which are user participation, real interaction, usability and iteration. The researcher was interested to know whether or not, and to what extent, these key principles are reflected in the companies' methodologies. The supervisors of this researcher agreed that nine companies were a sufficient number for the purpose of this research, as sufficient information and examples were collected during the interviews, to enable the researcher to complete the first draft of the questionnaire.

Round	Company Name	Meeting Time
One	*Company A* *Company B* *Company C*	*31 May 2006* *9 June 2006* *13 June 2006*
Two	*NONE*	
Three	*Company D* *Company E* *Company F* *Company G*	*12 July 2006* *21 July 2006* *28 July 2006* *9 Aug 2006*
Four	*Company H* *Company I*	*2 Aug 2006* *10 Aug 2006*

Table 41: Four Rounds Sample – Web Companies in Western Australia and Meeting Dates

Table 41 indicates that round two was the least productive since no companies were willing to participate in this research as they were either: 1) too busy to participate; or 2) not prepared to release any information about how to develop a website. Nevertheless, the researcher managed to meet representatives of nine companies in Western Australia. Interviewees ranged from the director, executive director, managing director to project manager. Before the meeting with the industry representatives, the researcher mailed a letter thanking them for taking part in this research and asking them to indicate which day, time and location will be suitable to them for conducting the interview (see Appendix C). Table 42 illustrates the business type of these nine companies which are involved in developing public, private, government and not-for-profit websites.

Company Name	Business Type
Company A	*Government, Private and Public*
Company B	*Commercial and Government Organizations*
Company C	*E-Commerce, and web-based supply chain management system* *Web content management customer relationship management system for a large property development and home building company*
Company D	*E-Commerce, Content Management Systems and the site aesthetics, security, structure and functionality*
Company E	*Private and Public*
Company F	*Commercial and Government Organizations*
Company G	*Website development (Public and Private), and Online Marketing Services*
Company H	*Content Management, Design Firm Partnerships, Applications, and Websites (Private, Public and Not for profit)*
Company I	*Private*

Table 42: Web Industry Companies in Western Australia and their business type

The nine companies were very positive in their response to the interview. They shared their knowledge and experience regarding methods for developing a website,

and they provided excellent examples from their experience. The researcher also shared with them her new methodology for developing a website. Positive feedback was received from the interviewees regarding the new methodology. For example, Company C stated: *"Good job, if you follow all the stages and steps definitely you will have a successful website"*, while company B stated: *"Your research is very useful, since the industry should look to your methodology to learn that both types of users should be available in the design"*.

The interviews with the nine companies were recorded (after receiving permission from the interviewee) with a digital voice recorder. The researcher downloaded all the interviews on to the computer and listen to them to interpret the interviews. Interviews with each participant were typically between forty-five minutes to two hours in length. Some participants provided more information compared with other participants by giving more examples from their experience with the website development process.

On average, about fifteen hours were needed to interpret each interview, thereby taking the researcher more than one hundred and thirty-five hours to interpret the nine interviews for this research. The transcripts from the interviews yielded more than thirty-three (33) pages of single-spaced text, and the interview data was comprised of 8,585 words.

In the next section, the researcher will analyze the results from the interviews providing: 1) a summary of the interviews; 2) new information obtained from the industry; 3) the positive and navigate feedback about the new methodology; and 4) new ways to increase the profit for the clients by using the website technology.

6.3 Summary of the Interviews

The researcher interviewed representatives of nine companies in Western Australian asking the interviewees questions concerning their methodology, tools and techniques for developing a website. In addition, the researcher expanded her set of

interview questions (see Appendix D) to cover questions regarding the four key principles for this research, which are user participation, real interaction, usability and iteration. From the interviews, the researcher observed that most of the industry methodologies are based on their industry experience and knowledge derived from past projects, rather than on academic/theory perspectives.

The interviewees raised questions concerning the prototyping, testing, evaluation, implementation and maintenance stages, and about tools to encourage user feedback. From the interviews, the researcher derived several conclusions concerning the four key principles for this research and the various stages of the proposed new methodology. These conclusions are summarized in the following sections. The order of topics follows approximately that for the set of focus questions used in the interviews (see Appendix D).

6.3.1 Four Key Principles

The four key principles were introduced in the interview to ascertain whether these principles were currently utilized in the Industry methodologies in which stage(s), and the reasons behind adopting these in their methodology. From the interviews, the researcher concluded the following with respect to the four key principles.

6.3.1.1 User Participation

The inclusion of user participation in a methodology is very important, as accurate information about system requirements will be collected from the two types of users; end-users (internal to the client organization) and client-customers users (external). It also assists users to understand and fully utilize the new websites. Users "*need to interact with systems and to be informed how to make optimum use of them*" (Howard 1996, p. 197).

To build an effective website, companies first "*need to listen to the people who will be using the site*" and put "*end users, the company and the agency together to*

brainstorm and reach a consensus about websites, branding, and messaging". Moreover, to let "*end users tell companies how they want to be "told and sold", and gives companies an opportunity to gain insight about what's important to consumers*" (Holtzman 2005, p. 110). Therefore, more support from the users will be available from the beginning to the end in the development process to indicate if the website is working according to their needs and requirements and to encourage them to test and evaluate every stage and step before moving to another stage.

From the interviews, the researcher observed that most of the interviewees agreed that user participation is an important aspect in the development process. In some companies, users do participate from the beginning to the end of the development process, while other companies allow the users to participate in some stages only, and the rest of the companies do not believe that user participation will provide any benefits to the development process. Comments from the interviewees regarding user participation are summarized in Table 43.

Company representatives stated that the reason for user participation is to ensure that the system is successful, efficient and effective and to "*reduce the time in the implementation and testing stages*" (Company D). Furthermore, user participation in the design process is important to "*make sure they are happy and to ensure the goals are met*" (Company E).

Company Name	User Participation Perspective
Company A	o *We prefer to deal with the top management in order to reduce the conflicts.* o *Every project has different requirements so user participation is depending on project type, budget, time and experience. We can involve two types of users those who are working with the website and those who interact with the website.*
Company B	o *Not many clients want us to involve them in day-to-day development, since that will cost them a lot.*
Company C	o *Top management plays a good role in the website design, since they have the authority to involve the users from their company in the website design and this is dependent on the budget.*
Company D	*1. Why we need to involve the user:* o *Less time in implementation and testing stages* *2. The disadvantage of involving the user:* o *Different people with different ideas* o *Very hard to make decisions*
Company E	o *Top management will be involved in the design process from the beginning to the end, to allow them to check the entire website systematically to reduce duplication.* o *If the management is asking to get more users to test the website, we prefer between two to four persons only, no more, since each one will have different ideas and suggestions. Different ideas and suggestions from the users will make it very hard to arrive at a decision and, most importantly, will take more time to develop a website.* o *User participation in the design process is to make sure they are happy and to ensure the goals are met.*
Company F	o *Depends on the project, client and budget.* o *We still encourage our clients to involve specific types of users from various levels, but it is still very hard to achieve this.*
Company G	o *Two types of users are involved in the design process (end-users and clients) as each type has different requirements and needs, therefore, we need to involve them to ensure their needs are meet during the design process.* o *Two types of user participation are users depending on the site and the project, and this participation can be from the beginning to the end of the design process, or can be in various levels in the design process.*
Company H	o *Two or three types of users are available and that depends on the project budget*
Company I	o *Two types of users, who will be using the website in addition to the company users*

Table 43: User Participation Perspective in Development Process

There are also potential difficulties that can arise from user participation. Table 43 indicates that Company A limited user participation to top management to "*reduce the conflicts"*; and Company C suggested that top management plays *" a good role in the website design, since they have the authority to involve the users from their company in the website design and this is dependent on the budget"*. However, Company D stated, "*user participation in the development process will produce different ideas and it will be very hard for designers to make decisions for the website*". Company E indicated, **"***We prefer between two to four persons only, no more, since each one will have different ideas and suggestions. Different ideas and*

suggestions from the users will make it very hard to compose a decision and the most important will take more time to develop a website".

Table 43 indicates that three aspects affect user participation in the development process: the project site, the nature of the client, and most importantly, the budget. The budget is a critical aspect of the development process since "*not many clients want us to involve them in day-to-day development, since that will cost them a lot"* (Company B). These three aspects are considered to be the main reasons for limiting user participation in the development process.

On the other hand, currently most companies in Western Australian are encouraging their clients to involve not only the top management in the development process, but also the users who are dealing and interacting with the website. For example, company E indicated, "*Top management will be involved in the design process from the beginning to the end, to allow them to check the entire website systematically to reduce duplication*". Company F stated, "*We need to coach our clients to teach them the benefits behind customer involvement in the development process and provide the best solution, and we need to collect as much information as possible to reduce the time taken in the other stages. Now it is very hard to do that, since it is limited only to the client sector, and this is very expensive if we need an approach involving the customers"*.

Nevertheless, this research indicated from the beginning that user participation is essential in the development process to allow the end-users (internal to the client organization) and client-customers users (external) to learn more about the website before releasing it. Customer F stated, *"I agree with you that we need two types of users to evaluate and test the website, but that depends on the clients"*. In addition, Company C indicated, "*Audience plays a major role in the website design, (however), most of the websites are worthless because there is no communication between the users and the designers*".

6.3.1.2 Real Interaction

Real interaction is an important process; hence, it is one of the four key principles in this research. Bort (1997, p. 66) stated that real interaction is essential since one can find out things like: "*Where do people go most often? Which search engines do they most often come from? How long does it take them until they complete their transaction? And most importantly, how do you minimize the number of clicks to get them to the point where you want them to go*?". This process will help the designer to track the client-customers users' (external) activities on the website and to "*understand what people like and do not like*" (Wagner 1997, p. 63). Usually, the real interaction software (i.e. *Media Temple, Flash, FarCry, Smart Tools*) will generate a log file, which will help the designers to understand the users' behavior on the website such as "*which pages they view, how long they stay and how often they return*" (Company A).

The interviews indicated that "real interaction" is an unknown technique to most of the companies; however, after the researcher explained its purpose, most of them recognized it as "*web hits; web statistics or click tracking*". However, most of the clients are not concerned about this information, as they do not want to waste time and money to understand the advantages and disadvantages of this technique, and the way that this information will increase their website performance. Therefore, the use of such techniques "*is very limited in the market*" according to Company C, while Company F indicated that real interaction is "*very expensive and most of the clients do not want it, since most of the clients do not understand all this information and how it will help them to increase their profit*".

The utilization of these techniques depends on: 1) project site, 2) budget, and 3) clients types. Currently, the majority of the website developer companies are encouraging their clients to learn more about real interaction and its benefits. For example, the company will provide information from the log reports about the users' behavior and their reaction to dealing with the website. After examining these reports, the client can identify the changes to the website in order to meet the users' requirements, and "*how to tweak a site to improve the user experience*" (Morrison

2004, p. 5). Therefore, the use of real interaction tools (or web tracking tools) "*implies a certain level of commitment, because you have to be prepared to respond*" (Bort 1997, p. 65). Comments from the interviews regarding real interaction are summarized in Table 44.

Company Name	Real Interaction Perspective
Company A	o *Transaction of information or engaging of information, the benefits of the real interaction is to determine whether or not the website is successful and also we need to monitor and track the users (such as which pages they view, how long they stay, and how often they return).*
Company B	o *The main benefits of real interaction are to determine whether the website is effective, however, real interaction will be used in the website according to the client's preference and their budget.*
Company C	o *Real interaction is considering the human interaction with the website. Real interaction is mostly about click tracking, you need to follow your user. It can be done in real time or historical time. Very limited in the market.*
Company D	o *Tracking the users.*
Company E	o *Web statistical.*
Company F	o *Real interaction is very expensive and most of the clients do not want it, since most of the clients do not understand all this information and how this information will help them to increase their profit. However, now we are encouraged them to think about it, since they will benefit from it.*
Company G	o *Is called tracking. Tracking downloading, the visits of the end-users to the website* o *Real interaction is collection of statistical information. Very important information that will help us to improve the website structure to the end-users. This information is considered a guide to improve the website. We are looking at this information to assess the website usability and navigation.*
Company H	o *Called web hits, the purpose just to track the visitors and what they are hitting and then the software will generate a report to solve any problem within the website* o *We need to encourage our clients to learn more about usability and real interaction in order to track more users to their website and to increase their profit.*
Company I	o *Is called tracking, in our business we are using Google Analytics, and we are analyzing the information from this software to improve the website interaction and functionality.*

Table 44: Real Interaction Perspective in Development Process

Real interaction is becoming more popular and an increasing number of clients are prepared to deal with it. However, other clients neglect this technique, since it is very expensive; and they need more knowledge and experience in their team to be able to understand the outcomes of the log reports. Company F stated, "*The new clients who want to develop a website for the first time disregard it, while the sophisticated clients who have the website for two or three years are concerned how the real interaction will increase their profit and attract more users to their website*". Encouraging clients is very important in order to learn more about the real interaction benefits to the website as Company F indicated, "*We need to encourage our clients*

to learn more about usability and real interaction in order to attract more users to their website and to increase their profit".

Company C indicated that, "*Tuesday is the best day for users to check the websites, especially in Western Australia*", while Company B stated, "*Most of the users are very busy on Monday and at the end of the week*". Therefore, the companies examine the statistical report after Tuesday to identify the problems within the website and decide on how to solve them so as to "*improve the website structure to the end-users and this information is considered as a guide to improve the website*" (Company G).

Company F concluded that "*My agenda is to have happy clients, as happy clients come back for more work… we have a strong real interaction from the beginning and some clients consider these issues while some do not, but we are focused on results with or without client knowledge*".

6.3.1.3 Usability and Human Computer Interaction

Usability and Human Computer Interaction (HCI) are important elements in the New Participative Methodology for Developing Websites. These aspects are considered indispensable in order to produce a usable, effective, efficient, successful, trustworthy, user controlled, navigationally sound, speedy and secure website to the end-users (internal to the client organization) and client-customer users (external) simultaneously. For example, user satisfaction and the sales in the e-commerce shopping sites will increase due to high usability of websites. Usability is the "*extent to which a system with [a] given functionality can be used efficiently, effectively, and satisfactorily by specified users to achieve specified goals in a specified context of use*" (Te'eni et.al 2007 p.2-3).

Usability "*has been shown to be a key factor when the services of an organization use the Internet*" (Flavian et al. 2006, p. 2). Trent Mankelow (2006, p. 53) corroborates that with good usability several advantages will be bestowed on the business by "*increasing sales, reducing costs and boosting labor productivity, staff*

take less time to train, are more productive and make fewer mistakes". In addition, "*the costs of development, maintenance and support decreases and clients have a better experience of dealing with your business*". Furthermore, Flavian et al (2006 p. 2) declared "*website usability is a very important part of the store's image and (that) it can influence shopping behavior in a similar way to those aspects of traditional establishments*".

This research declares that HCI and usability will be a step of the design stage to allow users (end-user and client-customer) analysts, and designers (internal and external) to confirm that the website design:

- Meets the users' requirements;
- Provides job satisfaction; and
- Achieves the five goals for the discipline of HCI "*to develop or improve the safety, utility, effectiveness, efficiency and usability of systems that include computers*"

(Diaper and Sanger 2006, p. 119).

According to Te'eni et al. (2007 p. 22-23) the study of HCI is "*not confined merely to the interface between the computer and user*" but should be used to:

- *Develop more usable and successful systems;*
- *Provide researchers with cohesive and cumulative knowledge for theory building, and;*
- *Apply this theoretical knowledge to enhance real information systems*

During the interviews, most of the interviewees agreed that usability is critical in the development process to produce websites where users can "*find information quickly and easily"* (Company A). Table 45 indicates that most of the interviewees concur that usability techniques should be part of the development process, as this will help the website to be "*free from bugs, with good navigation,*" (Company D), and "*to avoid frustration*" (Company B).

Company Name	Usability Perspective
Company A	o *Find information quickly and easily.*
Company B	o *The site meets the goals from the user perspective.*
Company C	o *Usability is very important from the marketing perspective. Very important to ensure that the application achieves the goals of the application.* o *From the user perspective: the ability to understand what was to be communicated and be able to navigate across to relevant information, which means the ability to do your job.* o *From the designer perspective: the application must achieve the goal.*
Company D	*Two types of usability:* o *Technical: speed of information.* o *Design: content management system software, the new version taking into consideration the usability aspects.*
Company E	*Usability :* o *How easily the website can used by customers* o *How easy it is to define what they need* o *Navigation* o *Interaction* o *Goals as easy as possible for customer*
Company F	*Usability: interesting question* o *"don't make me think", system should have the ability to be used intuitively.* o *It has effective usability if it is working.* o *The contents should cover different types of users.* o *If it is easy to use, it does not mean that a good usability is available in the website, since it will be very frustrating to the sophisticated users.* o *You need to cover both the users when you design website, which means the sophisticated, and the normal users; also you need to think how to do the functions in the web, which you want.* o *The usability should focus on what type of activities the users want to perform.*
Company G	o *Usability has a number of areas which should be considered such as functionality, how effective, efficient and successful.*
Company H	o *Achieve the task (which is the purpose of the website), define the goals, safety; tasks have to be accomplished, enjoyable and easy to work.*
Company I	o *Easy to work with a website.*

Table 45: Usability Perspective in Development Process

However, after reviewing the industry methodologies, it became obvious that usability techniques were often not clearly defined. In other words, this technique is not considered as a step in any stage but is a part of some stages. For example, Company F stated, "*Usability is available in the first two stages in our methodology*"; these stages identify the business requirements and define what the client wants. Company A declared that usability techniques are "*available from the beginning of the design until to the end*".

The term Human Computer Interaction (HCI) was new to most of the companies and most of them did not recognize this term, and therefore it has not been adopted in the terminology of their methodologies. Company H defined HCI as the "*interaction between the user and computer to achieve easily your tasks and goals*".

In this research, usability and HCI will be adopted in the new methodology to reduce user frustration and increase their commitment and loyalty to the website, to encourage more users to visit the website regularly, and finally to increase the client sale percent. According to Company C, *"Usability is very important from the marketing perspective to ensure that the application achieves the goals of the application"*. The research concluded that more techniques for implementing HCI principles are needed in website development methodologies used by industry.

6.3.1.4 Iteration

Iteration is utilized in industry methodologies, as most interviewees declared that before moving to another stage, the outcomes are tested. Hence, iteration occurs until the website meets the users' requirements. Some methodologies use feedback from top management while other companies employ a wider range of feedback techniques. The new methodology utilizes iteration at each stage and step to ensure that the website meets both user and company objectives.

6.3.2 Prototyping

Prototyping is considered a part of the development process to evaluate different proposals for the final website. These prototypes will be used by the users (end-user and client-customer) analysts and designers (internal and external) to determine if the website objectives are met.

Howard (1996 p. 200) stated that prototyping brings many advantages to the development process by:

- *Improv[ing] communication in the system development process;*
- *Removing misunderstanding[s] from requirements (is) [in order]is to show or demonstrate the object, action or property being discussed;*
- *Provid[ing] a basis for an on-going debate with users about their system requirements;*

- *[Having] the use of the prototyping approach place(s) greater emphasis on the interpersonal and communication skills of developers and users.*

Hence, prototyping is an essential aspect of the development process. Two types of prototyping are available in the proposed methodology - low and high fidelity. The former will give an indication about how the website will look. The functionality provided by the latter will be similar to the final product (including some navigation support) in order to allow the users to check the functionality of the website.

From the interviews (see Table 46), the researcher identified that prototyping is available in company methodologies but with restrictions. For example, low and high fidelity are available in all the companies except Company C. This interviewee stated that low fidelity was not available in their methodology because there is "*no budget (available for this technique) and most importantly, no one looks at paper prototypes as they would like to see the real one*".

Company Name	Prototyping Perspective
Company A	o *Two types of prototyping are used, the low is for our perspective, while the high is for the client perspective to check the functionality of the website.*
Company B	o *Low fidelity is to show the client how the website looks as for the high for the client perspective to check the website functionality.*
Company C	o *Only use the high fidelity type (Called a web development. The low fidelity is not available because of no budget and (the most important) no one will look at paper prototypes, as they would like to see the real one.*
Company D	o *Only the high fidelity is available in our design.*
Company E	o *Two types of prototyping are used in our methodology, the low is very important to allow the user to consider the look and feel of the website, which means they will check the layout and the structure and to make sure they are happy with it before moving to the high fidelity.* o *The high fidelity is similar to the final website, and in this prototyping, we need to consider the color and images of the website.*
Company F	o *Two types of prototyping are used in our methodology, as for the low only one design will be developed by using software (i.e. Photoshop) since that will cost a lot.* o *The high is similar to the final website.*
Company G	o *Low and high fidelity are available in our methodology, as for the low we used a blue print and the number of sketches will depend on the client, project and budget. High fidelity (screen mock-up) is similar to the final version of the website, the client will check the layout of the home page and other pages including the navigation and functions.*
Company H	o *Both low and high fidelity are available in our design process, the project plays a key role if we need to adopt both of them or not. The client will prefer the low fidelity with color layout in order to understand how the system will look.*
Company I	o *Yes we are using prototyping, but we are using different software for different project requirements.*

Table 46: Prototyping Perspective in Development Process

Low fidelity prototyping is often limited to one design only, as the development of more options will cost more and usually the client will have a limited budget. Therefore, Company F stated, "*we gather as much information as we can [for the*

low fidelity] and then we develop the style, if this style is still not meeting their requirements then we need to return to do the changes, but this will cost them extra payment in order to create a new style to meet their requirements".

Interviewees indicated that every client has a different attitude and approach regarding how to deal with changes in the website. If the client wishes to make any changes to his/her website at the last minute, the company will make the changes but the client will need to pay extra money for these changes since it requires revising the requirements. For example, Company F declared "*we did everything for a client; before the last stage, they call us and said two days before we changed our logo… but how come this happen and we gave you the draft two weeks before, and you said everything is OK, how come you did not know about the logo change? Therefore, these clients are not thinking about their decisions and that will cost him/her extra money, so we return and ask them, since it is your problem and you did not inform us, therefore, you need to pay extra money to solve the problem*".

Another example was provided by Company F regarding the attitude of the client when s/he was working with the prototype: "*A client came to us, and was happy with everything, but one issue was they were not happy with the font. Since it would not cost too much, we did it for free as it took me one hour to finalize the job, and of course you need to maintain the relationship with your clients, but it was frustrating*".

Most of the companies prefer to offer one or two sketches in the low fidelity prototyping stage for the website; however, some companies indicated that the nature of the low fidelity prototype would depend on the client, project and the budget. Company H stated that their clients "*prefer to have two sketches for the low fidelity (prototype) with color layout in order to understand (what) the system will look like*" and they will choose between them.

6.3.3 Testing and Evaluation

Under the New Participative Methodology for Developing Websites, the researcher adapted from the Star Lifecycle model (Hix et al. 1993) a usability evaluation stage in the center of the new methodology (see Figure 25). Since the evaluation is in the center, this will allow the designers and users to assess each stage and step before moving to another one, to ensure that the users' requirements are met. Te'eni et al (2007, p. 141) stated, "*evaluation is basically an ongoing process, occurs at each stage of the development process, and is regarded as the center of the development*". Testing is the fourth stage in the new methodology, and in this stage the website will be tested by experts and users to ensure that the website functions effectively in a technical sense.

As part of the interview procedure, the researcher added a question to distinguish between the Evaluation (of usability) and testing (of functionality) stages. From the interviews, the researcher noticed that most of companies were very confused about the difference between these two functions since most of the companies were combining the testing of usability (evaluation) with the testing of functionality in one stage, while some companies have only the testing of functionality stage in their methodology.

Most of the companies agree that these processes should be available in every stage in their methodologies, but no specific tools are used or techniques carried out in these stages. Although, the top management and users within and outside the company will assess the website at the end, in most cases, only the technical team will be involved in testing the website to make sure that it meets the users' requirements during the design stage. Later, the users will test the website before the implementation stage.

Table 47 indicates that most of the companies do include the testing and evaluation stages in their methodologies and most combine these stages together to reduce cost and time for both the client and website development company. Testing and

evaluation techniques depend on the clients, project, and most importantly, the budget. For example, Company F stated, "*some clients will not spend more money to test the website on various types of web browser, and if users try the website and it is not working on their browser (say an old one), bad luck, this means that these users will not return to this website. The user will say that since only 0.7% (of) users are using this specific browser, we will not pay more money to test this website on this browser so indeed we will lose them*".

Currently, most of the companies are starting to educate their clients to distinguish the difference between usability evaluation and testing of functionality. According to Company F, there are two types of clients in the market these days, the sophisticated and normal ones. The former are looking for usability while the latter are looking for testing, therefore: "*if we want to develop a website for a new client (i.e. s/he did not already have a website) they will focus on testing (Functionality). While if we are doing a revision for a website, the client will look for functionality and of course the main issue will be usability. Sometimes, clients will come to us (saying) that their website is very hard to use, therefore, we consider this and we do both usability and functionality"*. Company H has a new style for usability testing by sending an e-mail to users "*to check the website and then they click on submitted to check their results. This software is restricted to specific project since privacy issues will occur since the company will release some information about the e-mail status such as who does or does not open the e-mail*" and this style is known as "E-mail Campaign Monitor".

Table 47 indicates that only the technical team in the company will test and evaluate the website at every stage, while the client will do the testing and evaluation at the end. However, in this research the New Participative Methodology for Developing Websites (see Figure 25) will involve both users (end-user and client-customer) to evaluate each stage and step before moving to another stage, as the evaluation of (usability) is at the center of the new methodology.

Company Name	Evaluation and Testing Perspective
Company A	o *Evaluation done by the company (which means people with knowledge) while the testing will be done by the users (which means people without knowledge)* o *Evaluation is similar to user testing, while testing is similar to technical testing*
Company B	o *Evaluation is part of every stage, but not so much under the coding stage, while the testing is available in our approach to test both the functionality and usability of the website.*
Company C	o *Testing is available in every stage; evaluation is the first stage of prototyping or evaluates software. The evaluation is not available in our methodology, only the testing.*
Company D	o *Testing will be limited to the website (testing the website on different browsers) while the evaluation is to check if the website is OK, to make sure the user can find some information easily. Evaluation is part of the design stage (to address the usability issues, which means how the website looks) while the testing is part of the implementation stage.*
Company E	o *The differences between evaluation and testing- evaluation is called usability testing, to test the navigation and the layouts of the website, while the testing is to check the production of the website.*
Company F	o *Sophisticated users will be looking for usability, while the normal users will be looking for testing, therefore, if we want to develop a website for a new client (s/he did not have a website) they will focus on testing (functionality). While if we are doing a revision for a website, the client will look for functionality and of course the main issue will be usability. Sometimes clients will come to us saying that their website is very hard to use, therefore, we consider this and we do both usability and functionality testing.*
Company G	o *Testing: does the form submit successfully, are all the pages available and the images? Different types of testing we have in our design process, system testing, user testing, our staff and client can do testing for the website.* o *Evaluation is available in every stage in our design process, and our staff will evaluate every process before moving to the second stage. Evaluation of the functionality and the goals of the website.*
Company H	o *Both evaluation and testing are available in our design process, after the implementation, to meet the goals.* o *Testing is always required and if you test from the beginning, you need to achieve it by following the steps in the methodology. When you finish the website, you need to evaluate if the website meets the goals and the objectives of client requirements, the most important thing is we need to know if the website is easy to use and so on.* o *E-mail Campaign Monitor – is used for usability testing by sending an e-mail to users to check the website and then they click on 'submitted' to check their results. This software is restricted to specific projects since privacy issues will occur since the company will release some information about the e-mail status such as who does or does not open the e-mail.*
Company I	o *Our company does testing and evaluation stages, as the website will be tested from the technical side and the also the functionality of the website will be tested.*

Table 47: Evaluation and Testing Perspective in Development Process

6.3.4 Implementation and Maintenance

Implementation and Maintenance are essential stages in the development process as this will ensure release of the website online in an effective way and that it will continue to be effective and up-to-date. Maintaining the website is an important part of the development process, as with it the business will provide high quality service to increase the users' return to the website and to encourage the loyalty and the trust of the website users. Therefore, "*providing high quality service should arguable*

*increase their willingness to come back and do more business with the vendor. Conversely, customers who experience low service quality will be more inclined to defect to other vendors because they are not getting what they expec*t" (Gefen 2002, p. 29). In addition, "*if the service-quality meets or exceeds the customer's expectations, the customer will be willing to return to do further business with the vendor*" (Petre, Minocha and Roberts 2006, p. 190).

The new methodology will have both implementation and maintenance stages available, as in the implementation stage not only the delivery but also the promotion step of the website is available. As for the maintenance, the real interaction step will be available to track the users and to improve the structure and the functionality of the website to encourage the users to return to the website to do auxiliary business. The most significant key of real interaction tools is commitment, meaning that the clients or the company needs to deliver and modify all the necessary changes in the website strategy in order to meet the users' requirements, as Bort (1997, p. 65) stated, "*using commercial web tracking tools implies a certain level of commitment, because you have to be prepared to respond*".

Most of the companies agree that the implementation stage will be part of the contract between the company and the client; therefore, the industry will be in charge of placing the website online. As for the maintenance, it will depend on the client. If the client is too busy and has no knowledge of how to maintain the website, the website development company will be in charge of the maintenance, but this will cost the client more money.

On the other hand, some clients will be in charge of maintenance of their website after the development company has provided training sessions on the maintenance processes. Currently, most of the clients have Content Management Systems (CMS), which will allow them to maintain their website by themselves (in a semi-automated fashion). Therefore, the development company will encourage their client to maintain not only their information "*but also the functionality and navigation of their websites*" (Company F).

According to company F, "*The maintenance will be the responsibility of the clients not our company, sometimes the clients will maintain the website daily, or weekly or once a year. We usually encourage our clients to review their website at least once a year, in respect to the functionality, usability and other issues, and sometimes we call them to do changes to the website, but the most important thing is we need to make our clients happy*".

Company C indicated that maintenance should be performed every "*12 to 16 weeks to refresh the website, after you study the statistical information (from real interaction) then you can do the changes*". Company C indicated that automatic error reporting by the server will "*generate a report error weekly to inform the website development company about the errors types and where*".

Finally, Company G declared, "*Interaction management is the key to a successful system and maintaining contents of the website is very important to make sure each interaction within the system is working without any problem*".

6.3.5 Tools to Encourage Feedback

In this section, the researcher will review a sample of the tools that are used in the industry to provide more user feedback about the website. The use of feedback surveys, forms, and e-mail are considered the main methods of interaction between the users and the clients – see Table 48.

For example, Company B stated that the use of surveys and forms are very handy for the users' feedback regarding the website, "*the most important (aspect is to) give them a prize and they will fill the survey or form for you*". Company C also stated that if any website adds a form or survey to their website "*a prize should be available in the website to encourage the users to give more feedback about the website*". In addition, most of the clients will "*act on the feedback (only) after they receive (say) 100 responses*" according to Company B. They will collect all the

feedback, sort it and determine how important it is to carry out changes to the website.

Company Name	Feedback Tools Perspective
Company A	o *Feedback button and prize* o *Forms, Survey, Polls*
Company B	o *Mailing list, survey and forms with prize*
Company C	o *Prize should be available in the website to encourage the users to give more feedback about the website.* o *Survey* o *Contact form*
Company D	o *Forms* o *Content Model* o *Content Section* o *Discussion Forum* o *Telephone* o *E-mail*
Company E	o *Forms* o *Content information such as e-mail, and telephone* o *Chatting* o *Discussion forums*
Company F	o *Forums* o *FAQ* o *Survey* o *E-mail* o *Phone* o *Chatting is very expensive since you need a person to be available 24/7* o *Usually we encourage our client to respond to the users (e.g. via telephone call) in order to have a good relationship with the users.* o *Website feedback is part of users' experience and if website provides poor services, they will not come back so we encourage our client to do it directly or don't, so best to remove your e-mail address for feedback and leave only the telephone number.* o *Some users are not interested in feedback (via forms etc) but only personal communication with the client company.*
Company G	o *Forms*
Company H	o *Content forms* o *Survey* o *Discussion Forums* o *Depend on the project, client and budget.* o *I do not like to have an e-mail address on the website to prevent spam*
Company I	o *Forms*

Table 48: Feedback Tools Perspective in Development Process

Company H stated, "*I do not like to have an e-mail address on the website to prevent spam*". The researcher agrees and supports this statement, since using e-mail for feedback will waste the time and energy of the client (to open and read all these e-mails). On the other hand, some users wish to contact the client directly to ask them questions regarding the product since; "*some users are not after feedback but are after personal communication*" (Company H).

Finally, the only feedback tool which is not popular in the industry is "Chat" since this tool requires a person to be available 24/7 and most of the clients are not prepared to pay extra money to provide this service.

6.4 Industry Methodologies

According to Russo, Hightower and Pearson (1996, p.387), a methodology "*consists of a set of guidelines, activities, techniques and tools, based on a particular philosophy of system development and understanding of the target system*". Most of the interviewees agreed that a methodology is a method or process which needs to be followed by the designer to develop a website which meets the users' needs.

During the interviews, the company representatives discussed their methodology by listing the stages and steps and most agreed that every project has different requirements and needs so it is not necessary to use all the stages and steps in every project. This is called 'contingency'. For example, Company A indicated that "*every project has different requirements and needs*". The new integrated methodology for this research needs to be "contingent" with both the analyst and client choosing the particular techniques which suit the problem situation. More information about contingency is provided in Chapter 8.

Table 49 provides a summary of the industry's various understandings of the term 'methodology' from the commercial perspective. It indicates that a methodology is considered to be a process that should be followed to develop a website and this process should be in sequence and iteration possibilities should be available to ensure that the goals of the project are achieved.

Company Name	Methodology Perspective
Company A	o *The method is the project stages, and should be in sequence.*
Company B	o *A process how to use the method, structure the way we work with client - should be in loop and in sequence*
Company C	o *The ability to follow the same path every time, and these stages should be followed in sequence.*
Company D	o *Project plan, whole of sequence of steps and we need to test and evaluate it*
Company E	o *Method to do something, similar to written statement; is a process.*
Company F	o *Provide a high quality product with sequence of steps and stages.*
Company G	o *Process to achieve the outcomes - sometimes the methodology can be standard or maybe variations can be adopted according to the type of project.*
Company H	o *A method to build a website, and a way to achieve a goal at the end and why you are doing this type of sequence.*
Company I	o *A Particular task to achieve a goal at the end.*

Table 49: Methodology Perspective in Development Process

The researcher reviewed the industry methodologies and checked these against the new methodology to identify the missing stages and steps. Seven companies were prepared to share their methodologies with the researcher while the last two (Companies G and I) did not release any information about their methodologies, since they were considered confidential and exclusive. In Table 50, the following symbols are used: ☑ (indicates the stage is available), ☒ (indicates the stage is missing), and ⛥ (the stage is available to a limited extent).

Company	Planning	Analysis	Design	Evaluation	Testing	Implementation	Maintenance	Extra Stages
Company A	☑	☑	☑	☒	☑	⧄	⧄	
Company B	☑	☑	☑	☒	☑	☑	☒	
Company C	☑	☑	☑	☒	☑	⧄	⧄	*Iteration –Looping*
Company D	☑	☑	☑	☒	☑	☑	⧄	*Training Staff*
Company E	☑	☑	☑	☒	☑	☑	⧄	
Company F	☑	☑	☑	☑	⧄	☑	☑	*Training Staff and Project Review*
Company H	☑	☑	☑	☒	☑	☑	☒	

Table 50: Aspects Available in Industry Methodologies

Table 50 indicates that not all the stages are available in the industry methodologies. For example, the evaluation stage is not available except for company F. However, most of the companies combine the testing and evaluation in one stage. From the interviews, the researcher noticed that no specific step is available in the industry methodologies for usability and real interaction. Usability is considered informally, but no tools or techniques are adopted to formally assess usability against project goals. As for real interaction, it is not popular with the clients and there is no precise step for this process in any methodology. However, these days most of the companies are encouraging their clients to consider the outcomes from real interaction reports, so as to improve and enhance the website structure. In addition, there are extra stages, which are available with some industry methodologies similar to the stages and steps which are available in the new methodology.

Therefore, when the industry methodologies are compared with the new methodology proposed by the researcher, it is obvious that there is a major disparity between them. The new methodology incorporates: two types of participation, real interaction, usability, iteration and most importantly, it includes the evaluation stage. On the other hand, the researcher was able to identify new aspects from the industry to improve the new methodology structure and to ensure the practicality of the new methodology if it were adopted by the industry.

6.5 Positive and Negative Comments Regarding the New Participative Methodology

During each interview, the researcher discussed with the interviewees her draft New Participative Methodology for Developing Websites. Very positive responses were received from the industry representatives, which encouraged the researcher to continue development of the methodology by adding extra aspects suggested by the interviewees. The positive responses were:

- *The new methodology has all the stages which you need to develop a website;*

- *Your research is very useful, since the industry should look to your methodology to learn that both types of users should be involved in the design;*

- *The new methodology is very much a user-centered methodology;*

- *Good job, if you follow all the stages and steps definitely you will have a successful website;*

- *You have done a great job so far;*

- *All the stages and steps are available in this methodology.*

The researcher received only one somewhat negative response (from Company I) indicating that this methodology is similar to that used by their company – and hence, nothing new. However, this company did not release any information at all regarding their methodology during the interview.

6.6 Changes to the New Participative Methodology Resulting from the Interviews

After examining the data gained from all the interviews, the researcher identified the new information about methodologies provided by the industry, which will be very useful as an addition to the New Participative Methodology for Developing Websites. This will allow this new methodology to become more practical. The key additional insights gained from the interviews were:

- Evaluation (usability) and testing (functionality) should be recognized as separate activities and be at the center of the new methodology, as both users (end-user and client-customer) should evaluate and test each stage and step before moving to another stage.

- Feedback Tools need to be added to the new methodology in the real interaction step to allow the users to provide feedback efficiently.

- Low fidelity prototyping should involve at least two alternative solutions to give the clients more than one choice for the website. Usually, only two options are provided, since these prototypes are difficult to complete within the limited time available.

- A Project Review stage should be added. This means the designers need to check the website one week after the implementation to ensure that everything is working according to the project goals.

- The methodology should incorporate the option of using content management systems (CMS). The CMS approach was developed to allow the "*storage and manipulation of website content*" (Rogers and Kirriemuir 2003). It can be "*responsible for managing content and the portal for information delivery, manage templates and navigation*" (Byrne and Boye 2006, p. 32, 33). This system "*manages the timely, accurate, collaborative, iterative, and reproducible development of web property*" (Nakano 2002, p. 33). According to Guenther 2006 (p. 54), the CMS can provide the following functionality: *"….streamline the front-end process of managing content through well-defined work-flows and templates and allow more effective management of back-end processes to include defining, standardizing, controlling, staging, routing, storing and delivering content*".

The heart of CMS is the client's participation, which allows them to edit and submit information by using various templates and workflows without needing any previous knowledge of web editing tools, and this information becomes available on the website as soon as it has been created. Guenther 2006 (p. 55) indicated that this software will give the clients the necessary tools they need to "*create Web pages and, most importantly, to do so without requiring the technical knowledge that used to be a part of Web page development*". However, to avoid user frustration and abandonment of a CMS, "*it is essential that the content is modeled and stored in such a way that meets the business' publishing needs and the needs of the end users*"

(Regli and Gingras 2006, p. 42). Kaufman (2006, p. 1) stated "*to create a synergy of tools, workflow and controls, the proprietary content management system is not rocket science, but is efficient, responsive and flexible*".

This requires design assistance from website development professionals. The use of CMS is becoming popular these days with website development companies and clients. The clients will receive the necessary training on how to manage the CMS for their website and provide up-to-date information to the users. This will lead to "*satisfied content authors and ultimately happy customers both now and in the future*" (Regli et al. 2006, p. 44). Therefore, the potential use of CMS software will be adopted in this new methodology by allowing the users to use templates and work flow tools to enhance the structure and the functionality of the website.

The researcher made some changes to the draft methodology by adding new stages and steps to Figure 25 to ensure that the new methodology incorporates the extra processes identified in the interviews.

This provided a revised version of the new methodology for the industry to evaluate via the questionnaire. The following changes were made:

- **Testing Stage:** moving the testing stage from the fourth place to the first place, which means the testing and evaluation will both be at the center of the new methodology hence the users will evaluate and test each stage before moving to the new stage.

- **Feedback Tools:** new techniques were added to the real interaction step (under the maintenance stage), to allow the users to give positive or negative feedback about the website. Tools which should be available, include forms, surveys, telephone number, etc.

- **Low Fidelity:** under the prototyping step, in the design stage, it is suggested that two sketches of the website (instead of three) be created to reduce expenditure of time and money.

- **Project Review:** a new step was added under the maintenance stage to ensure that the website is running without any problems. This means that one week after implementing the website online, the website will be checked by the designer to ensure that it is operating properly.

- **Content Management Systems (CMS):** this system option was added to the new methodology to allow the designer to manage the content of a website. This approach system will allow clients to be able to more easily create, modify, or remove information from the website.

Figure 29 summarizes the revised version of the new methodology. Table 51 shows the revised version of the issues, tools and techniques for each stage and step which need to be carried out by the designer in order to achieve a user-friendly website to prevent user frustration when s/he deals with this interface. The major stages of the methodology may be described as follows:

0. **Usability Evaluation (SA0):** this stage is located at the center of the new methodology, as, before moving to another stage, it is necessary to evaluate the results from the previous stage, which is known as "formative evaluation".

    0.1 Usability Evaluation – Measurement (SE0.1): this step is an ongoing evaluation of the website to ensure it meets the website goals.

1. **Functionality Testing (SA1):** this stage is also located at the center of the new methodology (with the usability evaluation) to test the results from the previous stage before moving to another stage. Expert-based and user-based evaluations will test the website to ensure that the web site functions effectively from the technical perspective.

2. **Planning (SA2):** this stage allows the designer and users to address various project-scoping issues such as the requirements for developing a website; the nature of the product; the buyers; the firm's competitors; the location of the site; and how to promote the website. In addition, this stage involves developing a

detailed schedule of activities required in order to carry out the development of the website in an efficient and effective manner.

3. **Analysis (SA3):** in this stage, users, analysts and designers are expanding their findings into adequate detail to illustrate exactly what will and will not be built into the website design, and to add, improve, and correct the initial website requirements if they are not meeting the users' desires.

   3.1 Analysis - Task Analysis (SE3.1): this step will define the purpose of developing the website, the user type, the type of work users will do with the website, users' goals and their activities.

4. **Design (SA4):** the design stage will utilize the requirement specification from the previous stage to define: 1) what the website is; 2) how the website will work; 3) user involvement in decision-making; 4) future users; 5) usability requirements.

   4.1 Design - HCI and Usability Goals (SE4.1)*:* this step will allow users (end-user and client-customer), analysts, and designers (internal and external) to confirm that the website design is efficient, effective, safe, has utility, is easy to learn, easy to remember and to evaluate, practical, visible, and provides job satisfaction. There are many specific issues that need to be taken into consideration when designing website pages, such as text style, fonts, layout, graphics and color.

   4.2 Design – Navigation (SE4.2): this step is to define the specific navigation paths through the website between the entities and to establish the communication between the interface and navigation in the hypermedia application.

   4.3 Design – Prototyping (SE4.3): this step is essential in the website design process to allow users and management to interact with a prototype of the new website and to gain some experience in using it. This step will allow the management to reduce cost and increase quality through early testing.

5. **Implementation (SA5):** this stage involves the technical implementation of the website design. It will allow users to use the new product and to check whether it meets their requirements.

   5.1 Implementation – Construction (SE5.1): this step involves the technical implementation of the website design.

   5.1 Implementation - Training Staff (SE5.2): this step will give necessary training to the staff about the new website.

   ***5.2 Implementation – Promotion (SE5.3)*:** this step will use various tools such as: press releases, link building and banner-ad campaigns, paid search engine, directory listing campaigns, and traditional marketing methods (i.e. Newspaper, Radio and TV) to promote the website.

6. **Maintenance (SA6)**: this stage is ongoing maintenance to the website including update changes and the correction of errors in the website.

   6.1 Maintenance - Real Interaction and Feedback Tools (SE6.1): under the maintenance stage real interaction needs to be tracked by using the server log file. This information is very useful to the designers to improve and enhance the structure and the functionality of the website to encourage more users to visit it. In addition, feedback tools should be available on the website to allow the users to be able to contact the website owner for information or personal communication and to provide feedback about the website. For example, forms, survey, discussion forum, contact form, telephone number, and a prize should be available in the website to encourage the users to provide feedback about the website. The researcher recommended that in order to prevent spam, the organization's e-mail address should not be made available on the website.

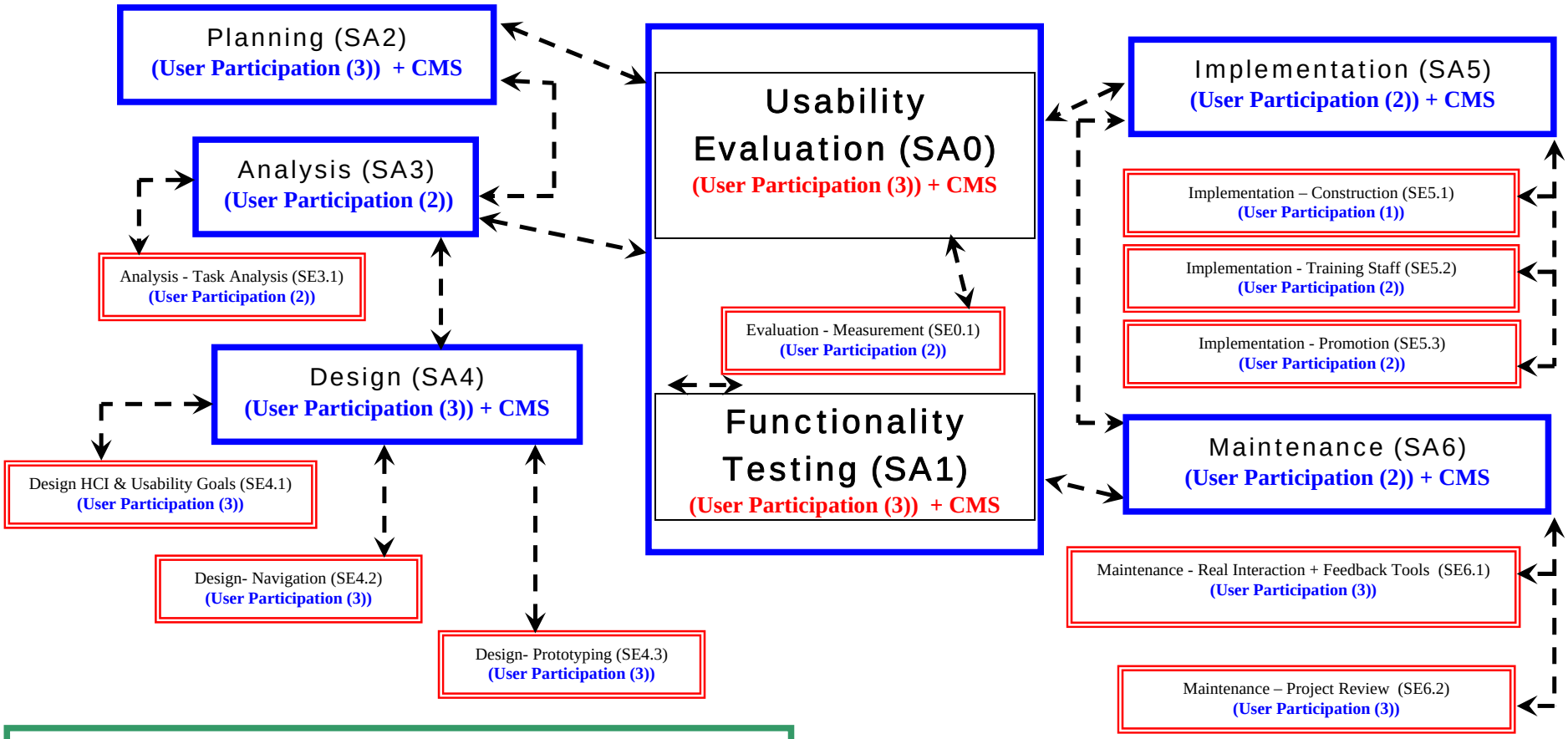
   6.2 Maintenance – Project Review (SE6.2): this step should be available to ensure that the website is working within the project goals. This means

that after putting the website online, the designers need to check the website after one week to evaluate if the website construction and structure are working according to the users' needs and requirements. One example of a tool that can be used for the project review is the checklist; i.e. a checklist for the goals and objectives, usability and technical requirements.

7. **User Participation (SA7):** this aspect is a very important concept in the methodology, as the main purpose is to allow user participation in the website development process to gain more information about the problems and alternative solutions from the users and to familiarize them with the system before it is released. For each stage, there is a rating (from 0 to 3), which indicates the extent of user participation in the development process.

8. **Iteration (SA8):** occurs between each Stage and Step in the New Participative Methodology for Developing Websites to check that the website does indeed meet users' (end-user and client-customer) requirements and company objectives before moving to another stage.

9. **Content Management Systems (CMS) (SA9):** this aspect is relevant to the usability evaluation, functionality testing, planning, design, implementation, and maintenance stages in the New Participative Methodology for Developing Websites. This tool will allow the users to manage the web contents by allowing them to add, edit, remove, and submit information by using various templates and workflows without needing any previous knowledge of the website editing tools.



Participation (SA7) rate from: is from 0 to 3. Zero represents no participation while 3 indicates maximum participation. Ratings of 1 and 2 are minimum and moderate participation respectively. The ratings are based on the Using the Consultative and Representative approaches according to Mumford (1995).

Figure 29: New Participative Methodology for Developing Websites

Iteration (SA8) It occurred between each Stage and Step
(User Participation (3))

Content Management Systems (CMS) (SA9) is potentially relevant to the usability evaluation; functionality testing; planning; design; implementation; and maintenance stages.

Stage *(& Step)*	Issues, Tools and Techniques
Usability Evaluation	o Formative usability evaluation by expert- and user-based
Measurement	o *On going evaluation*
Functionality Testing	➢ Functionality testing by expert- and user-based
Planning	➢ Define the objectives ➢ User requirements ➢ User analysis ➢ Cost-benefits analysis ➢ Alternatives and constraints ➢ What is your product? ➢ Who are the buyers? ➢ Who are your competitors? ➢ Where should it be located? ➢ How to promote your website?
Analysis	➢ To add, improve and correct the initial website requirements
Task Analysis	o *Define user types, their work, goals and activities*
Design	To define: ➢ What the website is ➢ How the website will work to achieve the purpose behind using this website ➢ User involvement in decision making ➢ Future users
HCI and Usability goals	➢ *User usability – Web design should be* o *Efficient* o *Effective* o *Safe* o *Utility* o *Easy to learn* o *Easy to remember* o *Easy to evaluate* o *Usable* o *Practical* o *Visible* o *Job satisfaction* o *Extra techniques, text style, fonts, layout, graphics and color*
Navigation	o *Site, Layout, Link, Navigational Structure for the hypermedia Application*
Prototyping	o *High-Fidelity* o *Low –Fidelity*
Implementation	➢ Implementing the website using software
Construction	o *Technical Application (i.e. HTML, Dreamweaver; Cold Fusion and ASP)*
Training Staff	o *Necessary Training*
Promotion	o *Press Releases* o *Link building and banner-ad campaigns* o *Paid search engine* o *Directory listing campaigns to promote the website* o *Traditional Marketing (i.e. Newspaper; Radio and TV)*
Maintenance	➢ Update changes and the corrector of errors in the website
Real Interaction + Feedback	o *Log file* o *Forms, survey, discussion forum, contact form and telephone number*
Project Review	o *Checklists*

Table 51: Issues, Tools and techniques for the New Participative Methodology

6.7 Extra Issues Emerging From the Interviews

After reviewing the interviews with the industry representatives, the researcher identified a set of new ideas which helped in the development of the second phase of this research, which was the questionnaire. These new concepts are listed in Table 52.

Issues	New Ideas from the Interviews
Power Issues	*Some web site development companies prefer to deal only with the top management of the client organization, to reduce the conflicts (see Section 6.3.1.1).*
Role of user management	*Top management plays a key role in the website design since they have the authority to involve the users from their company in the website design. However, this also depends on the budget. (see Section 6.3.1.1).*
Managing diversity of user opinions	*Users' participation in the development process will involve different people with different ideas and this will be problematic for the designer.* *Some developers prefer between two to four persons only, no more, since each one will have different ideas and suggestions. Different ideas and suggestions from the users will make it very hard to make a decision and most importantly will take more time to develop a website (see Section 6.3.1.1).*
Contingency	*Every project has different requirements and needs and hence the methodology used depends on project site, budget, clients types etc. (see Section 6.4).*
Temporal Variance	*Most of the users are very busy on Monday and at the end of the week. Tuesday is the best day for users to check the websites. (see Section 6.3.1.2).*
Cost Issues	*Not many clients want us to involve them in day-to-day development, since that will cost them a lot (see Section 6.3.1.1).*
Automatic error reporting	*The server generates an error report weekly to inform the website development company about the error types and where they are occurring (see Section 6.3.4).*
Frequency of revisions	*Website revision should occur every 12 to 16 weeks to refresh the website; after studying the statistical information (from real interaction), then changes can be made (see Section 6.3.4).*
Role of CMS	*Currently most of the clients have Content Management Systems (CMS), which allows them to maintain their website by themselves (in a semi-automated fashion). Therefore, the development company will encourage their client to maintain not only their information but also the functionality and navigation of their website (see Section 6.3.4)*
Sign-off of user feedback	*Top management will be involved in the design process from the beginning to the end, to allow them to check the entire website systematically to reduce duplication (see Section 6.3.1.1).*
Education of Clients	*Website development companies need to encourage their clients to learn more about usability and real interaction in order to attract more users to their website and to increase their profit (see Section 6.3.1.2).*
E-mail Evaluation Method	*E-mail Campaign Monitor – is used for usability testing by sending an e-mail to users asking them to check the website. This software is restricted to specific projects since privacy issues will occur since the company will release some information (for example e-mail status such as who can and cannot open the e-mail) (see Section 6.3.3).*

Table 52: Summary of New Ideas from the Interviews

6.8 Summary of Interviews questions which lead to the Questionnaire

The key results of the interview stage of the research are summarized in Table 53. The researcher used this information to devise the questionnaire which was forwarded to the industry in the next research phase to assess the practicality of the new methodology.

Issues	Changes to the New Methodology	Basic questions for the Questionnaire
Testing vs Evaluation	*The researcher added usability evaluation and functionality testing to be the center of the new methodology, which means that every stage and step will be tested before moving to another stage.*	*Do you think evaluation (Usability) and Testing (Functionality) should be carried out at each stage of website design?*
Feedback Tools	*The researcher added the Maintenance stage (under the real interaction step) feedback tools. These tools should be available in the website design to offer feedback about the website and to allow the users to communicate with the website.*	*Do you think feedback tools should be available on the website?*
Low Fidelity	*The researcher made some changes to the low fidelity aspect under the prototyping step. Previously, the developer was requested to provide three options for a website, but after the interviews, the researcher realized that two are sufficient. Therefore, the change to low fidelity is two sketches instead of three sketches.*	*Do you think low fidelity prototyping should be available in the website development process?* *How many low fidelity versions (design options) do you provide in your design if you are using low fidelity prototyping?*
Project Review	*The researcher added this aspect under the Maintenance stage by establishing a new step for it. Project review is very useful in the website development process, as after one week, the website will be reviewed to determine if the website meets the project goals.*	*Do you think project review steps should be available in your website development process?* *Do you think it is very important to review the website one week after going "live" to ensure it meets the project requirements?*
Content Management Systems (CMS)	*The researcher added this option to the methodology.*	*Do you use Content Management Systems (CMS) in your website development?* *Do you think Content Management Systems (CMS) is very important aspect in website development?* *Do you think adopting Content Management Systems (CMS) in the website development process will reduce the time to update the website by the clients and make sure that the information will be up to date as soon as possible?*

Table 53: Questionnaire derived from the Interview Questions

6.9 Conclusion

This chapter described the mechanics of the research conducted in the first phase in this research, specifically detailing how the interviews were conducted, the data collected and converted for analysis. Each focus question was interpreted and analyzed and preliminary conclusions were drawn, especially in relation to the utility of the new methodology. After analyzing the results from the interviews, the researcher carried out some changes to the new methodology to make it more complete and practical.

This chapter discusses several issues which arose from the interviews, especially the positive and negative comments regarding the new participative methodology. Most of the interviewees agreed that this new methodology is a user-centered methodology and has all the required stages to produce a successful website. The researcher identified some extra issues emerging from the interviews, which led to modifying the new methodology and the development of the second phase of this research (the questionnaire). In addition, the draft questionnaire was reviewed using the data from the interview to make sure that respondents would be able to assess key aspects of the practicality of the new methodology.

Chapter seven will discuss how the questionnaire was designed and implemented online. It also discusses the target population for the questionnaire. In addition, the researcher will discuss how the questionnaire was administered and analyzed.

CHAPTER SEVEN

QUESTIONNAIRE PHASE

7.1 Introduction

Chapter Six described the technicalities of the first phase of this research, which was the interviews. It provided a discussion of how the interviews were conducted, data collected, interpreted and analyzed. In addition, the researcher discussed the changes which were made to the new methodology following the researcher's interpretation of the interview data. Furthermore, the researcher discussed the positive and negative comments regarding the new participative methodology provided by the participants from industry and IS Professionals. Most of the interviewees agreed that this new methodology contains all the stages and steps which are needed to establish a flourishing website.

In this chapter, the researcher will discuss how the questionnaire was designed incorporating results of the interview phase; in particular the process for setting the questionnaire online, considering the target population for this questionnaire. The chapter goes on to detail how the questionnaire was administered and how the data was analyzed. Finally, it summarized the changes to the new methodology which the researcher made, as a consequence of the questionnaire outcomes.

7.2 Questionnaire Design

Interviews were carried out with personnel from the website design industry in Western Australia, and analysis of this data resulted in the design of the questionnaire, which is the second and last phase in this research (see Appendix E). Designing the questionnaire involved interpretation of the interview data and analysis together with consideration of the major and minor research questions for

this research. The questionnaire had to receive the approval of the Ethics committee at the University before sending it to the industry participants and IS Professionals. The method for phase two of this research (see Figure 30) consisted of the following steps:

- Design the questionnaire (hard copy version)
- Receive the approval from the Ethics Committee at the University
- Design the questionnaire online version
- E-mail to the nine website companies (from interviews) information about the questionnaire
- E-mail to ten IS Professionals to obtain the IS perspective regarding the new methodology
- E-mail reminder letter to companies and IS Professionals who did not complete the questionnaire
- Receive all the responses
- Review and analyze the results
- Execute changes to the new methodology and finally
- Release the new revised methodology

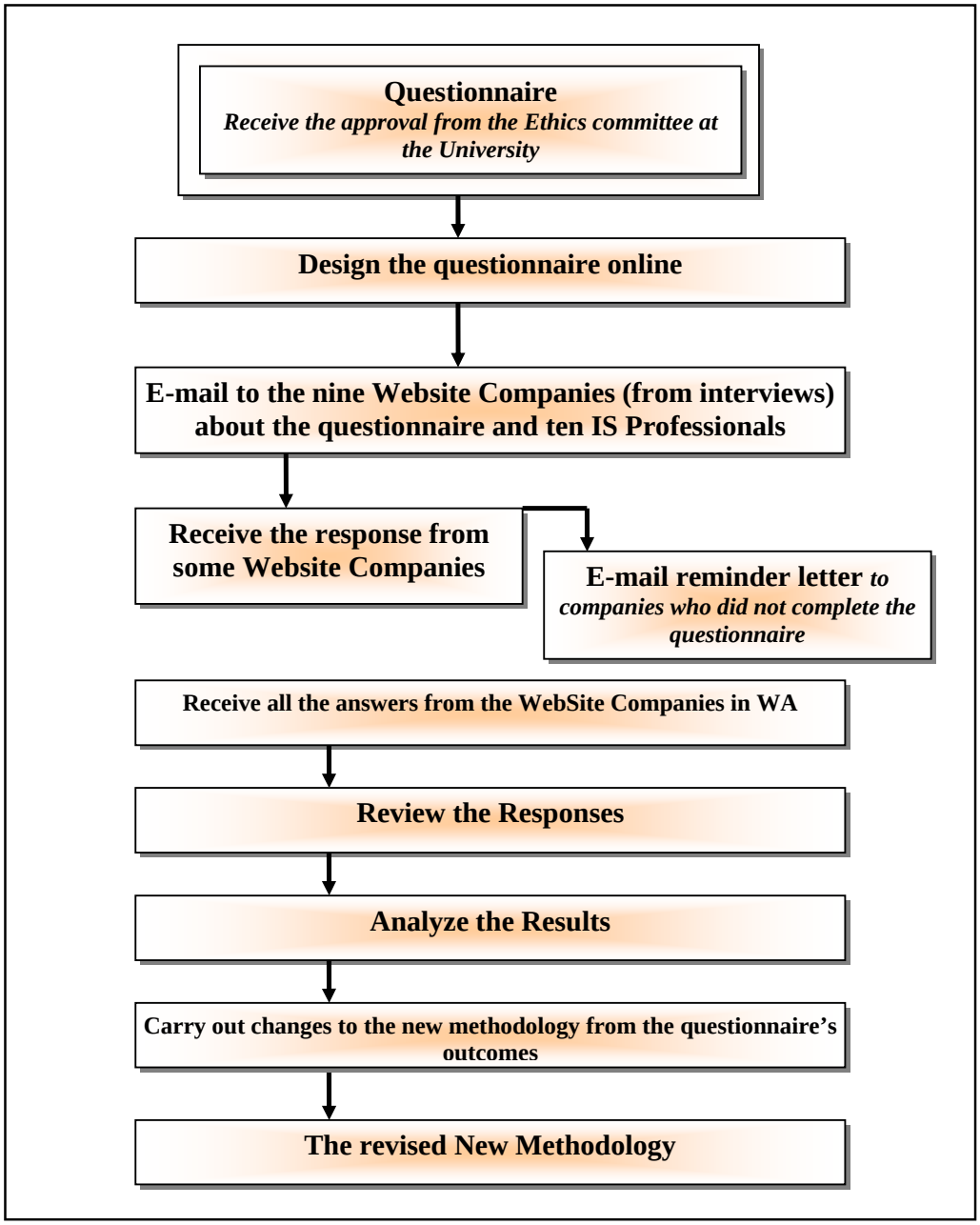


Figure 30: Summary of Questionnaire Phase

The questionnaire was divided into seven parts as each part discussed one key principle for this research. A description of each part was provided to the participants to explain its purpose. The seven parts were as follows:

- **Part One (1) - User Participation:** This thesis distinguishes between two types of users: end-users (internal to the client organization) and client-customers users (external). End-users (Internal) are the real users in the client

organization who test and evaluate the website and use it to respond to the client-customer's queries. The client-customer users (external) are those who interact with this website to accomplish their goals.

- **Part Two (2) - Real Interaction:** means website use statistics or click tracking. The designer will track users' behavior to help understand what attracts or repels users. This can be achieved by adding two options to the website: 1) feedback form to elicit users' opinions; or 2) a counter to a webpage, which will provide detailed statistics (log file) to the designer.

- **Part Three (3) - Human Computer Interaction and Usability:** Human Computer Interaction (HCI) "*is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them*" (Preece et al. 1994, p. 7). Usability evaluation is used to confirm that the website design is efficient, effective, safe, has utility, is easy to learn, easy to remember, practical, provides job satisfaction, and defines performance measures that effectively assess the users' requirements and requests.

- **Part Four (4) - Iteration:** use of prototypes to allow for evaluation of effectiveness - this approach will assist the designers to build up the new website and make sure that the project will be tested repeatedly until it meets users' requirements. Steps within the methodology may be repeated if necessary.

- **Part Five (5) - New Participative Methodology for Developing Websites (Integrated and Contingent)** This integrated methodology was created from basic concepts derived from: lifecycle models, IS development methodologies, methodologies with explicit human factors aspects, websites methodologies, marketing methodologies, and additional detailed techniques (i.e. task analysis and detailed website design and implementation). The main focus has been on defining users' requirements and needs, planning, analysis, design, testing, implementation, evaluation and maintenance. These stages are very useful in any methodology as they enable the designer to ensure that the system is

running according to the needs of users and the client organization. The new integrated methodology needs to be "contingent" with both analyst and client choosing the particular techniques which suit the problem situation.

- **Part Six (6) - General Questions:** the key results of the interview stage of the research project are summarized in this section, and the researcher requests comments on these aspects of the new methodology.

- **Part Seven (7) - Background Information:** In this section, the participants provided some details about their level of formal education and main field(s) of study.

A five-point Likert scale was used in each part of the questionnaire to "*examine how strongly subjects agree or disagree with statements*" (Sekaran 2003, p. 197). Cavana et al. (2001, p. 205) stated that the midpoint (e.g. the third in a five-point scale) in the Likert scale "*is either neutral ('neither agree nor disagree') or a passing level (e.g. 'satisfactory')*". The five points on the scale are: Strongly disagree, Disagree, Neutral, Agree and Strongly Agree. Besides using the Likert five-point scale for this questionnaire, the researcher provided a section for participants to write down other comments regarding each part.

To accomplish the second and final phase, the researcher prepared two letters concerning the questionnaire, one to be sent with the questionnaire (see Appendix E), while the second letter was sent via e-mail (see Appendix F). The former letter provided the participants with information about the questionnaire, the time frame, and the duration to complete the questionnaire. The second letter contained:

- Instructions how to complete the online questionnaire (see Appendix G)
- A request to nominate other staff from their organization who would also be willing to complete the questionnaire

In addition, each participant received (via the e-mail) a PDF (see Appendix H) file containing information about the new methodology to help the participant to assess the new methodology (in part five of the questionnaire).

7.3 Design of Online Questionnaire

After careful consultation with the research supervisors, the researcher decided to use the Online Survey Tool from Curtin Business School as the method to make the questionnaire available to the participants. The researcher was the first person to try the Online Survey Tool externally. The reasons for adopting this tool were:

- The tool can be accessed from anywhere and anytime;
- The tool is easy to manage;
- The tool is inexpensive and practical;
- This tool can have a *high response rate*" (McBurney et al. 2007, p. 245);
- This tool can "*provide a more dynamic interaction between respondent and questionnaire than can be achieved in e-mail or paper surveys*" (Dillman 2007, p. 354);
- The tool is quick to deliver the results;
- The tool will reduce errors with the results since the results are captured as an Excel spreadsheet, which makes it easier for the researcher to analyze the results;
- The Online Survey tool from Curtin Business School will allow the researcher to ensure that any information provided by respondents through the questionnaire will be held as strictly confidential. Information will not be disclosed to any parties beside the researcher and her supervisors.

To design and test the questionnaires for this research, the IT Department at Curtin Business School provided the researcher with some instructions to be followed. First of all a username and password were assigned to the researcher by the IT department to allow her to access the main page of the questionnaire. After accessing this, the researcher created nine other pages. Seven pages were dedicated to each part of the questionnaire, while the other two pages were the welcome and concluding pages.

For each page, the researcher added to the template the description; question for each part; scale; size; question number and instructions to the participants on how to complete the questionnaire. At the beginning, the researcher believed that this tool

would be very usable. However, after spending more than sixty hours entering and updating all the information for the questionnaire and testing the survey before putting it online, the researcher faced several problems including:

- Online Survey Tool instructions were not easy to follow, especially to distinguish between private and public targets;

- The questionnaire adopted the public target in the template, which means the researcher had to e-mail a letter (see Appendix F) to the participants to invite them to complete the questionnaire. This situation caused some problems for the researcher since the instructions did not explain whether to use the original or a revised spreadsheet. The researcher used the original sheet, and within seconds, the industry participants received an e-mail from the system providing them with username and password for the questionnaire. This situation was very frustrating to the researcher since the instructions were not clear at all and the participants returned an e-mail asking about the purpose of the researcher's email to them.

- The availability of the Online Survey Tool was another problem faced by the researcher. During the second weekend of November 2006, the server was offline from Friday afternoon until Monday afternoon and during that time several participants were trying to access the tool but without any success. The researcher managed to resolve the problem with the IT Department and contacted the participants to inform them about the server availability;

- The IT Department started to make some changes to the Online Survey Tool template without informing the researcher. At this stage, a problem occurred, which meant that the last two participants completed the questionnaires but the server did not collect their answers. The researcher solved this problem by emailing the questionnaires (as a word document) to the last two participants again to complete and e-mail it back. The participants completed the questionnaires within one day and the researcher highly appreciated their efforts;

- The last problem faced by the researcher was the downloading of results from the system. Most of the participants used a comma in the comment section. The system considered the words after the comma as a new column. Therefore, when the researcher downloaded the results from the system, an IS professional assistant was needed to resolve the problem. The researcher highly appreciated his efforts in this matter.

Dealing with the Online Survey Tool was very challenging and exciting new opportunities for the researcher. However, the positive aspect was that most of the participants were able to successfully complete the questionnaires and they provided positive feedback regarding the new methodology.

7.4 Questionnaire Participants

This section discusses the participants who completed the questionnaire for this research. As was indicated previously, the participants were drawn from the nine Website Companies who participated in the interview phase of this research.

Table 54 indicates that 78% of the original participants completed the questionnaire, which is a very good result. For company C, two employees completed the questionnaire while there was only one participant from the other companies.

Most of the companies completed the questionnaire within one week except for companies A and G. Therefore, the researcher e-mailed a reminder letter (see Appendix I) to the non-responding companies to encourage them to respond to this questionnaire.

Company Name	Complete the Questionnarie
Company A	*The participant left the company, the researcher e-mailed the company secretary all the necessary information for the questionnaire. The company secretary asked her manager to nominate another participant to complete the questionnaire, but, the researcher did not receive any response from him or her.*
Company B	*Completed the questionnaire*
Company C	*Completed the questionnaire*
Company D	*Completed the questionnaire*
Company E	*Completed the questionnaire*
Company F	*Completed the questionnaire*
Company G	*At the beginning of November 2006 the researcher e-mailed the participant about the questionnaire Unfortunately, the participant did not respond to the e-mail. The researcher emailed a reminder letter but there was no answer, until the researcher telephoned to ask if they were willing to participate in the questionnaire. However, the answer was that they would not participate.*
Company H	*Completed the questionnaire*
Company I	*Completed the questionnaire*

Table 54: The WA Companies Invited to Complete the Questionnaire

Company A and G did not respond to the two e-mails until the researcher telephoned asking if they were willing to participate in the questionnaire. The person interviewed from company A had left the company, so the researcher e-mailed the company secretary all the necessary information for the questionnaire. The company secretary asked her manager to nominate another participant to complete the questionnaire, but the researcher did not receive any response from him or her. Since Company G did not respond to the two emails, the researcher telephoned asking if they were willing to participate to complete the questionnaire; however, the answer was that they would not participate.

In addition, the researcher e-mailed ten IS Professionals asking them to complete the questionnaire for this research. This was to obtain the IS perspective regarding the new methodology, since most of the industry participants had degrees in multimedia and communication technology, but few had an academic background in IS. Table 55 indicates that 80% of the potential IS Professional participants completed the questionnaire. The last two IS professionals did not respond to the three emails which were sent by the researcher. However, the researcher was satisfied with the response rate since the target was nineteen (19) participants and a total of sixteen (16) responses was achieved.

Company Name	Number of Participants who completed the Questionnaire
Company A	*None*
Company B	*One Participant*
Company C	*Two Participants*
Company D	*One Participant*
Company E	*One Participant*
Company F	*One Participant*
Company G	*None*
Company H	*One Participant*
Company I	*One Participant*
IS Professionals	*Eight Participants*

Table 55: Number of participants who completed the questionnaire

7.5 Analysis of the Questionnaire

Under this section, the researcher discusses the analysis of the questionnaire data in terms of the major and minor research questions. As previously mentioned, this questionnaire (see Appendix E) addressed: the four key principles in this research; the new methodology and general questions covering specific topics (i.e. evaluation; testing; feedback tools; cost issue; prototype low fidelity; project review and Content Management Systems (CMS)). In addition, at the end of each question, participants had the opportunity to make additional comments regarding that particular section.

The industry participants and IS Professionals were asked to rate their level of agreement (Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A) and Strongly Agree (SA) to the user participation role in the website development process. The researcher assigned a specific code for each of the level of agreement, number one (1) for Strongly Disagree, two (2) for Disagree, three (3) for Neutral, four (4) for Agree, and five (5) for Strongly Agree.

The mean[70], percentage, and the standard deviation were calculated for each question (in each part) of the questionnaire to present an observable picture of the relationship between the questionnaire outcomes and the research questions (see Appendix J for full details of results and sections 7.5.1 to 7.5.7 for summary and interpretation).

[70] The calculation of the mean was combined the strongly agree and agree together, and strongly disagree and disagree together.

These results indicated that most of the industry participants and IS professionals agree that user participation, real interaction, usability and human computer interaction were significant aspects in the website development process. In the next section, the researcher will discuss how the results for each part of the questionnaire address the minor and major research questions.

7.5.1 Part One – User Participation

This research distinguishes between two types of users: end-users (Internal) are the real users in the client organization, and the client-customer users (External) are those who interact with this website to accomplish their goals.

Please indicate your level of agreement with each statement:	***Strongly Disagree (SD)***	***Disagree (D)***	***Neutral (N)***	***Agree (A)***	***Strongly Agree (SA)***
That only the top management should take part in the website development process to reduce conflicts.		*X*			
That only end-user should participate in evaluations during the website development process.		*X*			
That both types of users, "end-users and client-customers", should participate in the website development process.				*X*	
That both types of users, "end-users and client-customers", should participate from the beginning to the last stage in the website development process.			*X*		
That both types of users, "end-users and client-customers", should participate only in early stages in the website development process.		*X*			
That both types of users "end-users and client-customers" should participate only at the last stages in the website development process.		*X*			
That user participation in the website development process will reduce the time in various stages such as in the testing, evaluation, implementation and training.			*X*[71]		
That the level of user participation in the website development process depends on the type of website and project budget.				*X*	
That more than four users participating in the website development process will produce too many different ideas and suggestions and it will be very hard for the designers to make a decision.			*X*		

Table 56: Part One (1) – User Participation Responses (*Mean = X*)

[71] Under this question, the mean is Neutral despite that the agree percentage is 63% while disagree percentage is 31%.

User participation is essential in the website development process since it permits the users to contribute ideas to the process. In addition, they will become more familiar with the website objectives and goals. In this research, the researcher included some questions in the questionnaire to evaluate opinions concerning users' participation level in the website development process. The presentation of the mean result in Table 56 indicates that most of the industry participants and IS Professionals agreed (4) that user participation is a significant aspect of the website development process. Of the sixteen responses from the industry participants and IS Professionals, 94% disagree (2) that only the top management should take part in the website development process to reduce conflicts and 81% disagree (2) that only the end-user should participate in evaluations during the website development process. Company E commented, "*Only the top management should take part in the website development. They should/will have the ultimate decision making capacity but it's also worthwhile to have a trusted, experienced end-user involved from the beginning as top management seem generally not as well connected to the 'grass-roots' as the end-users*".

Similarly, 94% of the industry participants and IS Professionals agree (4) that both end-users and client-customer users should take part in the website development process. In addition, 75% of the industry participants and IS professionals disagree (2) that the two types of users should participate only in the early stages, and 62.5% disagree (2) that they should participate only in the last stages of the website development process. These results support an active role for both user types in the website development process with 50% agreeing (4) that both users should take part in the website development process from the beginning to the last stage in the development process. However, 19% responses were neutral as to whether they agree or disagree to allow the two user types to participate in the website development process

Additionally, 87.5% of participants agree (4) that the level of user participation in the website development process depends on the type of website and project budget. In addition, 63% agree (4) that user participation in the website development process will reduce the time in various stages such as testing, evaluation, implementation and training. Lastly, 56% disagree (2) that more than four users participating in the

website development process will produce too many different ideas and suggestions and it will be very hard for the designers to make a decision. This is weak support for involvement of more than four users.

The outcome of the first part corroborates the proposition that the two types of users (end-users and client-customers) should take part in the website development process. The outcomes of the first part of the questionnaire support the minor question, which relates to user participation in the new methodology. The minor question is:

- *Will the website development process benefit from participation by both end-users and client-customers?*

The outcomes indicated that both users (end-users and client-customers) should take part in the website development process. The mean presentation in Table 56 indicates that most of industry's participants and IS Professionals agreed (4) that the website development process will benefit from users' (end-users and client-customers) participation. Company H stated, "*Ideally, all websites will have a comprehensive iterative design cycle involving both what I call experts who have an understanding of heuristics (perhaps your "end-users") and client-customers, perhaps using cheaply built prototypes in the early stages of the development cycle. However, if one of my clients wants a limited functionality website, they are more likely to want to pay for our knowledge of heuristics rather than spend money on user-testing*". Furthermore, IS Professional 5 affirmed, "…. *External users should participate at appropriate points in the life-cycle. They should be involved in evaluating and refining the visual prototype in the early phases of the project. After the prototype is refined during the requirements definition phase, external users should participate in validating functionality. The external users should then participate in pilot roll-out at the beginning of deployment*".

7.5.2 Part Two – Real Interaction

In this research, the Real Interaction aspect was introduced to identify the importance of real data about the way users interact with the website and how this data can assist in the website development and maintenance process. Real Interaction was a new terminology to the industry participants, as most of them know this aspect as "website hits, website use statistics or click tracking". In part two of the questionnaire, the researcher provided some questions to evaluate whether Real Interaction is very important in the website development process.

Please indicate your level of agreement with each statement:	*Strongly Disagree (SD)*	*Disagree (D)*	*Neutral (N)*	*Agree (A)*	*Strongly Agree (SA)*
That this facility (monitoring of real interaction) is very important in the website development process.				*X*	
That the industry should encourage their clients to use this facility in their websites to teach them the benefits behind it.				*X*	
That this facility will increase the client's profit.			*X*		
That this facility will attract more users to the website.				*X*	
That if adopting this facility in the website, clients should respond quickly to the users' comments.				*X*[72]	
That Tuesday is the best day for assessing user behavior on websites.			*X*		

Table 57: Part Two (2) – Real Interaction Responses (*Mean* = *X*)

The mean presentation in Table 57 indicates that all participants agreed (4) that the Real Interaction aspect is important in the website development process, since it provides statistical information about the users' interaction and behavior with the website.

The participants' responses for part two in the questionnaire were positive since 75% agreed (4) that this aspect is very important in the website development process and 87.5% agreed (4) that the industry should encourage their clients to use this aspect

[72] Under this question, the mean is Agree despite that the agree percentage is 44% while Neutral percentage is 56%.

(or this facility) in their websites to teach them the benefits behind it. The participants were on average neutral regarding whether this aspect (facility) will increase the client profit. However, 100% of the participants agreed (4) that adopting this aspect in the website development process would attract more users to the website, while 38% of the participants agreed that this facility would increase the client's profit.

The above results indicate that the Real Interaction aspect should be available in the website development process. Company H confirmed that "*Log files tend to be more accurate, although do[not]n't take into account 'thinking aloud' evaluation. Log files show what users actually do, rather than what they think they do - both kinds of information are important*". In addition, Company D indicated that "… *The real benefit of web usage data is in the ability to continually evaluate the structure of the website and find ways to improve the effectiveness based on how people are actually using it*". While Company B representative declared that, "*There's too much resistance to complete a feedback form. Usage stats provide accurate information - a form is a backup option*".

A total of 56% of the participants were neutral (3) concerning the statement that, if adopting this aspect in the website development process, clients should respond quickly to the users' comments and statistics, but 44% agreed (4) that clients should respond quickly to the users' comments. In addition, 43.75% were neutral concerning whether Tuesday is the best day for assessing user behavior on websites. The representative from Company I stated, "*Tuesday is when you get best conversion rates but it is not necessarily reflecting the behavior of the bulk of your visitors*".

The results indicate that the real interaction aspect is important in the website development process, since this tool provides useful information to the designers to assist them to understand the performance of the website with real users.

7.5.3 Part Three – Usability and Human Computer Interaction

In this research, usability and Human Computer Interaction (HCI) were introduced to the new methodology to ensure that the website is efficient, effective, easy to learn and easy to remember, provides job satisfaction and meets users' requirements and needs. HCI is involved in several stages in the development process including design, implementation and evaluation.

Please indicate your level of agreement with each statement:	***Strongly Disagree (SD)***	***Disagree (D)***	***Neutral (N)***	***Agree (A)***	***Strongly Agree (SA)***
That usability is a very important aspect of the website development process.					*X*
That usability issues are very hard to work with it, especially with immature clients since it takes time and money to learn about the concepts behind it.			*X*[73]		
That adopting usability principles in the website development process will increase the clients' profit.				*X*	
That adopting usability principles in the website development process will encourage client-customer users (external) to revisit the website.				*X*	
That Human Computer Interaction techniques should be part of the website development process since it is concerned with design, evaluation and implementation of interactive computer-based systems.				*X*	
That by adopting Human Computer Interaction techniques in the website development process the clients' profits will increase.				*X*	
That usability and human computer interaction techniques should be part of the website development process to improve the structure and functionality of a website.				*X*	

Table 58: Part Three (3) – Usability and Human Computer Interaction Responses (*Mean = X*)

The mean presentation in Table 58 indicates that the industry's participants and IS Professionals agreed (4) that usability and HCI were essential in the website development process 100% strongly agree (5) that usability is a very important aspect of the website development process.

[73] Under this question, the mean is Neutral despite that the agree percentage is 44% while disagree percentage is 50%.

Table 58 identified that the mean for question two is neutral (3), however the percentage provided a different view as 50% disagree (2) that usability issues are very hard to work with it, especially with immature clients since it takes time and money to learn the concepts behind it. These days, the industry in Western Australia is coaching their clients (old and new) to teach them the benefits behind adopting usability term in the website development process.

From the participants' responses, 75% agreed (4) that adopting usability principles in the website development process will increase the clients' profit, and 94% agreed (4) that adopting usability principles in the website development process will encourage client-customer users (external) to revisit the website.

The most important aspect in part three is that 94% of responses from the industry and IS Professionals agreed (4) that Human Computer Interaction techniques should be part of the website development process since it is concerned with design, evaluation and implementation of interactive computer-based systems. This statement is considered very important to this research since current industry's methodologies were missing key HCI aspects.

Similarly, 53%[74] of the industry participants and IS Professionals agree (4) that by adopting Human Computer Interaction techniques in the website development process, the client' profit will be increased, and 87.5% agree (4) that usability and human computer interaction techniques should be part of the website development process to improve the structure and functionality of a website.

Participants' comments also supported the significance of Usability and HCI: "*Usability is a very important aspect of the website development process …. and usability is a measure of a certain quality of a website. The quality of usability is created during the process…*" (Company I). Furthermore, a participant from Company H stated "*Good HCI practices need to be put into practice, rather than just HCI fads. Solid understandings of HCI are often overlooked when new technologies*

[74] This percent was calculated from 15 not from 16 participants, since one participant did not complete this question.

or revisited technologies are distributed (eg AJAX), which break many user learned conventions". Finally, IS Professional 5 stated, "*While usability is very important, many other factors influence visits to the site and profitability*".

7.5.4 Part Four – Iteration

The iteration aspect was adopted in this new methodology to ensure that the website will be tested constantly until it meets users' requirements.

Please indicate your level of agreement with each statement:	*Strongly Disagree (SD)*	*Disagree (D)*	*Neutral (N)*	*Agree (A)*	*Strongly Agree (SA)*
That iteration is a very important aspect in the website development process.				*X*	
That iteration should be available in each stage and step in the website development process.				*X*	
That adopting iteration in the website development process will ensure that the website meets the user (end-user and client-customer) requirements and company objectives.				*X*	

Table 59: Part Four (4) – Iteration Responses (*Mean* = *X*)

Table 59 indicates that most of the participants believe that iteration should be part of the website development process since the mean was agreed (4). Of the sixteen responses from the industry's participants and IS Professionals, 88% agree (4) that iteration is a very important aspect in the website development process. In addition, this new methodology will allow the iteration to be available in each stage and step to ensure that the users' requirements are met. This approach was agreed (4) to by 87.5% of participants.

In addition, 68.8% agree (4) that adopting iteration in the website development process will ensure that the website meets the user (end-user and client-customer) requirements and company objectives.

Industry participants and IS Professionals also provided some comments regarding the iteration aspect in the website development process, especially in the new methodology. IS Professional 5 stated, "*All modern system development methodologies such as RUP are based on iterative development*". However, an important issue regarding iteration is that "*Web site objectives must be kept in mind at all times during the development cycle and revisited - iteration can have the effect of deviating away from those objectives*" Company H.

After reviewing the outcomes from parts two, three and four, it is clear that before developing a website, the specific needs should be identified and considered in the context of usability, HCI, real interaction and iteration. The agreement of the industry participants and IS Professionals on the questions in parts two, three and four provides support for the minor research question:

- *What are the requirements which need to be considered before creating a website, such as usability, Human Computer Interaction (HCI), iteration, and real interaction and how can such criteria be addressed within a design methodology?*

Most of the industry participants and IS Professionals agreed that the inclusion of these aspects in the website development process was essential since they will improve the website structure, usability and user satisfaction, which in turn will lead to an increase in the client's profit.

7.5.5 Part Five – New Participative Methodology for Developing Websites, Integrated and Contingent

In this part, the researcher will examine the results from the industry participants regarding part five of the questionnaire. This part mainly focused on the new participative methodology for developing websites and the role of contingency in the website development process (see Table 60).

Of the industry participants' and IS Professionals' responses, 56% agreed (4) that this new methodology contained all the necessary stages and steps which are needed to develop a website, and 75% agreed (4) that this new methodology is very much a user-centered methodology.

Please indicate your level of agreement with each statement:	***Strongly Disagree (SD)***	***Disagree (D)***	***Neutral (N)***	***Agree (A)***	***Strongly Agree (SA)***
That this new methodology has all the necessary stages and steps which are needed to develop a website				*X*	
That this new methodology is very much a user-centered methodology				*X*	
That this new methodology specifies sufficiently all the stages and steps required				*X*	
That this new methodology would help you to develop a website successfully				*X*	
That this new methodology is practical and easy to work with			*X*		
That this new integrated methodology is contingent, which means the analyst and client can choose the specific tools and techniques which suit the problem situation since every project has different requirements and needs				*X*	
That the appropriate website development methodology will depend on the particular type of project website, budget and client				*X*	

Table 60: Part Five (5) – New Participative Methodology Responses (*Mean* = *X*)

Similarly, 62.5% agreed (4) that this new methodology specifies sufficiently all the stages and steps required. In addition, 69% agreed (4) that by adopting this new methodology, the website will be developed successfully.

On the other hand, 50% were neutral (3) and neither agreed nor disagreed that this new methodology is practical and easy to work with. The researcher considers that this percentage occurred as this methodology has not been tested by any industry participants or IS Professionals, since this would take many months. This means that the participants would prefer to have experience with the methodology in order to be able to rate its ease of use.

Since this questionnaire was completed by the industry participants and IS Professionals, the researcher noticed that 38% of the IS professional recommended this methodology as practical and easy to work with compared with 13% from the

industry participants. This outcome indicates that IS professionals are more aware of the new methodology structure compared with the industry participants, since the background of most of the IS Professionals is Information Systems. This provides clear indication that the IS Professionals have more knowledge and experience with IS methodologies and structure since this new methodology was created from basic concepts derived from various methodologies from the IS, Human Factors, Websites, Marketing and Additional details techniques.

However, Table 60 indicates that most of the industry participants were pleased with the structure and construction of the new methodology as this new methodology contains all the necessary stages and steps.

After reviewing the outcomes from part five, the researcher considers that most of the industry participants agree (4) that this new methodology satisfies the needs of the website industry in Western Australia, as most agreed (4) that this methodology has all the necessary stages and steps, which are mandatory when building up a website effectively. Hence, the results supported the minor research question:

- *Will this new methodology satisfy the needs of the website industry in Western Australia?*

The industry in Western Australia was satisfied with the structure of the new methodology as was indicated in section 6.5 in Chapter Six. In addition, most of the industry participants agreed (4) that this methodology is a user-centered methodology.

Company D stated, "*The methodology presented is a very accurate reflection of the process that is required to develop and effective website*". IS Professional 4 declared, "….. *this model does capture good web design principles in totality, it does seem more like it gets all good design methodologies and lumps them together into one. It is like a catch-all methodology which may be hard for some people to use as they need to decipher what are the best tools and techniques to use. This therefore leaves the 'success' of this methodology to experience rather than strong concept*. Finally, Company H also stated, "*Marketing professionals generally have less of a*

background in HCI concepts and website development methodologies, compared to website developers - marketers are (and should be) concerned with brand awareness and promotion, as opposed to usability and development methodologies". Therefore, it is important that both the HCI and promotion aspects be available in the new methodology.

However, Company F provided some critical comments regarding the new methodology (see Figure 29). Company F stated, "*Starting point seems vague - is it SA0, SA2, SA3 or SA3.1? ... I normally start at SA3.1 and then work from there*". Moreover, *SA9 is not part of a methodology; it is part of a design"*. Some points can be made regarding these comments. Firstly, according to the Company F statement SA0, SA2, SA3 or SA3.1 are vague, but later Company F stated that usually they start working from SA3.1, which is a contradiction. Secondly, the planning (SA2) and analysis (SA3) stages are very important. According to the new methodology, the planning stage will allow the designer and users to address various issues regarding the development of a website, such as the type of product; the potential buyers and competitors and ways to promote the website. In addition, this stage involves developing a detailed schedule of activities required to carry out the development of the website successfully. The analysis stage will require the users, designers and analysts to expand their findings to gain more information about the website structure and correct the initial website specification to meet the users' requirements.

McManus and Wood-Harper (2003, p. 16-18) stated that failure of information systems project management "*is associated with development scope creep, and project managers need to rigorously monitor requests for changes.* In addition, *some developers think that fast and loose development is a route to quick delivery. This is incorrect since development accounts for a significant percentage of the project pie. Careful control of development is essential*". Moreover, Hallows (2005, p. 8) declared that "*there are three recurring reasons that projects fail: scope changes, poor project planning, and technology*". The above statements confirmed that omitting the planning and analysis stages would lead to the failure of the project since these stages are essential in any project, especially the website development

process, since the designer and users will gain more information about the website product requirements, buyers and competitors from these stages.

Moreover, Company F declared that "*SA9 is not part of a methodology; it is part of a design*". The SA9 stage is potentially relevant not only to the design but to the usability evaluation, functionality testing, planning, design, implementation, and maintenance stages in the new methodology to allow users to manage the web contents in these stages.

50% of participants agree that this new methodology is contingent, which means the designers and clients can choose the specific tools and techniques which suit the problem situation since every project has different requirements and needs. Contingency is an important concept in the website development process since the designers and users can act upon and respond to the different circumstances of the development. This means the outcomes offer some support for the minor research question:

- *Can the integrated new methodology be "contingent" in an effective way, with designers and users choosing the particular techniques and tools, which suit the specific problem situation?*

IS Professional 2 stated "*It is essential to be able to determine the factors that a development is contingent upon. Contingency is important provided that good decisions can be made and acted upon to respond to the different circumstances*". In addition, Company D declared that "*The details of how to perform each stage are not included in this methodology, which is good as it is best to leave that to a technical expert (designer, programmer) to evaluate based on the particular requirements. Also, typically the amount of iteration and client involvement will vary from client to client based on budget and other constraints*".

Furthermore, the researcher calculated the mean for the IS Professional and industry participants separately to distinguish the difference in their response. The researcher found that 62.5% of IS Professionals agreed (4) that this new methodology is contingent compared to 37.5% of the industry participants.

This outcome indicates that IS Professionals were more experienced and informed about the term "contingent" with respect to the website development process since the academic background of most of the IS Professionals was Information Systems while most of the industry participants have degrees in other areas such as multimedia bachelor, diploma or PhD in non-Information Systems disciplines.

Hence, the meaning of the term "contingent" might be unfamiliar to some of the industry participants since academic background plays an important part in understanding what contingency means in this context. Finally, 94% agree (4) that the appropriate website development methodology will depend on the particular type of project website, budget and client, which supports the contingency approach.

7.5.6 Part Six – General Questions

In this part, the researcher requested some comments from the industry participants about some key results from the interview stage. Table 61 indicates that most of the industry's participants and IS Professionals agreed that the key issues evaluation (usability) and testing (functionality); feedback tools; cost issue; low fidelity; project review and Content Management Systems (CMS) should be part of the new methodology. In respect to the evaluation and testing stages, 62.5% agreed (4) that evaluation (usability) and testing (functionality) should be carried out at each stage of the website development process, which matches the structure of the new methodology.

Please indicate your level of agreement with each statement:	*Strongly Disagree (SD)*	*Disagree (D)*	*Neutral (N)*	*Agree (A)*	*Strongly Agree (SA)*
Evaluation (Usability) and Testing (Functionality)					
That evaluation (of Usability) and Testing (of Functionality) should be carried out at each stage of the website development process				*X*	
Feedback Tools					
That feedback tools should be available on the website to track user behaviors				*X*	
Cost Issue					
That the cost issue is the main concern for clients when choosing a methodology to develop a website				*X*	
Low Fidelity					
That low fidelity prototyping should be used in the website development methodology				*X*	
Project Review					
That project review steps should be available in your website development process				*X*	
That it is very important to review the website one week after going "live" to ensure it meets the project requirements				*X*	
CMS					
That Content Management Systems (CMS) is a very important aspect in website development				*X*	
That using Content Management Systems (CMS) in the website development process will reduce the time to update the website by the clients (following implementation)					*X*[75]

Table 61: Part Six (6) – General Questions Responses (*Mean* = *X*)

Similarly, 87.5% responses agreed (4) that feedback tools should be available on the website to track user behaviors in the new methodology. These tools are available in step 6.1. They will allow the users to be able to contact the website owner to gain more information about the products or to receive personal communication. On the other hand, 69% agreed (4) that the cost issue is the main concern for clients when choosing a methodology to develop a website; therefore, it is important that this new integrated methodology be contingent, which means that the designers and client can choose the specific tools and techniques which suit the particular website development task. This will help reduce costs.

The low fidelity prototyping is popular with the industry participants as 75% agreed (4) that this aspect should still be used in the website development process. In the

[75] Under this question, the mean is Strongly Agree despite that the agree percentage is 94% while neutral percentage is 6%.

new methodology, the researcher indicated that under the prototyping step, in the design stage, it was suggested that it might be preferable to create two low fidelity sketches (alternative options) instead of three, to reduce expenditure of time and money. The representative of Company H indicated that the number of prototypes is "*usually two, if not three. However, for smaller projects, the LFPs are usually tested on the clients and not end users (external), as budgets generally dictate this area. Clients are also aware of what their end users are looking fo*r", while IS Professional 5 stated, "*Low fidelity options are used during the Requirements phase to rapidly prototype various options based on participant feedback*".

The project review aspect was added to the new methodology as step (SE6.2) under the maintenance stage. All the participants agreed (4) that the project review step should be available in your website development process to ensure that the website is meeting the project goals. In addition, 68.75% agreed (4) that it is very important to review the website one week after going "live" to ensure it meets the project requirements.

The use of Content Management Systems (CMS) is important to the website development process since it allows the users to manager the web contents by permitting them to add, edit, remove and submit information. A total of 81% of responses agreed (4) that CMS is a very important aspect in website development and 94% agreed (4) that using CMS in the website development process would reduce the time to update the website by the clients (following implementation).

Industry participants and IS Professionals provided the researcher with some comments regarding the benefits of including the CMS approach in the new methodology. Company C stated, "*Easy to update, less time consuming, reduces repetition*", Company H declared, "*Yes, to give clients content control over their site. Static sites are less acceptable now - users want current, useful information and it is more likely the client will be able to provide that. The quicker a client can update their site, the more likely it is they will*". Company F affirmed, "*Yes -- helps to reduce total project cost, provides clients with significant functionality at affordable cost and provides many "web friendly" features that are otherwise expensive*".

Finally, Company D stated, "*The most important benefit of a Content Management System is that it separates the process of design of a website from the content creation process. The information is the most important component of a website, and the best person to write the information is in most cases not going to be the designer. For a website to become a useful tool for customers, it needs to have lots of relevant information that is updated frequently. By using a content management system, the relevant content author can put up a lot of high quality information that will attract visitors to the site, without having to learn any skills in web programming or design. If a content author cannot update their own content without getting a designer involved, the website will quickly become stagnant and outdated. Content Management Systems also provide other benefits including richer interactivity (forums, online calendars, online product catalogues, [*and*] feedback tools), approval processes for content (workflow), future proofing of content (export to XML), searching,* [and] *restricted access based on permissions, reporting and ecommerce*". Also, IS Professional 6 stated that CMS "*…speeds up the organization of and publication of contents to the site*".

The majority of the comments in part 6 were in relation to the project review aspect, since most of them were concerned that one week was not enough. In this respect, a misunderstanding occurred as most of them believed "*that the review only one week after deployment? Reviews have to be continuous*" (IS Professional 5). According to step 6.2 in section 6.6, the researcher confirmed that this step should be available in the new methodology so that when the website becomes available online, a review should be able to carry out to determine whether the website meets the original goals and objectives. As mentioned in section 6.6, the maintenance phase in the new methodology is ongoing. In addition, besides the above comments, Company D stated that, *"evaluation (of Usability) and Testing (of Functionality) should be carried out at each stage of the website development process? I do not think that this is practical at all stages of the development process. It should probably be Usability OR Functionality at each stage as each stage generally deals with either the design (requires evaluation of Usability) or the implementation (requires testing of Functionality)"*. The main feature of this new methodology is the testing and evaluation stages, which are the center of the new methodology. This means that the

stage should be evaluated and tested before moving to another stage to reduce the problems which usually occur in the development process.

7.5.7 Part Seven – Background

In this section, the researcher discusses the participants' backgrounds (see Table 62). The industry participants held a mixture of different degrees. It was noticed that the background of respondents plays an important role in determining their responses, especially in section five of the questionnaire.

Company	Degree	Stream	Others
Company B	Bachelor's Degree	Communications Technology	Nil
Company C	Bachelor's Degree	Multimedia	Nil
Company C	Bachelor's Degree	Multimedia	Nil
Company D	Bachelor's Degree	Information Systems	Computer Science
Company E	Diploma	Multimedia	Nil
Company F	Master's Degree	Information Systems	Nil
Company H	Post Graduate Diploma	Others - Please specify	BMedia Studies, BJourn, BMMedia
Company I	Doctorate (PhD)	Others - Please specify	Neuroscience
ITProf1	Master's Degree	Information Systems	Commerce
ITProf2	Bachelor's Degree	Information Systems	Nil
ITProf3	Master's Degree	Information Technology	Nil
ITProf4	Bachelor's Degree	Information Systems	Nil
ITProf5	Doctorate (PhD)	Information Systems	Nil
ITProf6	Master's Degree	Information Systems	Nil
ITProf7	Bachelor's Degree	Information Systems	Nil
ITProf8	Bachelor's Degree	Information Systems	Nil

Table 62: Part Seven (7) – Participants Background

These differences in background of two types of participants had some impact on the results. To test these statistical tests were carried out. However, it is recognized that the low number of participants means that these tests have a very low power.

7.5.8 Testing the Independence of Two Variables – Web Industry vs. IS Professional Participants

Information that was collected from the questionnaire was involved two independent variables; 1) the Industry and 2) IS Professionals participants. The Chi-Square analysis was used to test if the relationships between the variables are statistically significant or not. Chi-Square analysis is "*one of the most popular statistics because it is easy to calculate and interpret*" (Statpac[76] 1997). However, since the research sample was small, therefore, it was recommended to use SPSS Exact test in place of Chi-Square test since the variables have a high percentages of responses and to eliminate the risk of analyzing inaccurate results. In addition, the outcomes from Chi-Square statistic becomes "*inaccurate when used to analyze contingency tables that contain exactly two rows and two columns and that contain less than 50 cases*"(Statpac 1997).

SPSS Exact test used 2x2 tables when independent variables "*can fall into one of two mutually exclusive for categories*". The SPSS Exact test returns "*exact one-tailed and two-tailed p-values for a given frequency table*" (Preacher[77] and Briggs 2001). SPSS Exact Test "*tests the probability of getting a table as strong as the observed or stronger simply due to the change of sampling, where "strong" is defined by the proportion of cases on the diagonal with the most cases*" (Garson[78] 1998). Finally, Exact Test "*produces consistently conservative results, frequently counterintuitive to what would be expected from examination of the data*" (Engeman[79], Swanson and Rice 1990).

Table 63 indicates that the SPSS Exact Test result in question one is < 0.05. This means that the relationships are statistically strong, i.e. for the statement that "*only the top management should take part in the website development process to reduce conflicts*". There is a significant difference in the responses of web site Industry

[76] Statpac: http://www.statpac.com/statistics-calculator/counts.htm
[77] Preacher and Briggs: http://www.psych.ku.edu/preacher/fisher/fisher.htm
[78] Garson: http://statisticssolutions.com/fisher.htm
[79] Engeman: http://www.jstor.org/view/0006341x/di009375/00p00267/0

personnel and IS Professional Participants. This give a strong indication that both types of users should participate in the website development process as was shown by both the Industry and IS Professionals responses (disagreeing or strongly disagreeing with the statement).

Part1 : User Participation				
Questions	Strongly Disagree/Disagree	Neutral	Strongly Agree /Agree	Exact Sig (2-sided)
Question 1				**0.041**
Industry	100%			
IS Professional	87.5%		12.5%	
Question 2				0.413
Industry	87.5%	12.5%		
IS Professional	75%	25%		
Question 3				0.119
Industry		12.5%	87.5%	
IS Professional			100%	
Question 4				0.483
Industry	50%	25%	25%	
IS Professional	12.5%	12.5%	75%	
Question 5				1.000
Industry	75%	25%		
IS Professional	75%	12.5%	12.5%	
Question 6				0.369
Industry	50.0%	37.5%	12.5%	
IS Professional	75%	12.5%	12.5%	
Question 7				0.386
Industry	25%		75%	
IS Professional	37.5%	12.5%	50%	
Question 8				0.119
Industry			100%	
IS Professional	25%		75%	
Question 9				0.888
Industry	50%	25%	25%	
IS Professional	62.5%	12.5%	25%	

Table 63: User Participation

Table 64 indicated that the SPSS Exact Test results for this section are all > 0.05, this means the relationship between the type of participants is not statistically strong, but

the percentages responses from the Industry and IS Professionals shown that Real Interaction facility is considered an important aspect in the website development process.

Part 2: Real Interaction				
Questions	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	Exact Sig (2-sided)
Question 1				0.06
Industry		37.5%	62.5%	
IS Professional		12.5%	87.5%	
Question 2				0.077
Industry		12.5%	87.5%	
IS Professional		12.5%	87.5%	
Question 3				1.000
Industry	25%	37.5%	37.5%	
IS Professional	37.5%	25%	37.5%	
Question 4				1.000
Industry			100%	
IS Professional			100%	
Question 5				0.648
Industry		50%	50%	
IS Professional		62.5%	37.5%	
Question 6				0.565
Industry	25%	62.5%	12.5%	
IS Professional	62.5%	25%	12.5%	

Table 64: Real Interaction

Table 65 indicates that most of the participants from the Industry and IS Professionals agreed that usability is a very important aspect of the website development process and adopting usability principles in the website development process will increase the clients' profit.

In addition in question five, it was clear that the industry and IS professionals agreed that Human Computer Interaction techniques should be part of the website development process since it is concerned with design, evaluation and implementation of interactive computer-based systems. On the other hand, the SPSS Exact Test results are > 0.05. This means the difference in responses between the Industries and IS Professional is not statistically significant.

Part 3: Usability and Human Computer Interaction				
Questions	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	Exact Sig (2-sided)
Question 1				1.000
Industry			100%	
IS Professional			100%	
Question 2				0.308
Industry	62.5%	12.5%	25%	
IS Professional	37.5%		62.5%	
Question 3				0.308
Industry		12.5%	87.5%	
IS Professional		37.5%	62.5%	
Question 4				1.000
Industry			100%	
IS Professional		12.5%	87.5%	
Question 5				1.000
Industry		12.5%	87.5%	
IS Professional			100%	
Question 6				0.429
Industry		28.6%	71.4%	
IS Professional		62.5%	37.5%	
Question 7				1.000
Industry		12.5%	87.5%	
IS Professional		12.5%	87.5%	

Table 65: Usability and Human Computer Interaction

Table 66 shows that the SPSS Exact Test result is >0.05 for all questions and this indicates that the differences between the two types of participants are not significant. However, both types of participants agreed that iteration should be available in each stage and step in the website development process.

Part 4: Iteration				
Questions	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	Exact Sig (2-sided)
Question 1				1.000
Industry	12.5%	12.5%	75%	
IS Professional			100%	
Question 2				1.000
Industry	25%		75%	
IS Professional			100%	
Question 3				0.580
Industry	25%	25%	50%	
IS Professional		12.5%	87.5%	

Table 66: Iteration

In Part 5 (see Table 67) all of the SPSS Exact Test results are > 0.05 and this means that the difference between the Industry and IS Professional is not statistically significant. However, the percentage indicated that both types of participants agreed that this new methodology is very much a user-centered methodology; this new methodology specifies sufficiently all the stages and steps required; and this new methodology would help "you" to develop a website successfully.

The responses for question 6 indicates that the SPSS Exact Test result is > 0.05 this mean that the variables relationship is not statistically significant, but the percentages is the visa versa as the IS Professionals agreed (62.5%) that this new methodology is contingent, while the Industry responses were neutral (62.5%). This mean the Background of the IS Professionals plays a key role in question six, since these people have more knowledge in the Contingent aspect compared with the Industry.

Part 5: New Participative Methodology for Developing Websites from the Marketing Perspective, Integration and Contingent				
Questions	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	Exact Sig (2-sided)
Question 1				1.000
Industry		37.5%	62.5%	
IS Professional	12.5%	37.5%	50%	
Question 2				0.200
Industry		37.5%	62.5%	
IS Professional	12.5%		87.5%	
Question 3				1.000
Industry	12.5%	25%	62.5%	
IS Professional	12.5%	25%	62.5%	
Question 4				1.000
Industry	12.5%	25%	62.5%	
IS Professional		25%	75%	
Question 5				0.212
Industry	12.5%	75%	12.5%	
IS Professional	37.5%	25%	37.5%	
Question 6				0.619
Industry		62.5%	37.5%	
IS Professional		37.5%	62.5%	
Question 7				1.000
Industry	12.5%		87.5%	
IS Professional			100%	

Table 67: New Participative Methodology for Developing Websites, Integration and Contingent

Table 68 indicated that the SPSS Exact Test result for question six (1) is < 0.05; this means that the differences is statistically significant concerning the statement that a "Content Management Systems (CMS) is a very important aspect in the website development process".

Part 6: General Questions				
Questions	Strongly Disagree/Disagree	Neutral	Strongly Agree/Agree	Exact Sig (2-sided)
Question 1 Ev & Tes				0.132
Industry	50%	12.5%	37.5%	
IS Professional		12.5%	87.5%	
Question 2 Feedback				0.504
Industry	25%		75%	
IS Professional			100%	
Question 3 Cost Issue				1.000
Industry	25%	12.5%	62.5%	
IS Professional	25%		75%	
Question 4 Low Fidelity				0.521
Industry		12.5%	87.5%	
IS Professional	25%	12.5%	62.5%	
Question 5 Project Review (1)				0.569
Industry			100%	
IS Professional			100%	
Question 5 Project Review (2)				0.658
Industry	37.5%	12.5%	50%	
IS Professional		12.5%	87.5%	
Question 6 CMS (1)				**0.005**
Industry	12.5%	12.5%	75.0%	
IS Professional		12.5%	87.5%	
Question 6 CMS (2)				0.119
Industry			100%	
IS Professional		12.5%	87.5%	

Table 68: General Questions

7.6 Major Research Question and Changes to the New Methodology

From the second and the final phase of this research, the researcher concludes that most of the industry participants and IS Professionals agreed that each aspect of the new methodology structure, stages, steps, tools and techniques are needed to develop a website successfully. Hence, the outcomes from the second phase provided a positive answer to the major question of this research:

- *Can an integrated design methodology help designers and users to create effective websites, which meet the requirements of end-users, client-customers, and designers?*

After reviewing the entire questionnaire responses from the Industry Participants and IS Professionals, it is clear that there was strong support for the proposed new methodology. The only key additional insight gained from the questionnaire was moving the Human Computer Interaction (HCI) to a separate step under the design stage, since most of the industry participants and IS Professional agreed that by adopting HCI in the website development process will attract and encourage more users to the website development process. HCI design principles were covered in the design stage in the new methodology.

The rest of the stages and steps remain the same as described in section 6.6. Figure 31 and Table 69 show the final structure of the new methodology for this research. The researcher has produced the final diagram after reviewing the data from interviews from the industry and the responses to the questionnaire from both industry and IS Professionals.

Some other comments from the industry participants and IS Professionals were not included in this chapter since they were not related to this part. However, a full version of the comments is available in Appendix J.

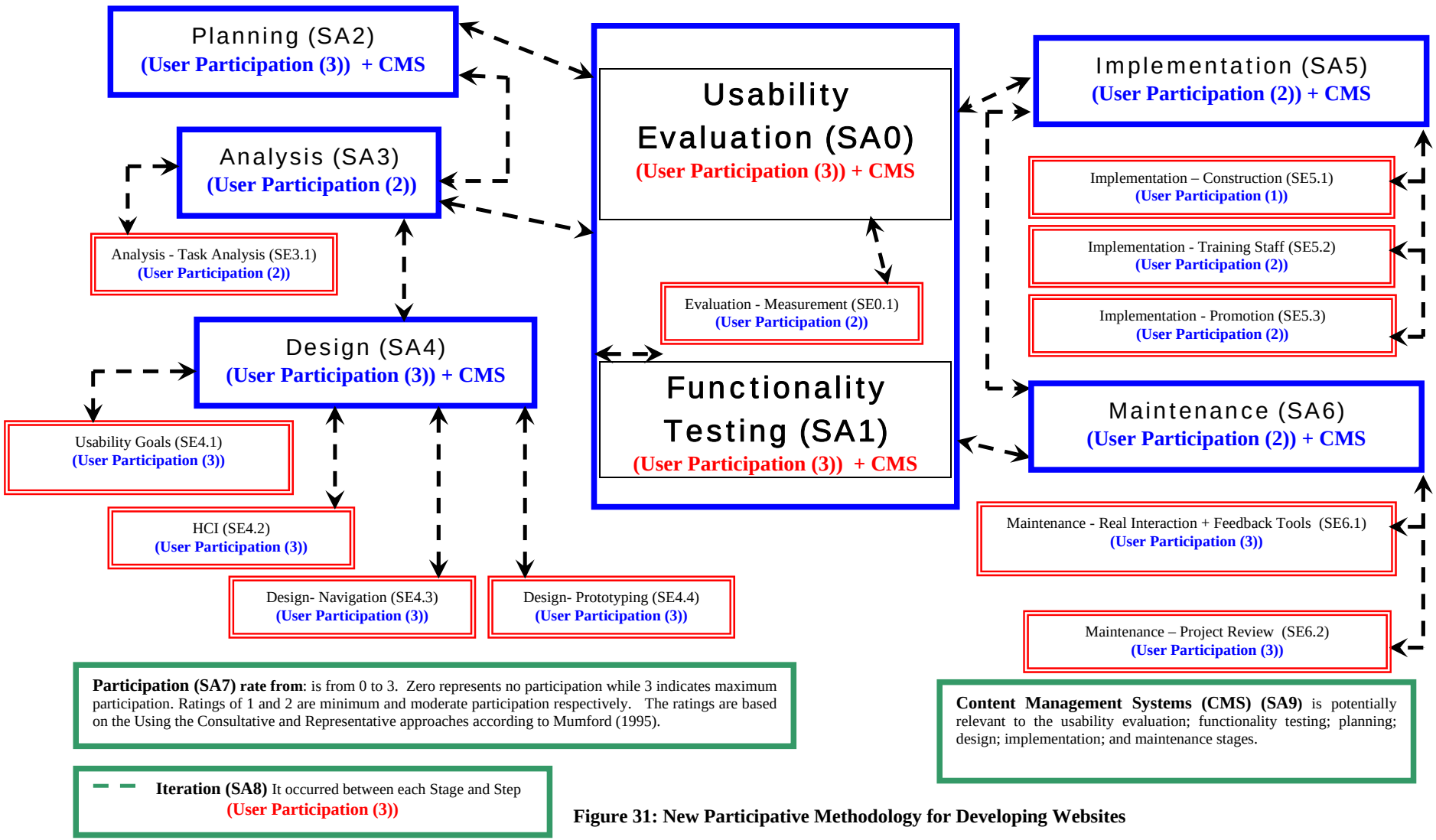


Figure 31: New Participative Methodology for Developing Websites

Stage *(& Step)*	Issues, Tools and Techniques
Usability Evaluation	o Formative usability evaluation by expert and user based
Measurement	o *Ongoing evaluation*
Functionality Testing	➢ Functionality testing by expert- and user-based
Planning	➢ Define the objectives ➢ User requirements ➢ User analysis ➢ Cost-benefits analysis ➢ Alternatives and constraints ➢ What is your product? ➢ Who are the buyers? ➢ Who are your competitors? ➢ Where should it be located? ➢ How to promote your website?
Analysis	➢ To add, improve and correct the initial website requirements
Task Analysis	o *Define user types, their work, goals and activities*
Design	To define: ➢ What the website is? ➢ How the website will work to achieve the purpose behind using this website? ➢ User involvement in decision making ➢ Future users
Usability goals	➢ *User usability – Web design should be* o *Efficient* o *Effective* o *Safe* o *Utility* o *Easy to learn* o *Easy to remember* o *Easy to use* o *Easy to evaluate*
HCI goals	o *Usable* o *Practical* o *Visible* o *Job satisfaction* o *Extra techniques, text style, fonts, layout, graphics and color*
Navigation	o *Site, Layout, Link, Navigational Structure for the hypermedia Application*
Prototyping	o *High-Fidelity* o *Low –Fidelity*
Implementation	➢ Implementing the website using software
Construction	o *Technical Application (i.e. HTML, Dreamweaver; Cold Fusion and ASP)*
Training Staff	o *Necessary Training*
Promotion	o *Press Releases* o *Link building and banner-ad campaigns* o *Paid search engine* o *Directory listing campaigns to promote the website* o *Traditional Marketing (i.e. Newspaper; Radio and TV)*
Maintenance	➢ Update changes and the corrector of errors in the website
Real Interaction + Feedback	o *Log file* o *Forms, survey, discussion forum, contact form and telephone number*
Project Review	o *Checklists*

Table 69: Issues, Tools and techniques for the New Participative Methodology

7.7 Conclusion

This chapter discussed the techniques which the researcher used in the second and final phase of this research, which was the questionnaire. In this chapter, the researcher discussed how the online questionnaire was designed and administered; and also discussed the target population for the questionnaire. The mean, percentage and the standard deviation were calculated for each question (in each part) of the questionnaire to present a clear view of the relationship between the outcomes of the questionnaire and the research questions.

The target population for the questionnaire was the nine companies from the website industry who participated in the interview stage; while the rest were ten IS Professionals. The reason for including the IS Professionals was to gain new information about the new methodology from the IS perspective

The research questions were supported by the questionnaire outcomes, since most of the industry participants and IS Professionals were pleased with the new methodology structure and style. After reviewing the questionnaire outcomes, a slight change was carried out to the new methodology by separating the usability and Human Computer Interaction into two steps instead of one. Finally, the researcher released the final version of the new methodology and the tools which were needed to develop a successful website.

Chapter Eight will conclude this thesis. In this chapter, the researcher will summarize the key results from the interviews and questionnaires and the changes which were made by the researcher to the new methodology. The researcher will discuss how "contingency" can be useful as this allows the designers and users to choose the particular techniques that suit the problem situation. In addition, the researcher will discuss why the outcome of question five in part five (of the questionnaire) was neutral. In this chapter there is also a discussion of the different proposals for further research which the researcher intends to carry out. Finally, the researcher will draw conclusions regarding the significance of the research and

provide recommendations for industry and IS Professional adoption of the new methodology.

CHAPTER EIGHT

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

8.1 Introduction

In Chapter Seven, the researcher discussed how the questionnaire was designed, implemented online and administered. Furthermore, the questionnaire was analyzed by calculating the mean, percentage and standard deviation for each response (in each part) to the questionnaire to establish the relationship between the questionnaire outcomes and the research questions. The questionnaire outcomes indicate that the industry participants and IS Professionals were pleased with the new methodology's structure and style.

The major and minor research questions were matched with the outcomes from the questionnaire, indicating a positive support for the research hypotheses. As a result of the questionnaire responses, slight changes were carried out to the new methodology, by separating the usability and Human Computer Interaction (HCI) into two steps instead of one. Most of the participants agreed that it was important to include HCI aspects in the website development process. Finally, the researcher prepared the final diagram describing the new methodology. This completed the data collection and analysis phases of the research.

This chapter will be the last chapter in this thesis. The researcher will discuss contingency in the website development process, comment on the practicality of the new methodology, and summarize the key research findings. In addition, proposals for further research will be discussed. Lastly, the conclusions will be presented,

including relevant recommendations for the website development industry and IS Professionals.

8.2 Contingency and Website Development Process

This research created an integrated methodology for developing websites from basic concepts derived from lifecycle models; IS development methodologies; methodologies with explicit human factors aspects; websites methodologies; marketing methodologies and additional detailed techniques. Most of the current methodologies provide for little flexibility of use and/or offer little or no advice about how to adjust the methodology to suit the needs of different projects. They hence require experienced practitioners in order to adjust the methodology for a specific case. What is more desirable is an explicitly 'contingent' approach to make adoption of the methodology easier for less experienced practitioners.

The new methodology produced in this research project is "contingent"- meaning that it will allow the designers and users to choose the particular stages, steps, tools and techniques, which "*suit the type of project, and its objectives, the organization and its environment, the users and the developers and the respective skills* (Avison et al. 2003, p. 82). This will provide flexibility to the users and designers to make it possible to adjust the version of the methodology to be used according to their needs.

Avison and Fitzgerald (2002 p. 9) stated that most "*methodologies are designed for situations that follow a stated or unstated 'ideal type'. The methodology provides a step-by-step prescription for addressing this ideal type. However, situations are all different and there is no such thing as an 'ideal type' in reality*". Therefore, a contingency approach should be used since. The intended benefits of making the new methodology contingent are to allow users and designers to select the techniques, which meet the requirements of the website, since each website has a different goal and objectives. To meet these objectives, the development of the website requires particular experience and skills to develop the website.

Analysis of the questionnaire outcomes indicates that 50% of respondents agreed that this methodology should be contingent. However, this term was new to the industry participants and this probably led 62.5% of these respondents to register a neutral response regarding the need for this methodology to be contingent. On the other hand, 62.5% of the IS Professionals agreed that this new methodology should be contingent. These IS Professionals have an academic background that makes them more familiar with the concepts and terminology of contingency. IS Professional 2 stated, *"It is essential to be able to determine the factors that a development is contingent upon. Contingency is important provided that good decisions can be made and acted upon to respond to the different circumstances"*.

For example, if one wants to develop an existing website, the users and designer can select stages, steps, and techniques, which meet the project objectives. If the user requirements are already known, the users and designers need only use that part of the methodology that covers the design to the maintenance stages.

Another example of contingency is the development of a new website with limited functions, which means no "real interaction" and feedback tools need be used. Therefore, the users and designers will use all the stages and steps except step (SE6.1) which incorporates the real interaction and feedback tools.

8.3 Practicality of the New Methodology

In this section, the researcher will discuss the practicality of the new methodology. The results of the questionnaire indicated that most of the industry participants were neutral in their response. However, the IS Professionals provided a different spread of responses, with 37.5% of them agreeing that this new methodology is practical and easy to work with and 25% providing a neutral response. Hence, the background of the participants plays an important role in their opinion concerning whether or not this new methodology is practical.

The researcher believes that the industry participants' results were neutral regarding the practicality of the new methodology, as a more firm opinion would be arrived at only after many months of using the methodology, as some stages and steps are unfamiliar. This will be addressed in future research by providing an opportunity for prolonged use of the new methodology. The results of this intended research are expected to be positive since most of the industry participants agreed that the new methodology had all the necessary stages and steps which are needed by the designers and users to develop a successful website. Another key issue is the broad range of expertise of website development personnel in the industry. Hence, training materials will be an important aspect of methodology adoption.

8.4 Summary of the Key Research Findings Concerning Methodology Stages

After reviewing the various methodologies (IS, explicit human factors, websites and marketing) and additional detailed techniques (i.e. task analysis and detailed website design and implementation) the researcher created the integrated methodology. The main focus is on defining users' requirements, and to identify the stages and steps, which are needed to develop a flourishing website. The researcher identified some key findings regarding the new methodology as follows:

- Under the **analysis** stage, the researcher added the task analysis step; this step will define the purpose of developing the website, user types and identify users' goals and objectives.

- Under the **design** stage, the researcher added four steps, which are Human Computer Interaction, Usability, Prototyping and Navigation. These steps were added to ensure that website requirements were achieved and met users and designers requirements simultaneously.

- Under the **Implementation** stage, the researcher added three steps, which are Construction, Training Staff and Promotion. The first was added to

incorporate the technical implementation of the website design. In addition, training staff and promotion were added to train the staff about the website structure, and importantly, to facilitate promotion of the website via various traditional and innovative marketing tools.

- Under the **maintenance** stage, the researcher added one-step, which is "real interaction". This step will assess the users' behavior with the website.

- Under the **evaluation** stage, the researcher added one-step, which is measurement. This step will provide on going evaluation of the website until it meets the website objectives.

- In addition, **user participation** was added to each stage and step to allow the users to participate in the development process.

- **Iteration** was added in the new methodology, occurring between each stage and step.

As a result of the interviews and questionnaire, the researcher identified some new aspects, which were added to the methodology. The main findings from the interviews were:

- **Content Management Systems**. This option was added to all the stages, except the analysis stage. This aspect is important to the new methodology, as it will allow the designer to manage the content of the website. In addition, the clients will be able to easily create, modify or remove information from the website.

- **Low Fidelity Prototyping.** Under the prototyping step (within the Design stage), there was support for the use of both low and high fidelity prototypes. With respect to the low fidelity prototype, it was suggested that only two sketch prototypes of alternative design be created for the website, to reduce expenditure of time and money.

- **Project Review**. This step was added to the maintenance stage to ensure that the website is working according to the website objectives.

- **Feedback Tools**. This new technique was added with the real interaction step (under the Maintenance stage) to allow the users to indicate their opinions (negative or positive) about the website.

- **Testing Stage**. After reviewing the interview data, the researcher moved the testing stage from the fourth place to the center, with the evaluation stage. This means that the users will evaluate and test every stage before moving to the next one.

The main change resulting from the questionnaire phase was the decision to separate Human Computer Interaction and Usability into two steps. After reviewing the outcomes from the questionnaire, the researcher concluded that it provides strong support for hypotheses from the minor and major research questions. Most of the industry participants and IS Professionals agreed that this new methodology has all the necessary stages, steps, tools and techniques which are required to develop a website, which will be easy to use and attract more users.

The four key principles utilized in this research project are not new to the fields of Information Systems and Usability; however, these principles have not previously been widely adopted by the website development industry. For these reasons, users still experience problems with their use of websites. Therefore, to facilitate the adoption of these principles, the new methodology provides specific procedures and techniques to implement these concepts and hence lead to the development of more effective and successful websites.

8.5 Results of Research Questions

In this thesis, the researcher defined major and minor research questions to demonstrate what this research seeks to achieve. From the interviews and

questionnaire outcomes, the researcher concluded that the results provide support for positive answers to the major and minor research questions. The minor questions were:

- *Will the website development process benefit from participation by both end-users and client-customers?*

The outcomes indicated that user participation is essential in the website development process, to permit users to clarify their requirements and to familiarize them with the website.

- *What are the requirements, which need to be considered before creating a websites, such as usability, Human Computer Interaction (HCI), iteration, and real interaction and how can such criteria be addressed within a design methodology?*

These requirements should be incorporated in a methodology for creating websites. The questionnaire outcomes indicated that industry participants and IS Professionals agreed that these requirements should be available in the development process to increase the client's profit and to attract more users to the website.

- *Will this new methodology satisfy the need for website industry in Western Australia?*

As for the third minor research question, the industry in Western Australia was supportive of the new methodology structure since it contains all the necessary stages and steps to develop a website.

- *Can the integrated new methodology be "contingent" in an effective way, with designers and users choosing the particular techniques and tools, which suit the specific problem situation?*

As for the final minor question, the questionnaire outcomes indicated support for the methodology incorporating contingency so that the users and designers can select

stages, steps and techniques according to the project needs. A way of implementing this contingency approach is being developed.

- *Can an integrated design methodology help designers and users to create effective websites, which meet the requirements of end-users, client-customers, and designers?*

The results from the interview and questionnaire phases indicate strong support for a positive response to the main research question, since most of the industry participants and IS Professionals agreed that the structure of the new methodology is appropriate and that it provides all the necessary requirements to develop a website successfully.

Therefore, after reviewing the interviews and questionnaire outcomes, the researcher concluded that the research objectives were met.

8.6 Significance of Research

This research has focused on two of the major problems which are facing developers of websites for online marketing - user participation and "real interaction". These problems need to be addressed by the designers in order to develop a website which meets the users' needs. In addition, the researcher identified another two aspects which need to be considered in the website development process, usability and iteration. These four key principles (user participation, "real interaction" usability and iteration) were considered the main foundation of this research so as to avoid frustration for the users, involving the users from the beginning with the design, making the website more friendly, and finally meeting users' requirements. To address this problem, the researcher created the new integrated methodology which was derived from various methodologies from the IS, explicit human factors, website and marketing methodologies, with additional detailed techniques (i.e. task analysis and detailed website design and implementation). Adopting the new methodology in the industry is likely to help businesses to increase revenue, improve overall user

satisfaction, increase users' loyalty and retention, improve service levels and decrease operational costs.

It is recommended that the industry participants try the new integrated methodology in their business since this methodology incorporates all the essential requirements which are needed by the designers and users to build the website. In addition, the researcher will in the future be encouraging and assisting the industry by developing intensive courses which will provide necessary knowledge to the participants about various aspects of developing a website successfully. An online tool to implement contingency aspects of the new methodology will also be developed.

8.7 Limitations

This research was focused on developing a new methodology from the marketing perspective. After studying the online marketing methodologies, it was clear that some stages and aspects were missing in these methodologies, causing several problems to occur from the clients' perspectives, such as dissatisfaction and frustration, and this will lead to users being disinclined to visit these websites again.

Therefore, this research focused on developing a new methodology for the website marketing perspective. Hence, the research results may be limited to that specific type of website. However, it is expected that they will have more general application.

In addition, the other limitation for this research is the time that it would take for the industry participants to assess the new methodology. It would have been preferable to permit them to try out the new methodology in real projects. However, they would probably be reluctant to do this and it would take many months to complete.

8.8 Proposals for Further Research

Further research will be carried out in the future with the website development industry and the education sectors. From the interviews and the questionnaire, the researcher noticed that most of participants have limited knowledge with respect to the Usability and Human Computer Interaction (HCI) aspects. As Table 50 (Chapter Six) indicated, most of the industry organizations paid little attention to these aspects in their methodologies. Therefore, the researcher plans to run intensive courses for the industry concerning usability and HCI aspects, since most of the industry participants and IS Professionals agreed (in the questionnaire stage) that these aspects should be part of the website development process.

The same courses may also be made available to postgraduate and undergraduate students to introduce the benefits of the adoption of the usability and HCI in the website development process. In addition, the new methodology will be introduced as a part of these courses, by providing detailed information about how this methodology was created and discussing the stages, steps, tools and techniques, which are part of this methodology. In addition, the researcher will discuss how the new integrated methodology needs to be "contingent" and how to implement this approach.

In the future, the researcher will develop a website about this methodology (in a similar style to the UsabilityNet (www.usabilitynet.org) website). This website will incorporate a software tool to facilitate selection of particular stages, steps and techniques from the contingent methodology to produce a tailored methodology for any specific project. This means that the researcher will assist the designers and users to select the most appropriate stages depending on the situation. These situations vary with respect to project problem, budget, time, etc.

8.9 Conclusions

This chapter concluded the research thesis by discussing the role of contingency in the new methodology and discussing the practicality of the new methodology. Furthermore, the researcher clarified that assessment of the practicality of the new methodology was limited.

The researcher summarized the key research findings from the interviews and questionnaires and discussed how these findings were used to revise the new methodology. The chapter also discussed how the outcomes from the interviews and questionnaire addressed the major and minor research questions. The significance of the research was discussed in this chapter, as well as its limitations. Finally, this chapter concluded by discussing the further research proposals, which the researcher intends to carry out in the future.

The researcher believes that this research project has been successful in developing an integrated, and potentially contingent, methodology for developing websites, especially those for marketing purposes. If adopted by industry, this improved methodology is likely to lead to more efficient and effective website development practices and result in websites that are more useful and that generate less frustration for users.

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APPENDICES

Appendix A

Dear Sir/Madam

I am a PhD student at Curtin Business School and a member of staff. Under the Department of Information Systems, I am conducting research to develop a new methodology for website design, which meets the requirements of the users and designer simultaneously. Your assistance in this research would be greatly appreciated and would assist in the success of its findings.

The first phase of this research involves a tailored, open-style interview, which is planned to take no longer than 1 hour. The interview will explore the virtues of different website design techniques and the methods used in your organization. Respondents are invited to indicate their willingness to participate in this phase by response to my e-mail.

The second phase of this research involves a questionnaire, which will take up to 30 minutes to complete. It will take less time if you complete it online. Once completed, please return the questionnaire via the reply paid envelope supplied. If you are completing this online, please ensure you have pressed the submit button. If you feel uncomfortable in answering certain questions, please feel free to disregard them.

Any information provided by respondents through either the interview or the questionnaire will be held as strictly confidential. Information will not be disclosed to any parties besides the researcher and her supervisors, unless required to do so by law. Finally, the researcher will ensure that published material will not contain any information that can identify a respondent or their organization.

Participation in this research is completely voluntary. Participants have the right to withdraw at any time without prejudice or negative consequences.

I encourage you to participate in this research as will provide a valuable insight into design website methodologies. More importantly, it may also aid your organization to enhance operational efficiency and compliance, as details will be provided to you concerning alternative methodologies. With web design being one of the most volatile fields in business, it is important to support research that can ensure its effective use.

Feedback regarding the results of the interviews and questionnaire will be provided to those participants who request this by ticking the appropriate section of the consent form.

If you are willing to participate in this research project, please complete the consent form, nominating the people from your organization who will be involved. Please also ask them to complete a participant consent form. Copies of these forms are attached. A reminded letter will be mail to you after one week, if no respond was arrived.

If you have any enquiries, do not hesitate to contact me by e-mail at Tomayess.Issa@cbs.curtin.edu.au or 9266 7682. Alternatively, feel free to contact my supervisors, Dr. Martin West at Martin.West@cbs.curtin.edu.au or 9266 2843 and Dr. Andrew Turk at A.turk@murdoch.edu.au or 93602793.

Thank you in advance.

Yours faithfully,

Tomayess Issa
Tomayess.Issa@cbs.curtin.edu.au
Lecturer
School of Information Systems – Curtin Business School
GPO Box U1987
Perth Western Australia 6845

RESEARCH STUDY – ORGANIZATION CONSENT FORM

Project Title: "**Development and Evaluation of a Methodology for Developing Websites"**

I, …… from …….., have read the information on the attached sheet. Any questions I have asked have been answered to my satisfaction. I agree to allow the listed individuals to be approached to take part in this activity.

Individuals suggested for request for participation are:

1.
2.
3.

I understand that all information provided is treated as confidential and will not be released by the investigator unless required to do so by law.

I agree that research data gathered for this study may be published provided my name or other information, which might identify my organization or me, is not used.

I would like feedback from this research: Yes / No (*Please cross out which ever not applicable)*

Name: _____

Title: _____

Organization Name: _____

Signature: _____

Date: _____

Researcher: _____

Signature: _____

Date: _____

RESEARCH STUDY – PARTICIPANT CONSENT FORM

Project Title: "**Development and Evaluation of a Methodology for Developing Websites"**

I ……. have read the information on the attached sheet. Any questions I have asked have been answered to my satisfaction. I agree to take part in this activity, however, I know that I may change my mind and stop at any time.

I understand that all information provided is treated as confidential and will not be released by the investigator unless required to do so by law.

I agree that research data gathered for this study may be published provided my name or other information, which might identify my organization or me, is not used.

I am willing to participate in the research project by being interviewed and/or completing a questionnaire about the research project.

I would like feedback from this research: Yes / No (*Please cross out which ever not applicable)*

I agree for the interview to be audio taped: Yes / No (*Please cross out which ever not applicable)*

Participant Name: _____

Title: _____

Organization Name: _____

Signature: _____

Date: _____

Researcher: _____

Signature: _____

Date: _____

Appendix B

Dear Sir or Madam,

As indicated in my previous letter, I am a PhD student at Curtin Business School and a member of staff. Under the Department of Information Systems, I am conducting research to develop a new methodology for website design, which meets the requirements of the users and designer simultaneously.

Last week, I posted a short letter to you asking for your assistance with this research. Unfortunately, until now I have not received a response from you. I understand that your job is demanding and time is a precious commodity for you. That is why I greatly appreciate any time you can give toward completing your response to my letter. I would very much like the opportunity to have the benefit of your expertise and experience in my research.

If you are willing to participate in this research project, please complete the consent form, nominating the people from your organisation who will be involved. Please also ask them to complete a participant consent form. Copies of these forms are attached.

If you have any enquiries, do not hesitate to contact me by email at Tomayess.Issa@cbs.curtin.edu.au or 9266 7682. Alternatively, feel free to contact my supervisors, Dr. Martin West at Martin.West@cbs.curtin.edu.au or 9266 2843 and Dr. Andrew Turk at a.turk@murdoch.edu.au or 93602793.

Thank you in advance.

Yours faithfully,

Tomayess Issa
Tomayess.Issa@cbs.curtin.edu.au
Lecturer
School of Information Systems – Curtin Business School
GPO Box U1987
Perth Western Australia 6845

Appendix C

Dear

Thank you very much for your quick respond it is really highly appreciates. According to my previous letter that this research will have two phases, focus questions and questionnaires. The first phase of this research involves a tailored, open-style interview (Please check the attachment), which is planned to take no longer than 1 hour. The interview will explore the virtues of different website design techniques and the methods used in your organization.

Please cross out which DAY would be applicable for the interview (*For Example*):
Wednesday XX May XXXX
Thursday XX June XXXX
Friday XX June XXXX

Please cross out which TIME would be applicable for the interview (*For Example*):
11.00 a.m.
12.00 a.m.
1.00 a.m.

Please cross out which LOCATION would be applicable for the interview:
In Your Office

Or

In My office
Curtin University of Technology
School of Information Systems
Building 408
Room 3012

If you have any enquires, do not hesitate to contact myself by email at Tomayess.Issa@cbs.curtin.edu.au or 9266 7682.

Thank you in advance.
Yours faithfully,

Tomayess Issa
Enc.

Appendix D

INTERVIEWS - Development and Evaluation of a Methodology for Developing Websites - By Tomayess Issa

1- Discuss the following in the context of website design from the marketing perspective:

- **Usability**
- **Types of Human Computer Interaction**
- **User Participation (or User Involvement)**
- **Real Interaction (**"*track[ing] the behavior of web site visitors, not just "hits," number of visitors, and page views, but which pages they view, how long they linger, how often they return*" (Robinson and Peroff 1999, p.62))[80].
- **Methodology**

2- Which methodology are you using for your design?

- **Name and list the stages if that is possible.**
- **Name which tools and techniques are you using in each stage.**

3- In what ways are you considering usability and real interaction in your design? What importance do you give to these aspects and why?

4- Discuss tools and techniques, which can be used for real interaction?

5- What types of users are involved in your design process? And when?

- **Do you involve all the users (with different profiles) in a specific stage (Or in all stages)?**
  - **If no why?**
  - **If yes why?**

6- Do you use prototyping in your design process? Why and what types?

- **Low Fidelity**
- **High Fidelity**

7- Do you distinguish between Evaluation (of usability) and testing (of functionality) stages?

8- Testing stage:

- **What do you test in your website; who will test your website?**

---

[80] *Robinson, R & Peroff, M 1999, 'Learning from the Internet pioneers', Medical Marketing and Media, vol. 34, no. 2, p. 60. Retrieved: Feb 1999, from ABI/Inform database.*

- **How do you evaluate the results from the testing stage? Please provide us with an example?**
- **Is testing carried out in each stage or only at the end of your design methodology? Why do you take this approach?**

9- Evaluation stage:

- **What do you evaluate in your website? Who does the evaluation? What do you do with the results?**
- **Which type of evaluation tools do you use in your methodology? Please provide us with an example?**
- **Is evaluation carried out in each stage or only at the end of your design methodology? Why do you take this approach?**

10- Who will do the Implementation stage? And How?

11- Do you maintain your website yearly, monthly or weekly and why?

12- Describe the tools, which are usually added to a web page to encourage feedback? Please provide us with an example.

Appendix E

QUESTIONNAIRE

Dear Sir/Madam

This questionnaire seeks information to assist in my PhD research project. In particular, I would appreciate it if you could comment on the "New Participative Methodology for Developing Websites" which I have developed. The findings will be used by the researcher to assess the utility of the new methodology if it was adopted by website development companies.

This questionnaire should take about 30 minutes to complete. Most questions only require you to tick a box, however, any comments that you can add would be greatly appreciated. We would like to hear from you within a week if possible, however, if this is too short a space of time, please respond as soon as you are able. Thank you for your assistance.

Yours faithfully,

Tomayess Issa
Tomayess.Issa@cbs.curtin.edu.au
Lecturer
School of Information Systems – Curtin Business School
GPO Box U1987
Perth Western Australia 6845

Part 1: User Participation

This thesis distinguishes between two types of users: end-users (internal to the client organization) and client-customers users (external). End-users (Internal) are the real users in the client organization, who test and evaluate the website and use it to respond to the client-customer's queries. The client-customers users (external) are those who interact with this website to accomplish their goals

Please indicate your level of agreement with each statement:	***Strongly disagree***	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***
That only the top management should take part in the website development process to reduce conflicts.					
That only end-user should participate in evaluations during the website development process.					
That both types of users' "end-users and client-customers" should participate in the website development process.					
That both types of users' "end-users and client-customers" should participate from the beginning to the last stage in the website development process.					
That both types of users' "end-users and client-customers" should participate only in early stages in the website development process.					
That both types of users'" end-users and client-customers" should participate only at the last stages in the website development process.					
That user participation in the website development process will reduce the time in various stages such as in the testing, evaluation, implementation and training.					
That the level of user participation in website development process depends on the type of website and project budget.					
That more than four users participating in the website development process will produce too many different ideas and suggestions and it will be very hard for the designers to make a decision.					

Comments
Please add other comments on the role of user participation in the website development process.

Part 2: Real Interaction

Real Interaction means "*website hits; website use statistical or click tracking")*. The designer will track users' behavior to help understand what attracts or repel users. This can be achieved by adding two options to the web: 1) feedback form to elicit users' opinions; or 2) adding a counter to a webpage, which will provide detailed statistics (log file) to the designer.

Please indicate your level of agreement with each statement:	***Strongly disagree***	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***
That this facility (monitoring of real interaction) is very important in the website development process.					
That the industry should encourage their clients to use this facility in their websites to teach them the benefits behind it.					
That this facility will increase the client's profit.					
That this facility will attract more users to the website.					
That if adopting this facility in the website, clients should respond quickly to the users' comments.					
That Tuesday is the best day for assessing user behavior on websites.					

Comments
Please add other comments on the use of real interaction in the website development process.

Part 3: Usability and Human Computer Interaction

Usability: to confirm that the website design is efficient; effective; safe; has utility; is easy to learn; easy to remember; practical; provides job satisfaction; and to define performance measures that effectively assess the users requirements and requests.
Human Computer Interaction: HCI "*is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them*" (Preece et al. 1994, p.7).

Please indicate your level of agreement with each statement:	***Strongly disagree***	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***
That usability is a very important aspect of the website development process.					
That usability issues are very hard to work with it, especially with immature clients since it takes time and money to learn about the concepts behind it.					
That adopting usability principles in the website development process will increase the clients' profit.					
That adopting usability principles in the website development process will encourage client-customers users (external) to revisit the website.					
That Human Computer Interaction techniques should be part of the website development process since it is concerned with design, evaluation and implementation of interactive computer-based systems.					
That by adopting Human Computer Interaction techniques in the website development process the clients' profit will be increased.					
That usability and human computer interaction techniques should be part of website development process to improve the structure and functionality of a website.					

Comments
Please add other comments on the use of usability and human computer interaction in the website development process.

Part 4: Iteration

Iteration: use of prototypes to allow for evaluation of effectiveness - this approach will assist the designers to build up the new website and make sure that the project will be tested repeatedly until it meets user's requirements.

Please indicate your level of agreement with each statement:	***Strongly disagree***	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***
That iteration is a very important aspect in the website development process.					
That iteration should be available in each stage and step in the website development process.					
That adopting iteration in the website development process will ensure that the website meets the user (end-user and client-customer) requirements and company objectives.					

Comments
Please add comments on the use of iteration in the website development process.

Part 5: New Participative Methodology for Developing Websites, Integration and Contingent

This integrated methodology was created from basic concepts derived from: lifecycle models; IS development methodologies; methodologies with explicit human factors aspects; websites methodologies; marketing methodologies; and additional detailed techniques (i.e. task analysis and detailed website design and implementation). The main focus has been defining users' requirements and needs, planning, analysis, design, testing, implementation, evaluation and maintenance. These stages are very useful in any methodology as via them the designer will make sure that the system is running according to the needs of users and the client organization. The new integrated methodology needs to be "contingent" with analyst and client choosing the particular techniques, which suit the problem situation. For more information about the new methodology, please check the attached pdf file.

Please indicate your level of agreement with each statement:	***Strongly disagree***	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***
That this new methodology has all the necessary stages and steps which are needed to develop a website					
That this new methodology is very much a user-centered methodology					
That this new methodology specifies sufficiently all the stages and steps required					
That this new methodology would help you to develop a website successfully					
That this new methodology is practical and easy to work with					
That this new integrated methodology is contingent, which mean the analyst and client can choose the specific tools and techniques which suit the problem situation since every project has different requirements and needs					
That the appropriate website development methodology will depend on the particular type of project website, budget and client					

Comments

*Please add comments on the **New Participative Methodology for Developing Websites.***

*Please add comments on the role of **Contingency** in the website development process.*

Part 6: General Questions

The key results of the interview stage of the research project are summarized in this section, the researcher requests comments on these aspects for the new methodology.

Please indicate your level of agreement with each statement:	***Strongly disagree***	***Disagree***	***Neutral***	***Agree***	***Strongly Agree***
Evaluation (Usability) and Testing (Functionality)					
That evaluation (of Usability) and Testing (of Functionality) should be carried out at each stage of the website development process					
Feedback Tools					
That feedback tools should be available on the website to track user behaviors					
Cost Issue					
That the cost issue is the main concern for clients when choosing a methodology to develop a website					
Low Fidelity					
That low fidelity prototyping should be used in the website development methodology					
Project Review					
That project review steps should be available in your website development process					
That it is very important to review the website one week after going "live" to ensure it meets the project requirements					
CMS					
That Content Management Systems (CMS) is a very important aspect in website development					
That using Content Management Systems (CMS) in the website development process will reduce the time to update the website by the clients (following implementation)					

Low Fidelity Prototyping: "Involves the use of materials that are further away from the final version and that tend to be cheaper and faster to develop"(Preece et al. 1994 p.541).

How many low fidelity versions (design options) do you provide for your design if you are using low fidelity prototyping?

Do you use CMS in your website development? If yes Why? If No Why?

Comments
Please add comments regarding the issues raised above.

Part 7: Background Information

Please tick your highest education level :

1. Higher Secondary/Pre-University
2. Professional Certificate
3. Diploma
4. Advanced/Higher/Graduate Diploma
5. Bachelor's Degree
6. Post Graduate Diploma
7. Master's Degree
8. Doctorate (PhD)

Please tick your main field(s) of study:

1. Information Systems
2. Communications Technology
3. Computer Science
4. Multimedia
5. Graphics
6. Others – Please specify ……

If you would like to receive feedback regarding the questionnaire results please indicate this below.

I would like feedback from this questionnaire: Yes / No (*Please tick which applicable)*

Appendix F

Dear

I have now reached the second and final phase of my PhD research. This involves a questionnaire regarding website development methodologies, which has been informed by the results of the interviews conducted in Phase 1.

I would appreciate it if you can complete this questionnaire within a week if possible, however, if this is too short a space of time, please respond as soon as you are able. The questionnaire includes questions, which will help me to evaluate my new methodology. With this e-mail you will receive a PDF file containing information about my new methodology.

To complete the questionnaire please register yourself at https://134.7.75.116/gst/ and set a password (more information about registering please check the questionnaire_instructions document), after the registering please enter your details (your e-mail address and password) and the system will take to questionnaire Member Home page, please click on WebPhdTomayess link as this will enable you to fill in the questionnaire. Please make sure that you click on finish once you have completed the questionnaire.

If possible, could you please nominate staff from your organization who would also be willing to complete this questionnaire. Please e-mail me their full name and e-mail address, and I will forward all the necessary attachments to them.

Thank you in advance for taking time out of your busy day to complete the questionnaire for my PhD research. I will provide you with feedback on the questionnaire results.

Your interest and consideration are greatly appreciated. If you need any additional information from me, please let me know.

Thank you in advance.

Yours faithfully,

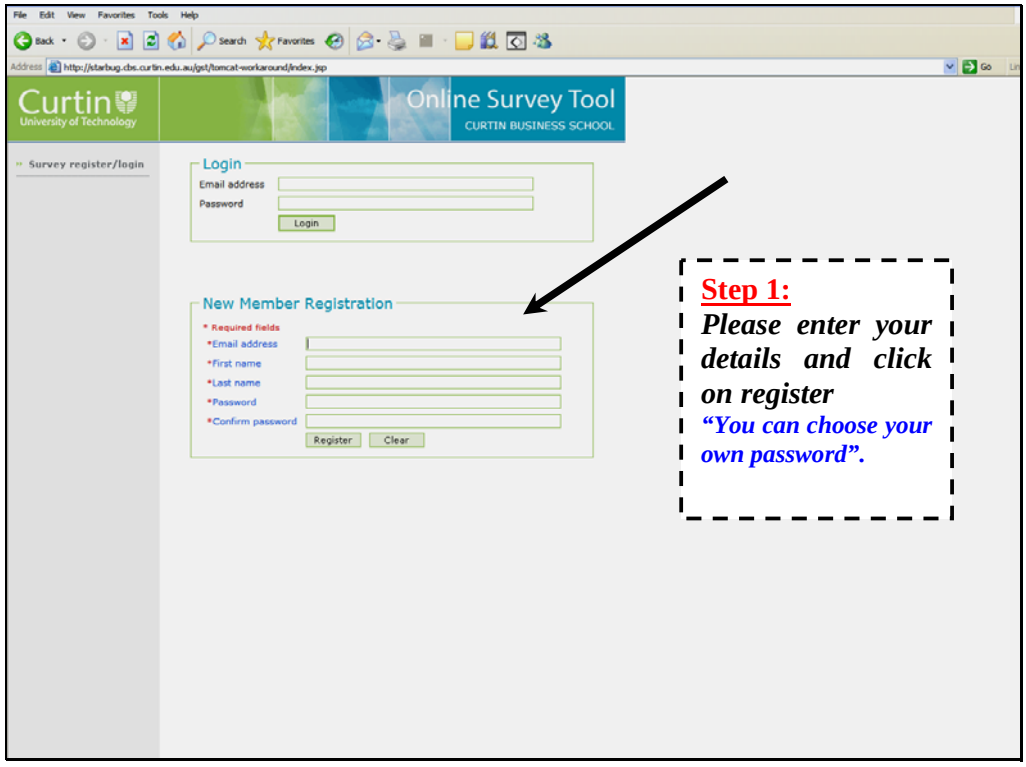
Tomayess Issa
Tomayess.Issa@cbs.curtin.edu.au
Lecturer
School of Information Systems – Curtin Business School
GPO Box U1987
Perth Western Australia 6845

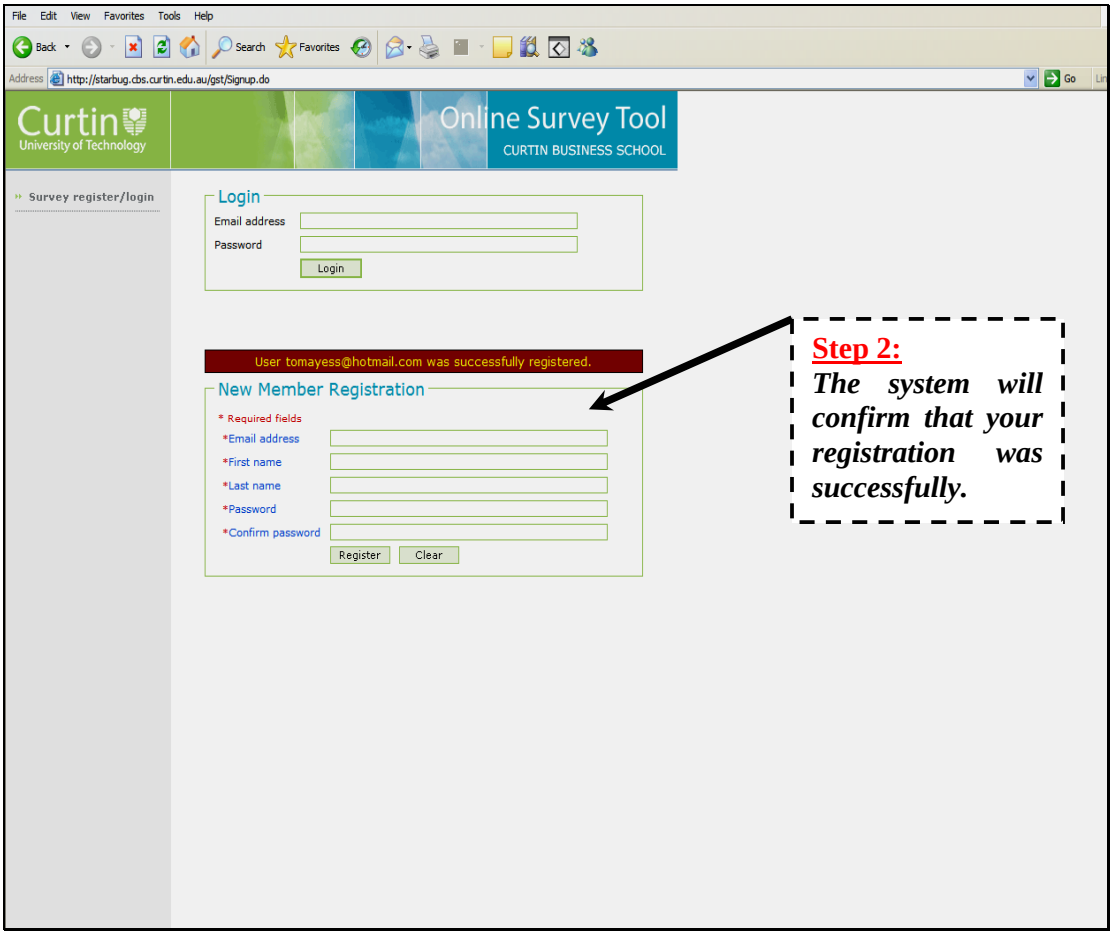
Appendix G

Tomayess Issa – PhD - School of Information Systems

Curtin University of Technology

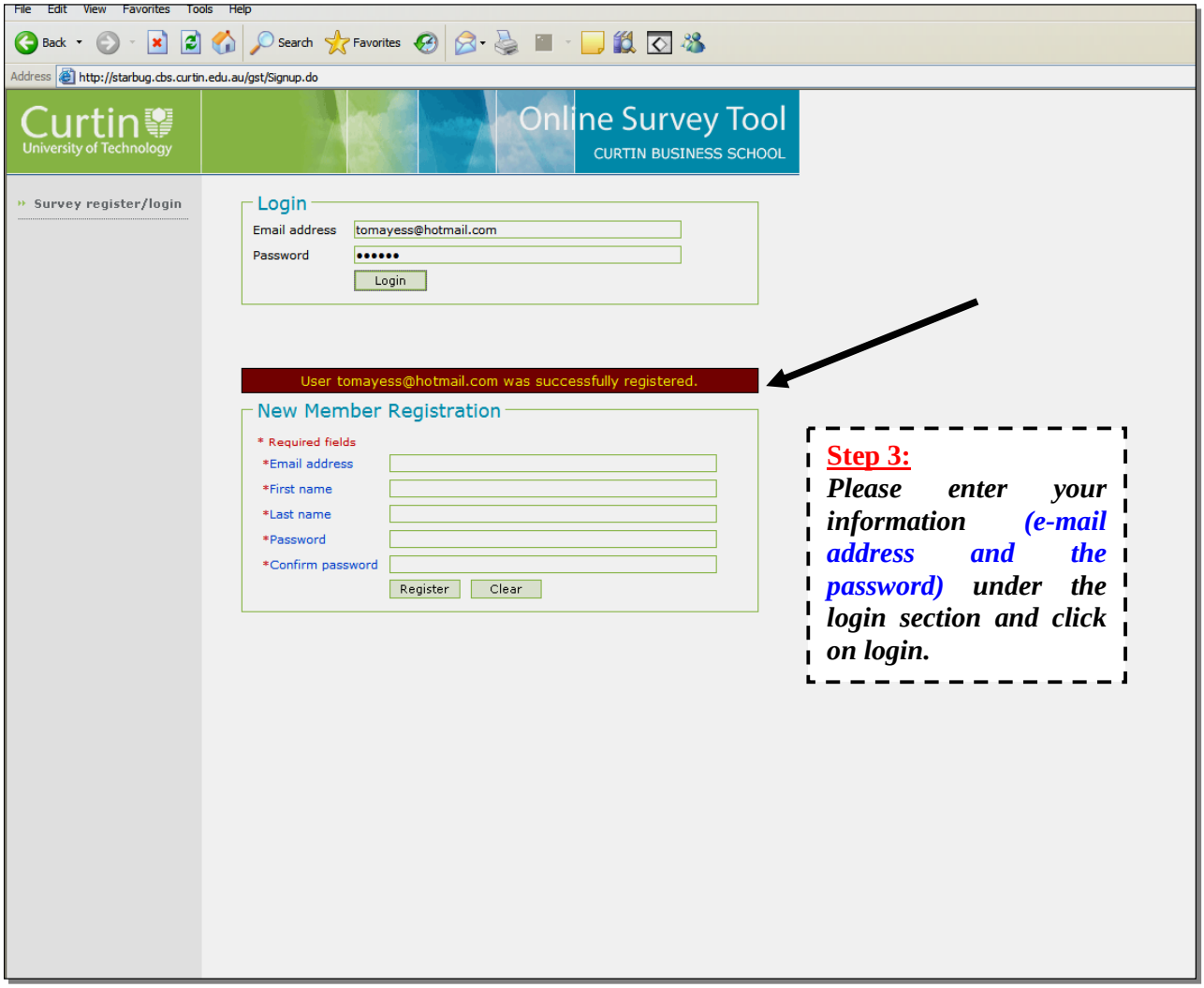
Questionnaire Instructions





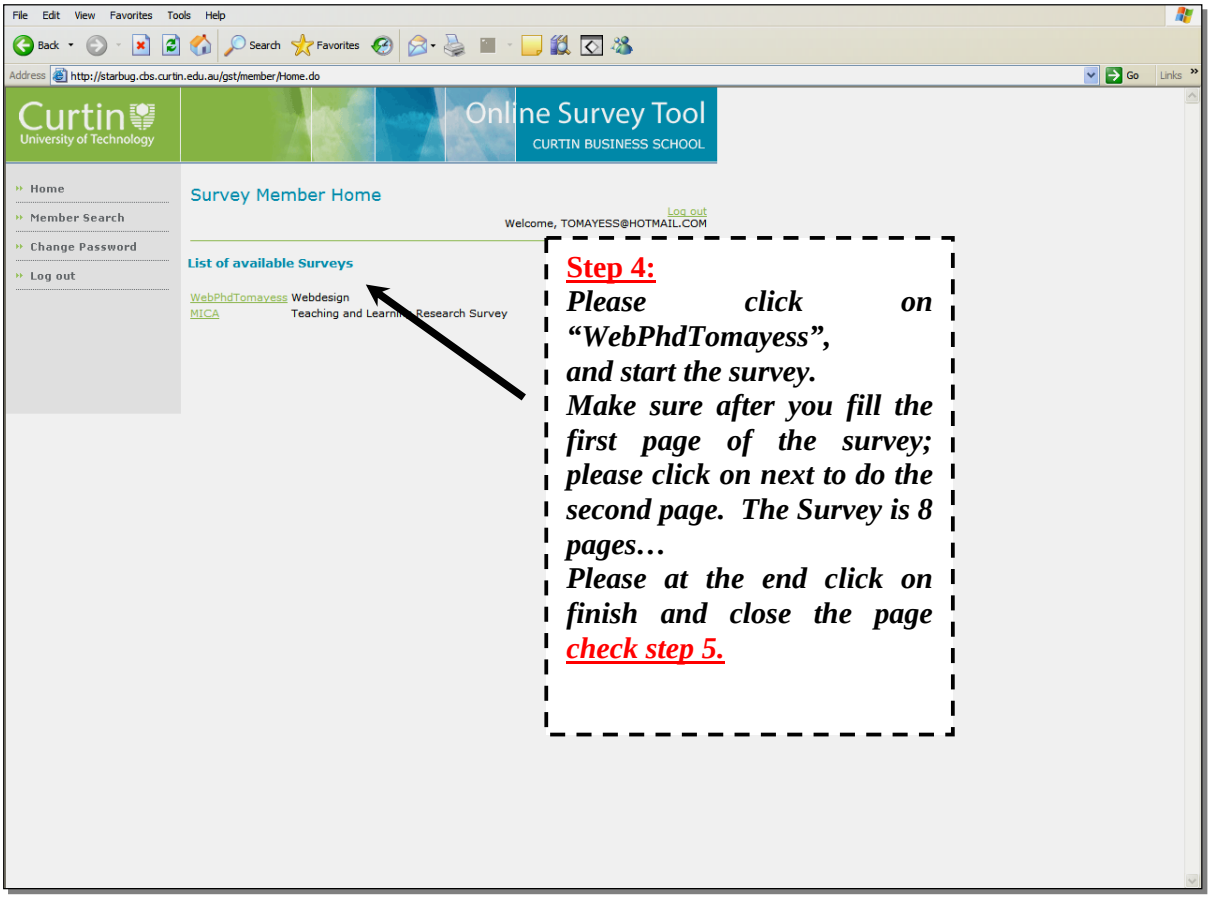
Step 2:

The system will confirm that your registration was successfully.



Step 3:

Please enter your information (e-mail address and the password) under the login section and click on login.

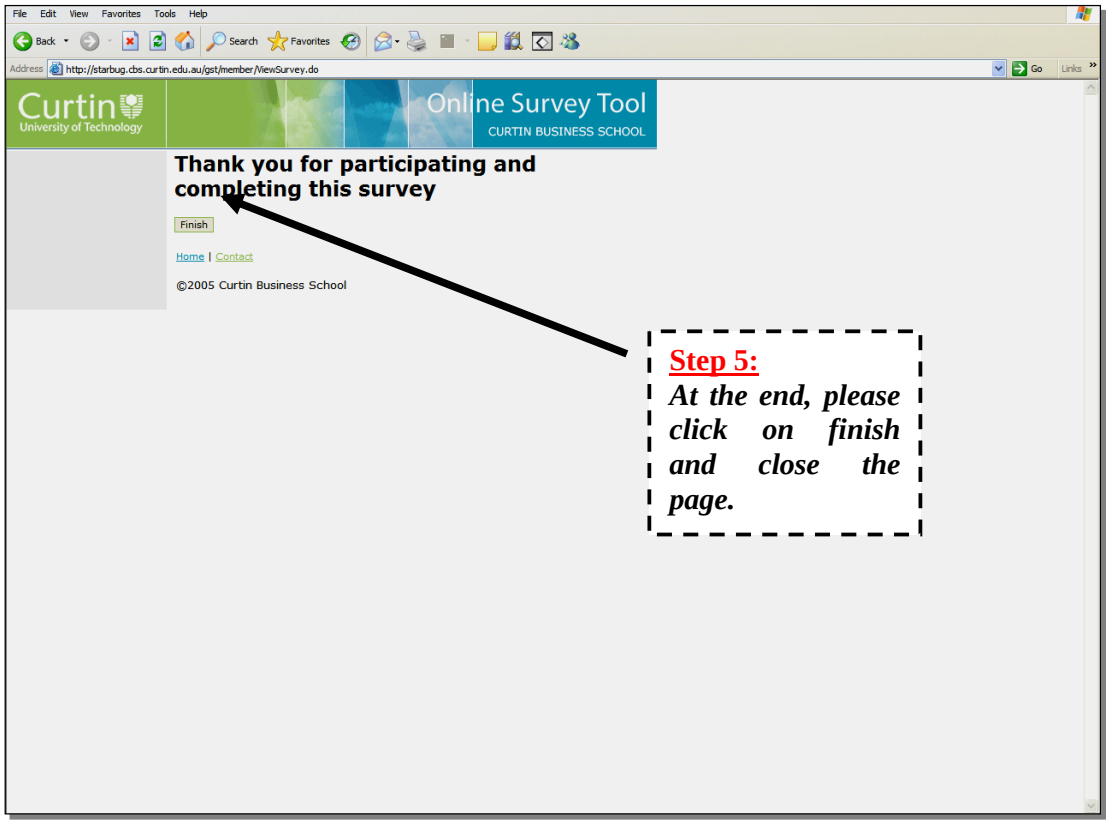


Step 4:

Please click on "WebPhdTomayess", and start the survey.

Make sure after you fill the first page of the survey; please click on next to do the second page. The Survey is 8 pages…

Please at the end click on finish and close the page check step 5.


File Edit View Favorites Tools Help
Back Search Favorites
Address http://starbug.cbs.curtin.edu.au/gst/member/ViewSurvey.do
Go Links
Curtin University of Technology
Online Survey Tool
CURTIN BUSINESS SCHOOL
Thank you for participating and completing this survey
Finish
Home | Contact
©2005 Curtin Business School
Step 5:
At the end, please click on finish and close the page.

Appendix H

Information to the Industry about the New Participative Methodology for Developing Websites

1- This integrated methodology was created from basic concepts derived from: lifecycle models, IS development methodologies, methodologies with explicit human factors aspects, websites methodologies, marketing methodologies, and additional detailed techniques (i.e. task analysis and detailed website design and implementation). The main focus has been on defining users' requirements and needs, planning, analysis, design, testing, implementation, evaluation and maintenance. These stages are very useful in any methodology as, via them, the designer will make sure that the system is running according to the needs of users and the client organization.

2- Four key principles (user participation, usability, iteration, and real interaction) were identified as fundamental aspects to develop systems in an effective manner. The four key principles are considered the main foundation for this research.

3- The integrated methodology needs to be "contingent" with analyst and client choosing the particular techniques, which suit the problem situation.

Figure 1 illustrates the stages and steps for the new participative methodology for developing websites. The figure was adapted from the Star Lifecycle model (Hix et al. 1993), as the usability evaluation and functionality testing stages are at the centre of the methodology. This will allow the designers and users to evaluate and test the results of each stage before moving to another stage. Prior to moving to the next stage, one needs to evaluate and test the previous stage to assess if users' requirements are met; if they are met, one may move to the next stage. If they are not

met, one can move to the next stage, if not, one needs to return to the previous stage. This process continues until the last stage in the new methodology.

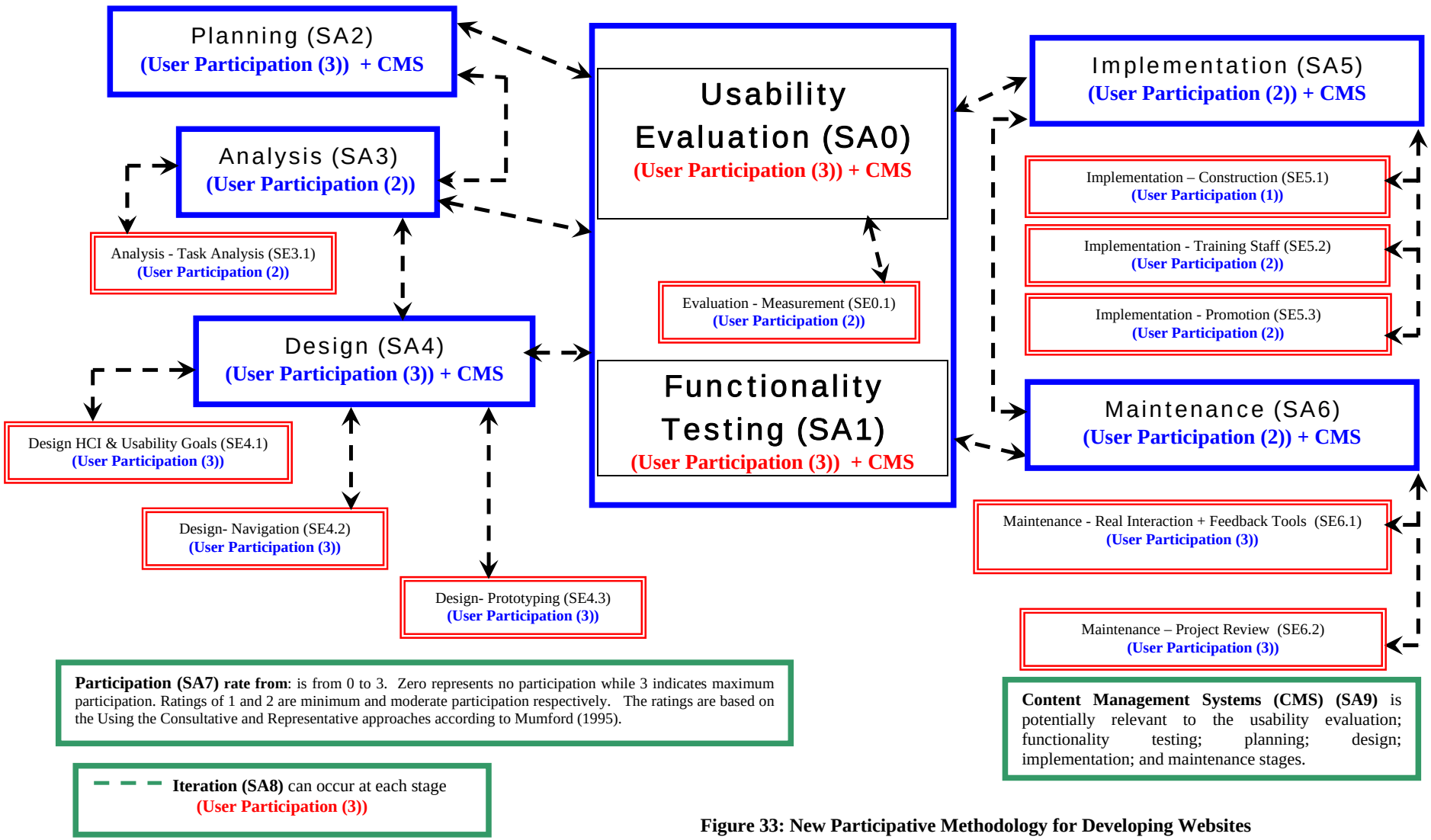


Figure 33: New Participative Methodology for Developing Websites

The major stages of the methodology may be described as follows:

0. **Usability Evaluation (SA0):** this stage is located at the center of the new methodology, as before moving to another stage, it is necessary to evaluate the results from the previous stage, which is known as "formative evaluation".

    0.1 Usability Evaluation – Measurement (SE0.1): this step is ongoing evaluation of the website to ensure it meets the website goals.

1. **Functionality Testing (SA1):** this stage is also located at the center of the new methodology (with the usability evaluation) to test the results from the previous stage before moving to another stage. Expert based and user based evaluations will test the website to ensure that the web site functions effectively in a technical sense.

2. **Planning (SA2):** this stage will allow the designer and users to address various project-scoping issues such as the requirements for developing a website; what is your product; who are the buyers; who are your competitors; where should the site be located; and how to promote your website. In addition, this stage involves developing a detailed schedule of activities required to carry out the development of the website in an efficient and effective manner.

3. **Analysis (SA3):** in this stage both users; analysts; and designers are expanding their findings into adequate detail to illustrate exactly what will and will not be built into the website design; and to add; improve; and correct the initial website requirements if they are not meeting the user's desires.

    3.1 Analysis - Task Analysis (SE3.1): this step will define the purpose of developing the website; users' type; the type of work users will do with the website; user's goals and their activities.

4. **Design (SA4):** the design stage will utilize the requirement specification from the previous stage to define: 1) what the website is; 2) how the website will work; 3) user involvement in decision-making; 4) future users; 5) usability requirements.

4.1 Design - HCI and Usability Goals (SE4.1)*:* this step will allow users (end-user and client-customer), analysts, and designers (internal and external) to confirm that the website design is efficient; effective; safe; has utility; is easy to learn; easy to remember and to evaluate ; practical; visible; and provides job satisfaction. There are many specific issues that need to be taken into consideration when designing website pages, such as text style, fonts, layout, graphics and color.

4.2 Design – Navigation (SE4.2): this step is to define the specific navigation paths through the website between the entities and to establish the communication between the interface and navigation in the hypermedia application.

4.3 Design – Prototyping (SE4.3): this step is essential in the website design process to allow users and management to interact with a prototype of the new website and to gain some experience in using it. This step will allow the management to reduce cost and increase quality through early testing.

5. **Implementation (SA5):** this stage involves the technical implementation of the website design. It will allow users to use the new product and to check if it meets their requirements.

5.1 Implementation – Construction (SE5.1): this step involves the technical implementation of the website design.

5.1 Implementation - Training Staff (SE5.2): this step will give necessary training to the staff about the new website.

5.2 Implementation – Promotion (SE5.3)**:** this step will use various tools such as: press releases, link building and banner-ad campaigns, paid search engine, directory listing campaigns, and traditional marketing (i.e. Newspaper; Radio and TV) to promote the website.

6. **Maintenance (SA6)**: this stage is the ongoing maintenance of the website including update changes and the correction of errors in the website.

   6.1 Maintenance - Real Interaction and Feedback Tools (SE6.1): under the maintenance stage, real interaction needs to be tracked by using the server log file. This information is very useful to the designers to improve and enhance the structure and the functionality of the website to encourage more users to visit it. In addition, feedback tools should be available on the website to allow the users to be able to contact the website owner for information or personal communication and to provide feedback about the website. For example, forms, survey, discussion forum, contact form, telephone number, and a prize should be available in the website to encourage the users to provide feedback about the website. The researcher recommended to prevent spam do not add the organization e-mail at the website

   6.2 Maintenance – Project Review (SE6.2): this step should be available to ensure that the website is working within the project goals. This means after putting the website online, the designers need to check the website after one week to evaluate if the website construction and structure are working according to the users needs and requirements. An example tool for the project review is checklists i.e. checklist for the goals and objectives; usability and technical requirements.

7. **User Participation (SA7):** this aspect is a very important concept in the methodology, as the main purpose is to allow user participation in the website development process to gain more information about the problems and alterative solutions from the users and to familiarize them with the system before it is released. For each stage there is a rating (from 0 to 3), which indicates the user participation in the development process.

8. **Iteration (SA8):** It occurred between each Stage and Step in the New Participative Methodology for Developing Websites to check that the website

does indeed meet users' (end-user and client-customer) requirements and company objectives before moving to another stage.

9. **Content Management Systems (CMS) (SA9):** this aspect is relevant to the usability evaluation; functionality testing; planning; design; implementation; and maintenance stages in the New Participative Methodology for Developing Websites. This tool will allow the users to manage the web contents by allowing them to add, edit, remove, and submit information by using various templates and workflows without any previous knowledge with the website editing tools.

In this new methodology, there are issues, tools and techniques for each stage and step (see Table 70), which need to be carried out by the designer in order to achieve a user-friendly website.

Stage *(& Step)*	Issues, Tools and Techniques
Usability Evaluation	o Formative usability evaluation by expert and user-based
Measurement	o *On going evaluation*
Functionality Testing	➢ Functionality testing by expert and user Based
Planning	➢ Define the objectives ➢ User requirements ➢ User analysis ➢ Cost-benefits analysis ➢ Alternatives and constraints ➢ What is your product? ➢ Who are the buyers? ➢ Who are your competitors? ➢ Where should it be located? ➢ How to promote your website?
Analysis	➢ To add, improve and correct the initial website requirements
Task Analysis	o *Define users' type, their work, goals and activities*
Design	To define: ➢ What the website is ➢ How the website will work to achieve the purpose behind using this website ➢ User involvement in decision making ➢ Future users
HCI and Usability goals	➢ *User usability – Web design should be* o *Efficient* o *Effective* o *Safe* o *Utility* o *Easy to learn* o *Easy to remember* o *Easy to evaluate* o *Usable* o *Practical* o *Visible* o *Job satisfaction* o *Extra techniques, text style, fonts, layout, graphics and color*
Navigation	o *Site, Layout, Link, Navigational Structure for the hypermedia Application*
Prototyping	o *High-Fidelity* o *Low –Fidelity*
Implementation	➢ Implementing the website using software
Construction	o *Technical Application (i.e. HTML, Dreamweaver; Cold Fusion and ASP)*
Training Staff	o *Necessary Training*
Promotion	o *Press Releases* o *Link building and banner-ad campaigns* o *Paid search engine* o *Directory listing campaigns to promote the website* o *Traditional Marketing (i.e. Newspaper; Radio and TV)*
Maintenance	➢ Update changes and the corrector of errors in the website
Real Interaction + Feedback	o *Log file* o *Forms, survey, discussion forum, contact form and telephone number*
Project Review	o *Checklists*

Table 70: Issues, Tools and techniques for the New Participative Methodology

Appendix I

Dear ….

Last week, I e-mailed you a request for your assistance with the second and final phase of my PhD research. Unfortunately, until now I have not received a response from you. I understand that your job is demanding and time is a precious commodity for you. That is why I greatly appreciate any time you can give toward completing your response to my email.

The questionnaire includes questions which will help me to evaluate my new methodology. With this e-mail you will receive a PDF file containing information about my new methodology.

To complete the questionnaire please register yourself at https://134.7.75.116/gst and choose your own password (for more information about registering please check the questionnaire instructions document). After registering, please enter your details (your e-mail address and your own password) and the system will take you to the Survey Member Home page, please click on WebPhdTomayess link as this will enable you to fill in the questionnaire. Please make sure that you click on finish once you have completed the questionnaire.

If possible, could you please nominate staff from your organization who would also be willing to complete this questionnaire. Please e-mail me their full name and e-mail address, and I will forward all the necessary attachments to them. My email address is Tomayess.Issa@cbs.curtin.edu.au

Thank you in advance for taking time out of your busy day to complete the questionnaire for my PhD research. I will provide you with feedback on the questionnaire results.

Your interest and consideration are greatly appreciated. If you need any additional information from me, please let me know.

Thank you in advance.

Yours faithfully,

Tomayess Issa
Tomayess.Issa@cbs.curtin.edu.au
Lecturer
School of Information Systems – Curtin Business School
GPO Box U1987
Perth Western Australia 6845

Appendix J

Part 1: User Participation

Participant	V1_1_UP	V1_2_UP	V1_3_UP	V1_4_UP	V1_5_UP	V1_6_UP	V1_7_UP	V1_8_UP	V1_9_UP
Company B	1	3	4	2	2	2	1	4	2
Company C	2	2	4	3	2	2	4	5	2
Company C	2	2	5	5	2	2	4	4	3
Company D	2	2	4	2	3	3	2	5	4
Company E	2	2	4	1	1	5	5	5	5
Company F	2	2	3	3	3	3	4	4	3
Company H	2	2	4	4	2	2	4	5	2
Company I	1	1	4	2	1	3	4	5	1
ISProf1	2	3	5	4	4	4	4	4	2
ISProf2	1	1	5	5	1	1	5	4	1
ISProf3	1	3	4	3	2	3	2	2	2
ISProf4	1	2	5	4	2	2	2	4	4
ISProf5	1	1	5	4	3	1	3	4	1
ISProf6	4	2	4	4	2	2	5	4	1
ISProf7	1	2	4	2	2	2	4	5	3
ISProf8	1	1	5	5	2	2	2	2	5

Mean	2	2	4	3	2	2	3	4	3
Standard Dev	0.81	0.68	0.60	1.25	0.81	1.03	1.26	0.96	1.36

Percentage

Agree/Strongly Agree	6		94	50	6	12.5	63	87.5	25
Neutral		19	6	19	19	25	6		19
Disagree/Strongly Disagree	94	81		31	75	62.5	31	12.5	56

Part 1: User Participation

Company D	*User participation is important for developing a website that is designed to meet the particular needs of a client, however the level of involvement greatly depends on the size of the company/organization, the budget for the website, the timeframe for the development of the website and any particular website requirements (e.g. reporting to the ASX, ecommerce, etc…). More complex websites will require a greater level of client involvement as the complex requirements of the client need to be accurately determined so that the website can be verified to be meeting those particular requirements. Small businesses with 1 or 2 employees will generally get everyone involved in the development of the website, while larger companies will assign representatives to speak on behalf of the company.*
Company E	*Only the top management should take part in the website development. They should/will have the ultimate decision making capacity but it's also worthwhile to have a trusted, experienced end-user involved from the beginning as top management seem generally not as well connected to the 'grass-roots' as the end-users.*
Company H	*Ideally, all websites will have a comprehensive iterative design cycle involving both what I call experts who have an understanding of heuristics (perhaps your "end-users") and client-customers, perhaps using cheaply built prototypes in early stages of the development cycle. However, if one of my clients wants a limited functionality website, they are more likely to want to pay for our knowledge of heuristics rather than spend money on user-testing.*
IS Professional 1	*Client-customers should participate more in early stages, end-users participate more at last stages. cheers..*
IS Professional 2	*That the level of user participation in website development process depends on the type of website and project budget. also depends on the type of users. In some cases, the users may not be available or able to be included. User participation is critical for the success of a web project.*
IS Professional 5	*User participation is critical to the success of a project. Internal business sponsors and users are critical to translating the strategic business vision into an implemented system. External users should participate at appropriate points in the life-cycle. They should be involved in evaluating and refining the visual prototype in the early phases of the project. After the prototype is refined during the requirements definition phase, external users should participate in validating functionality. The external users should then participate in pilot roll-out at the beginning of deployment.*

Part 2: Real Interaction

Participant	V2_1_RI	V2_2_RI	V2_3_RI	V2_4_RI	V2_5_RI	V2_6_RI
Company B	4	4	2	4	3	3
Company C	5	5	3	5	5	4
Company C	3	3	2	4	3	3
Company D	3	5	5	5	5	2
Company E	5	5	3	5	3	3
Company F	3	4	3	4	3	3
Company H	4	4	4	4	4	3
Company I	5	5	4	4	5	1
ISProf1	4	3	2	5	3	3
ISProf2	4	4	2	5	4	2
ISProf3	4	4	4	4	3	2
ISProf4	3	4	2	4	4	3
ISProf5	4	4	3	5	3	1
ISProf6	4	4	4	5	3	2
ISProf7	4	4	4	4	5	2
ISProf8	4	4	3	4	3	4

Mean	4	4	3	4	4	3
Standard Dev	0.68	0.62	0.96	0.51	0.87	0.89

Percentage

Agree/Strongly Agree	75	87.5	38	100	44	12.5
Neutral	25	12.5	31		56	43.75
Disagree/Strongly Disagree			31			43.75

Part 2: Real Interaction

Company B	*There's too much resistance to complete a feedback form. Usage stats provide accurate information - a form is a backup option.*
Company D	*As the analysis of website usage data cannot be performed until after the website has been deployed for some time, we include training on the use of the web based statistics package which is installed as a part of the clients' website. The real benefit of web usage data is in the ability to continually evaluate the structure of the website and find ways to improve the effectiveness based on how people are actually using it.*
Company H	*Log files tend to be more accurate, although don't take into account 'thinking aloud' evaluation. Log files show what users actually do, rather than what they think they do - both kinds of information are important.*
Company I	*Tuesday is where you get best conversion rates but it's not necessarily reflecting the behavior of the bulk of your visitors.*
IS Professional 2	*Any web statistics are only indicators of behavior. e.g. the reasons for spikes in usage cannot always be determined. It can often be more helpful for convincing internal management with regards to particular decisions on website prioritizing and management.*
IS Professional 4	*I don't feel that collecting web site statistics will add significantly more value to the development of a website. There is already a strong user involvement in the development process so there is no need to 'analyze' web hits etc, just ask it straight from the user.*
IS Professional 5	*This section assumes that there is an existing web site for which real interaction can be measured. This may not always be the case - esp. for new sites. A variety of methods should be used to gather input in the development process. This should include user surveys, ethnographic studies, competitor benchmarking, etc., in addition to real interaction measurement.*

Part 3: Usability and Human Computer Interaction

Participant	V3_1_UHCI	V3_2_UHCI	V3_3_UHCI	V3_4_UHCI	V3_5_UHCI	V3_6_UHCI	V3_7_UHCI
Company B	5	2	4	5	4	4	4
Company C	5	2	4	4	3	3	3
Company C	5	2	5	4	5	4	5
Company D	5	3	4	4	4	4	4
Company E	5	4	3	5	4	3	5
Company F	4	4	4	4	4	4	4
Company H	5	2	4	4	4		4
Company I	5	2	5	5	5	5	5
ISProf1	5	2	4	4	4	3	4
ISProf2	5	2	3	3	5	3	5
ISProf3	5	4	4	4	4	4	4
ISProf4	5	2	4	5	4	4	5
ISProf5	5	5	4	5	5	4	5
ISProf6	5	5	4	4	5	3	5
ISProf7	5	5	3	4	4	3	3
ISProf8	4	4	3	4	4	3	4

Mean	5	3	4	4	4	4	4
Standard Dev	0.34	1.26	0.62	0.58	0.58	0.63	0.70

Percentage

Agree/Strongly Agree	100	44	75	94	94	53	87.5
Neutral		6	25	6	6	47	12.5
Disagree/Strongly Disagree		50					

Part 3: Usability and Human Computer Interaction

Company D	*HCI is important to the successful design of a website, but your methodology does tend to skip over the design phase of the development. The HCI should be just one input to the design phase. The web has evolved into a rich visual medium and the visual design has much more importance than it has done in traditional software design.*
Company H	*Good HCI practices need to be put into practice, rather than just HCI fads. Solid understandings of HCI are often overlooked when new technologies or revisited technologies are distributed (e.g. AJAX), which break many user learned conventions.*
Company I	*Usability is a very important aspect of the website development process. Usability is a measure of a certain quality of a website.*
IS Professional 2	*Profit only increases if a site is both usable and useful. Profit increases when there is genuine value. However, it is possible to reduce profit by poor usability. Usability alone does not matter unless the website has value for the user.*
IS Professional 5	*While usability is very important, many other factors influence visits to the site and profitability.*

Part 4: Iteration

Participant	V4_1_IT	V4_2_IT	V4_3_IT
Company B	3	2	3
Company C	4	4	3
Company C	4	4	4
Company D	4	4	4
Company E	5	5	5
Company F	1	1	2
Company H	4	4	2
Company I	5	5	5
ISProf1	4	4	5
ISProf2	5	5	3
ISProf3	4	4	4
ISProf4	5	5	4
ISProf5	5	5	5
ISProf6	4	4	5
ISProf7	4	4	4
ISProf8	4	4	4

Mean	4	4	4
Standard Dev	1.00	1.095	1.025

Percentage

Agree/Strongly Agree	88	87.5	68.8
Neutral	6		18.8
Disagree/Strongly Disagree	6	12.5	12.5

Part 4: Iteration

Company D	*While iteration is important, the scope of the evaluation and changes needs to be clearly defined at each stage of the process and should become narrower, the further you are into the process.*
Company F	*Iteration (especially unbounded) can be VERY expensive. It just does not work for most clients that want a fixed price on their website development projects.*
Company H	*Iteration alone won't mean the website meets user requirements and company objectives - other factors come into play such as development methodologies. Some development methodologies (such as the STAR methodology) are too flexible and rely too heavily on iteration, whereas others (such as waterfall methodology) are too rigid and don't have iteration or end users incorporated at all. Web site objectives must be kept in mind at all times during the development cycle and revisited - iteration can have the effect of deviating away from those objectives."*
IS Professional 1	*Each iteration should be done within a generous amount of time gap so as to allow users getting a better feel of the web and can give a more honest feedback.*
IS Professional 2	*Iteration alone does not guarantee success. It is a contributing factor...*
IS Professional 4	*Iteration is like a double-edged sword. I think it is important to note that although it is always beneficial to have iteration as part of any methodology for development, it needs to have a sufficient balance with business needs, budget and schedule.*
IS Professional 5	*All modern system development methodologies such as RUP are based on iterative development.*

Part 5: New Participative Methodology for Developing Websites, Integration and Contingent

Participant	V5_1_New	V5_2_New	V5_3_New	V5_4_New	V5_5_New	V5_6_New	V5_7_New
Company B	4	3	3	4	3	4	4
Company C	4	4	4	4	3	4	4
Company C	4	4	4	4	3	3	5
Company D	4	4	4	4	4	4	5
Company E	5	4	5	4	3	3	5
Company F	3	3	2	3	2	3	4
Company H	3	4	4	2	3	3	4
Company I	3	3	3	3	3	3	3
ISProf1	4	4	4	4	4	4	4
ISProf2	3	4	2	3	2	4	4
ISProf3	4	2	4	4	4	3	4
ISProf4	4	5	4	4	2	4	4
ISProf5	2	4	3	4	3	3	5
ISProf6	3	4	3	3	2	3	5
ISProf7	3	4	4	4	3	4	4
ISProf8	4	4	4	4	4	4	5

Mean	4	4	4	4	3	4	4
Standard Dev	0.73	0.68	0.81	0.62	0.73	0.52	0.60

Percentage

Agree/Strongly Agree	56	75	62.5	69	25	50	94
Neutral	38	19	25	25	50	50	6
Disagree/Strongly Disagree	6	6	12.5	6	25		

Part 5: New Participative Methodology for Developing Websites, Integration and Contingent

Comments: New Participative Methodology for Developing Websites.

Company D	*The methodology presented is a very accurate reflection of the process that is required to develop an effective website. In the maintenance stage, I think that one week is not enough time to accurately determine if a website is operating effectively. The additional visitors generated by the marketing will not have had enough time to visit the site yet and the client will not yet be comfortable with analyzing usage patterns. We recommend that the client should be analyzing the web usage data themselves periodically and offer to do a fuller review of the website effectiveness at the end of the first year.*
Company E	*I find the flow chart very hard to follow. I would suggest that if Usability and Functionality are the centre piece that the illustration elements should radiate out from these centre two. The other element and their connecting arrows should circle around to indicate the cyclic natural and general direction of the workflow.*
Company F	*Starting point seems vague is it SA0, SA2, SA3 or SA3.1? ... I normally start at SA3.1 and then work from there. Not clear, where Functional Design comes in - it is loosely defined at SA4 but has no corresponding lower-level activity. SA6 is too technical for a methodology and can be achieved in a more comprehensive and business-focused manner with appropriate tools. Strongly disagree with spam comment. SA6.1 - one week is too little for most projects. SA8 - in principle I disagree with the concept of being able to return to any point of the methodology. There should be guidelines on how the methodology iterates. SA9 is not part of a methodology, it is part of a design.",” Whilst the concept of contingency sounds good, there needs to be the concept of commercial reality and commercial contract. Of course it is ideal to design the methodology for each project on a project by project basis (ref: ISO9000 "Project Execution Strategy") but given such an approach, it is likely that any variation to that will actually be a variation to the client contract and hence the issue of "what is the contract" may have more significance than website development methodology contingency.*
Company H	*Marketing professionals generally have less of a background in HCI concepts and website development methodologies, compared to website developers - marketers are (and should be) concerned with brand awareness and promotion, as opposed to usability and development methodologies. It is natural that the degree to which a team will adhere to a user evaluation will be dependent upon the problem situation. Development methodologies are generally in line with business practices - what staff members are available to evaluation, develop, analyze and integrate iterative results. What is the budget for each cycle and so on?*
IS Professional 2	*This is very difficult to judge without seeing it in action or having a case study or similar. It depends as well on the techniques used within each stage. It is also quite high-level, making it difficult to determine its effectiveness. It seems to be OK.*
IS Professional 4	*I feel that although this model does capture good web design principles in totality, it does seem more like it gets all good design methodologies and lumps them together into one. It is like a catch-all methodology which may be hard for some people to use, as they need to decipher what are the best tools and techniques to use. This therefore leaves the 'success' of this methodology to experience rather than strong concept.*
IS Professional 5	*The method appears to apply for the development of a small to mid-size content focused website with a relatively small team of people and not too large scale transactional websites. Project startup activities do not account for setting up the appropriate project organization to deliver large scale websites. In additional to user interface prototyping, it is essential to do Architecture Proof of Concepts to validate proposed system architecture in the case of large transactional sites; if the web site is based on proven products and limited to things such as content, this may not be as important. Testing - (Integration, Functional, Performance, User Acceptance, etc.) - seems to be completely missing.*

Part 5: New Participative Methodology for Developing Websites, Integration and Contingent

Comments: *the role of* ***Contingency*** *in the website development process*

Company D	*The details of how to perform each stage are not included in this methodology, which is good as it is best to leave that to a technical expert (designer, programmer) to evaluate based on the particular requirements. Also, typically the amount of iteration and client involvement will vary from client to client based on budget and other constraints*
Company F	*Whilst the concept of contingency sounds good there needs to be the concept of commercial reality and commercial contract. Of course it is ideal to design the methodology for each project on a project by project basis (ref: ISO9000 "Project Execution Strategy") but given such an approach it is likely that any variation to that will actually be a variation to the client contract and hence the issue of "what is the contract" may have more significance than website development methodology contingency.*
Company H	*It is natural that the degree to which a team will adhere to a user evaluation will be dependent upon the problem situation. Development methodologies are generally inline with business practices - what staff members are available to evaluation, develop, analyze and integrate iterative results. What is the budget for each cycle and so on?*
IS Professional 2	*It is essential to be able to determine the factors that a development is contingent upon. Contingency is important provided that good decisions can be made and acted upon to respond to the different circumstances.*

Part 6: General Questions

Participant	V6_1_Eval	V6_2_Feedback	V6_3_Cost	V6_4_Low	V6_5_ProRev	V6_6_ProRev	V6_7_CMS	V6_8_CMS
Company B	3	4	4	5	4	4	5	5
Company C	4	5	2	3	4	5	5	5
Company C	4	4	4	4	4	5	5	5
Company D	2	4	5	5	4	2	5	5
Company E	5	4	4	5	4	4	5	5
Company F	2	2	3	4	4	2	3	4
Company H	2	2	5	4	4	3	5	5
Company I	2	5	2	4	5	1	1	5
ISProf1	4	4	4	4	4	4	4	3
ISProf2	4	4	1	5	5	5	5	5
ISProf3	4	5	2	2	4	4	4	4
ISProf4	4	4	5	4	4	4	4	5
ISProf5	5	5	4	4	5	3	3	4
ISProf6	4	4	5	4	4	5	4	5
ISProf7	5	4	4	2	5	5	4	4
ISProf8	3	4	4	3	4	4	4	4

Mean	4	4	4	4	4	4	4	5
Standard Dev	1.09	0.89	1.26	0.96	0.45	1.24	1.09	0.63

Percentage

Agree/Strongly Agree	62.5	87.5	69	75	100	68.75	81	94
Neutral	12.5		6	12.5		12.5	13	6
Disagree/Strongly Disagree	25	12.5	25	12.5		18.75	6	

Part 6: General Questions

How many low fidelity versions (design options) do you provide for your design if you are using low fidelity prototyping?

Company C	*3, usually 2 have some strong similarities while the 3rd tends to be fairly different, even just to identify what they client does NOT like as well as what they do like.*
Company D	*3 (Static images representing the website designs)*
Company H	*Usually two, if not three. However, for smaller projects the LFPs are usually tested on the clients and not end users (external), as budgets generally dictate this area. Clients are also aware of what their end users are looking for.*
Company I	*Different numbers for different projects.*
IS Professional 2	*As many as are necessary. Generally between 2 and 12. Some systems are quite constrained, so there may little latitude to develop many options.*
IS Professional 3	*Multiple*
IS Professional 5	*Low fidelity options are used during the Requirements phase to rapidly prototype various options based on participant feedback.*

Part 6: General Questions

Do you use CMS in your website development? If yes Why? If No Why?

Company C	*Absolutely. A properly usable system with documentation and a trained client will save heaps of time and costs.*
Company C	*Easy to update, less time consuming, reduces repetition.*
Company D	*The most important benefit of a Content Management System is that it separates the process of design of a website from the content creation process. The information is the most important component of a website, and the best person to write the information is in most cases not going to be the designer. For a website to become a useful tool for customers, it needs to have lots of relevant information that is updated frequently. By using a content management system, the relevant content author can put up a lot of high quality information that will attract visitors to the site, without having to learn any skills in web programming or design. If a content author cannot update their own content without getting a designer involved, the website will quickly be come stagnant and outdated. Content Management Systems also provide other benefits including richer interactivity (forums, online calendars, online product catalogues, feedback tools), approval processes for content (workflow), future proofing of content (export to XML), searching, restricted access based on permissions, reporting and ecommerce.*
Company E	*Yes. Regularly updated content is the highest priority for a successful web site. Facilitating easy and fast updates for all content contributors, (a CMS) naturally becomes the next step.*
Company F	*Yes -- helps to reduce total project cost, provides clients with significant functionality at affordable cost and provides many web friendly" features that are otherwise expensive"*
Company H	*Yes, to give clients content control over their site. Static sites are less acceptable now - users want current, useful information and it is more likely the client will be able to provide that. The quicker a client can update their site, the more likely*
Company I	*For those that require it, yes. Reasons are obvious, I'd hope. Some sites do not require clients to update anything ever, and thus these sites won't bother with a readymade or custom made CMS.*
IS Professional 2	*Yes. For ongoing maintenance, consistency in the look and feel, for integration with other systems in the organization, for rigorous configuration management of the content. CMSs generally also allow some form of workflow and user security.*
IS Professional 4	*Yes - it is easier to maintain - more cost effective to develop post release material.*
IS Professional 5	*For web sites that are used to publish content, CMS is appropriate. For transactional sites, CMS may or may not be important.*
IS Professional 6	*Yes. It speeds up the organization of and publication of contents to the site.*
IS Professional 8	*Yes helps with scope of information.*

Part 6: General Questions

Please add comments regarding the issues raised in Part 6

Company D	*"That evaluation (of Usability) and Testing (of Functionality) should be carried out at each stage of the website development process" I do not think that this is practical at all stages of the development process. It should probably be Usability OR Functionality at each stage as each stage generally deals with either the design (requires evaluation of Usability) or the implementation (requires testing of Functionality).*
Company F	*Clients would rarely choose a methodology - they choose a provider and the provider chooses a methodology. One week is too short. CMS may not be a component of all websites.*
IS Professional 2	*CMSs generally also allow some form of workflow and user security.* *Cost is the often-cited driver, but most organizations are embarking on a website/system for other reasons. Cost is not the most important*
IS Professional 5	*Why review only one week after deployment? Reviews have to be continuous.*